

# UNIVERSITY OF HAWAI‘I SYSTEM

## ANNUAL REPORT



REPORT TO THE 2008 LEGISLATURE

Final Report on  
Making an Appropriation for Energy Efficient Transportation Strategies

Act 254  
Session Laws of Hawai'i 2007

February 2008



# State of Hawaii Energy Efficiency in Transportation Strategies Study- Phase I

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COLLEGE OF SOCIAL SCIENCES

HAWAII ENERGY POLICY FORUM

UNIVERSITY OF HAWAI'I AT MĀNOA

# State of Hawaii Energy Efficiency in Transportation Strategies Study - Phase I

By  
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With assistance of PB Consult, and Parsons Brinckerhoff Quade & Douglas

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# Table of Contents

EXECUTIVE SUMMARY .....	1
1.0 INTRODUCTION AND BACKGROUND .....	3
1.1 Act 254 Directives .....	3
1.2 Energy Efficiency in Transportation Strategies Working Group.....	4
1.3 Overview of Report.....	6
2.0 ENERGY CONSUMPTION IN THE TRANSPORTATION SECTOR.....	6
2.1 Energy and Transportation in Hawaii.....	6
2.2 Gasoline and Diesel Demand .....	7
2.3 Population and Vehicles.....	8
2.4 Historical and Projected Gasoline Demand .....	9
3.0 OVERVIEW OF STATE, REGIONAL, AND LOCAL PLANS .....	9
3.1 Overview .....	9
3.2 Plans and Documents Reviewed .....	10
3.3 Energy Efficiency-Related Goals and Policies.....	10
4.0 ENERGY EFFICIENCY STRATEGIES FROM OTHER JURISDICTIONS.....	11
5.0 ENERGY EFFICIENCY IN TRANSPORTATION: GOALS AND BENCHMARKS.....	12
5.1 Current/Existing State Goals.....	12
5.2 Preliminary List of Goals and Strategies .....	12
5.3 Examples of Potential Benchmarks.....	14
6.0 NEXT STEPS AND RECOMMENDED ACTIONS.....	15
6.1 Determine Goals and Benchmarks.....	15
6.2 Identify Data Needed to Measure Performance.....	15
6.3 Develop Energy Efficiency Information and Monitoring System.....	17
6.4 Near-Term Legislative Proposal: Statewide Transportation Sector Energy Efficiency Information and Monitoring System.....	18
6.5 Future Strategies and Legislation.....	18

7.0 APPENDICES

I	Act 254 (SLH 2007), Making an Appropriation for Energy Efficient Transportation Strategies.....	i
II	List of Working Group Members.....	iv
III	Related Data on Energy Consumption .....	v
IV	Plans and Documents Reviewed.....	xii
V	Strategies from Other Jurisdictions: Modes of Travel.....	xxii
VI	Strategies from Other Jurisdictions: Fuel Efficient Vehicles.....	xxvii
VII	Strategies from Other Jurisdictions: Alternative Fuels.....	xxx
VIII	Draft Legislative Proposal and Budget for the 2008 Legislature.....	xxxii
IX	Legislative Initiatives from Other Jurisdictions.....	xl

# State of Hawaii Energy Efficiency in Transportation Strategies Study Phase I

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## Executive Summary

In response to Act 254, 2007 Session Laws of Hawaii, the Hawaii Energy Policy Forum (“Forum”) at the University of Hawaii at Manoa conducted a study on energy-efficient transportation strategies to reduce the demand for fuel in Hawaii’s transportation sector and, in so doing, reduce Hawaii’s dependence on imported fossil fuel. The study, conducted in conjunction with the State Department of Business, Economic Development & Tourism (“DBEDT”) included consideration of the following:

- (1) Developing tangible goals, objectives, desired outcomes, and actions to implement an energy-efficient transportation strategy;
- (2) Developing implementation benchmarks for measuring outcomes of energy-efficient transportation strategies; and
- (3) Conducting a cost-benefit analysis of each energy-efficient transportation strategy.

The Forum convened a steering committee to plan the scope of the work and identify the major stakeholders that should be participants in this challenging yet significant undertaking. Invited representatives from business, labor, academia, and government included state, county and Metropolitan Planning Organization transportation planners, state energy and Native Hawaiian agency officials, utility and petroleum company executives, and automobile dealer and manufacturer industry advocates. These members comprise the Energy Efficiency in Transportation Strategies Working Group (“Working Group”).

After much discussion, the Working Group decided to initially focus on energy efficiency in ground transportation and developed the following consensual vision of “an energy efficient transportation system”:

“Hawaii’s energy efficient transportation integrates effective community input and planning (demand), and offers people of all ages and walks of life flexible options (supply) including mass transit, private and public vehicles and self-powered conveyance in alternative combinations that provide mobility at acceptable cost”.

With a short time frame and ambitious scope of work outlined in Act 254, the Working Group has met monthly since its inception. During this period the Working Group established three goals on which the study would focus its efforts:

- (1) Increase choices for modes of travel
- (2) Increase fuel efficiency of vehicle population
- (3) Diversify energy sources available to meet transportation energy needs

One of the major findings of the Working Group is that there is a lack of data upon which to establish goals and to track progress in meeting those goals. In their review of their existing data, Working Group members found significant gaps in the types of data needed to assess energy efficiency in transportation, and the lack of coordination among agencies in the collection and use of energy-related data. Thus, while there is a vast storehouse of data being collected throughout the State, these are fragmented, scattered, and not in usable format. Additionally, there is no systematic means for bringing energy-relevant data together. As a consequence, the potential impact of current or future energy-efficient initiatives or practices in meeting goals or benchmarks cannot be fully evaluated.

Because of the importance of developing energy-efficiency policies and practices in transportation and the potential cost of these actions, it is imperative that the State invest in collecting and analyzing the necessary data to make sound policy decisions.

More specifically, in order to agree upon specific transportation energy efficiency benchmarks and goals for the State, as required in Act 254, additional information such as transportation demand and fuel consumption data from the State and county jurisdictions and their respective government agency sources must be obtained. Specific data on transportation energy demand and supply from business and commercial sources should also be integrated. Finally, in order to develop realistic and achievable performance improvement goals and benchmarks, the data should be analyzed to develop (1) a historical trend, (2) a baseline forecast, and (3) a set of scenarios for potential future patterns of transportation energy consumption.

The State will more likely meet its goals and make progress toward meeting long-term benchmarks if current information on transportation system energy efficiency is regularly available and changes in energy efficiency of the transportation sector are regularly monitored. Regular monitoring can enable the State and counties to have confidence that implemented strategies are proving effective. If the information and monitoring indicates that additional progress is needed, the State and counties can adjust infrastructure investment and other strategies as appropriate.

Finally, the Working Group agreed that in order to regularly monitor progress toward meeting the benchmarks that would be recommended, a statewide

*transportation sector energy efficiency information and monitoring system* should be established and maintained. The information and monitoring system would be designed to provide consistent and scientifically reliable information on transportation energy consumption and supply trends and provide feedback on progress in meeting the goals and benchmarks that the State agrees upon. The transportation energy information and monitoring system would provide a more reliable means to compare the cost-effectiveness of alternative strategies.

While the Working Group has made significant progress in terms of bringing together a broad cross-section of energy and transportation stakeholders and in identifying major gaps in data and coordination needed to achieve an energy-efficient transportation system for the State, it requires the necessary data and commitment for coordinated data gathering and analysis.

Due in large measure to the enthusiasm and commitment of its diverse members, the Working Group is unified in its dedication to develop a comprehensive energy-efficient transportation strategy for the State, and therefore recommends that the 2008 Legislature appropriate funds in the amount of \$175,000 to continue its efforts, more specifically: (1) to determine data available among government and business sources; (2) identify gaps in critical data; and (3) develop and test models leading to the establishment of a reasonable and workable plan for a statewide transportation energy information and monitoring system.

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## **1.0 Introduction and Background**

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### **1.1 Act 254 Directives**

Act 254, Session Laws of Hawaii (SLH) 2007, directed the Hawaii Energy Policy Forum at the University of Hawaii at Manoa (“Forum”) to conduct a study on energy-efficient transportation strategies to reduce the demand for fuel in Hawaii’s transportation sector. The Act tasked the Forum in conjunction with the State Department of Business, Economic Development, and Tourism (DBEDT) to conduct the study. Requirements of the study include the following:

- (1) Developing tangible goals, objectives, desired outcomes, and actions to implement an energy-efficient transportation strategy;
- (2) Developing implementation benchmarks for measuring outcomes of energy-efficient transportation strategies; and
- (3) Conducting a cost-benefit analysis of each energy-efficient transportation strategy.



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## 1.2 Energy Efficiency in Transportation Strategies Working Group

The Forum convened a steering committee to plan the scope of work and identify the major stakeholders that should be participants in this challenging yet significant undertaking.

The Forum then established a working group comprised of state and county government, academia, business, labor, and community leaders to assist in preparing the study. It invited representatives from the State Department of Transportation (DOT), each county's transportation division, labor organizations, transportation planning organizations, petroleum companies, and from the automobile dealers and manufacturers industries. These members comprise the Energy Efficiency in Transportation Strategy Working Group ("Working Group"); see Appendix II for a list of Working Group members. From its first meeting in August 2007 through the writing of this report, the Working Group met four times and worked with the consultant<sup>1</sup> and the Forum during this period.

At the first Working Group meeting, DBEDT gave a presentation on the background of energy use in Hawaii. The presentation included information on Hawaii's petroleum consumption by various sectors, the fuel demand for Hawaii's ground transportation sector, the annual average gallons of fuel used per registered vehicle, the relationship between crude oil prices and gasoline prices, and transportation use projections.

The presentation highlighted that:

- 1) Transportation fuel is a necessary resource for the State of Hawaii;
- 2) Global factors affect transportation fuel supply and price;
- 3) Transportation system and vehicle efficiency could promote energy efficiency and moderate the growth in transportation fuel demand; and
- 4) There is a need to identify types of data and to quantify the energy consumption impacts of transportation alternatives.

After carefully reviewing DBEDT's presentation, the Working Group decided to first focus its efforts on energy efficiency in ground transportation for the State of Hawaii.

The Working Group consensually developed a vision of "an energy efficient transportation system" as follows:

"Hawaii's energy efficient transportation integrates effective community input and planning (demand), and offers people of all ages and walks of life flexible options (supply), including mass transit, private and public vehicles,

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<sup>1</sup> The Forum contracted with Dr. Lewison Lem and Kathleen Leotta of PB Consult, Parson Brinckerhoff, Quade & Douglas, Inc. to assist in developing preliminary strategies to develop goals and benchmarks for an energy efficient transportation system.

and self-powered conveyance in alternative combinations that provide mobility at acceptable cost.”

The Working Group also discussed the timeless intention to act upon the vision. A number of the driving forces to support the work on the vision and resulting goals were suggested as provided below:

- Create more sustainable transportation systems.
- Improve the energy efficiency of the transportation system while still protecting mobility and choice.
- Increase fuel security.
- Reduce carbon emissions.
- Transform Hawaii into an energy transportation paradise.

The Working Group also unanimously agreed upon the following preliminary goals to advance energy efficient strategies and reduce the intensity and waste in energy of our transportation systems:

1. Increase choices for modes of travel

Multiple modes of travel permit greater public choice for efficient and flexible trip planning.

2. Increase fuel efficiency of vehicle population

Incentives to improve the fuel efficiency of Hawaii’s vehicle population will influence consumer behavior in favor of buying and using more efficient vehicles.

3. Diversify energy sources available to meet transportation energy needs

Greater diversity of energy sources provides additional flexibility in meeting the energy needs of the transportation sector.

Any strategies to meet the above goals must also consider and evaluate socially acceptable economic consequences and cost-effectiveness.

Most of the Working Group’s attention focused on the first two goals, since they were seen as having a direct impact upon the energy efficiency of the transportation system. The third goal was being addressed by other activities of DBEDT.

As a result, the Working Group agreed that the most promising and important means for the State of Hawaii to improve the energy efficiency of its transportation system was through increases in transportation choices and increases in the fuel efficiency of the motor vehicle fleet within the state. The Working Group began

deliberations on a number of different strategies to meet the above goals. The discussion to date is provided in section 5.2.

The Working Group agreed that it was premature to develop specific goals, objectives and benchmarks without first identifying baseline performance. Members sought energy-related data from their respective agencies but found that data were not available yet crucial to this effort. The consultant sought and shared information from other jurisdictions (see Section 5.3), but the need for baseline information and a coordinated data collection and analytical system was the focus of the remaining meetings. The discussion and recommendations are detailed in Section 6.

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### **1.3 Overview of Report**

This report summarizes the findings of the Working Group's study, and is organized into the following sections:

1. Introduction and Background
2. Energy Consumption in the Transportation Sector
3. Overview of State, Regional, and Local Plans
4. Overview of Transportation Energy Efficiency Strategies from Other Jurisdictions
5. Energy Efficiency in Transportation: Goals and Benchmarks
6. Next Steps and Recommended Actions

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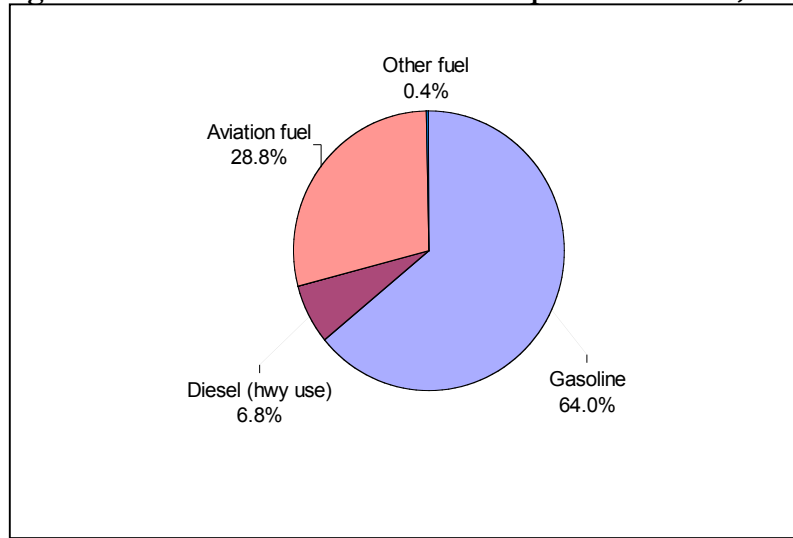
## **2.0 Energy Consumption in the Transportation Sector**

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### **2.1 Energy and Transportation in Hawaii**

Hawaii's ground transportation sector is responsible for the consumption of about 71 percent of Hawaii's transportation fuel use (see Figure 1). It also is most subject to influence by public policy at the State level. The Working Group therefore agreed to focus on ground transportation.

**Figure 1. Hawaii In-State Use of Transportation Fuels, 2007**

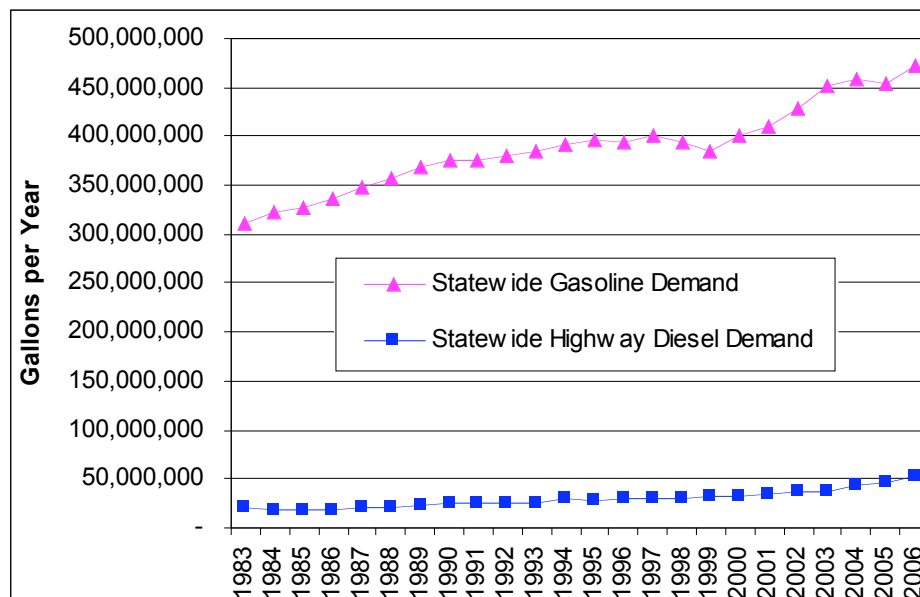


Source: Fuel Tax Records, Department of Taxation, State of Hawaii

## 2.2 Gasoline and Diesel Demand

Gasoline and diesel consumption in the state has, for the most part, steadily increased since the early 1980s (see Figure 2). Figure 2 also shows the relative consumption of gasoline versus diesel, with the consumption of gasoline, unsurprisingly, much higher than diesel.

**Figure 2. Statewide Trend in Gasoline and Diesel Demand**



Source: Strategic Industries Division, DBEDT, based on Department of Taxation Data, State of Hawaii

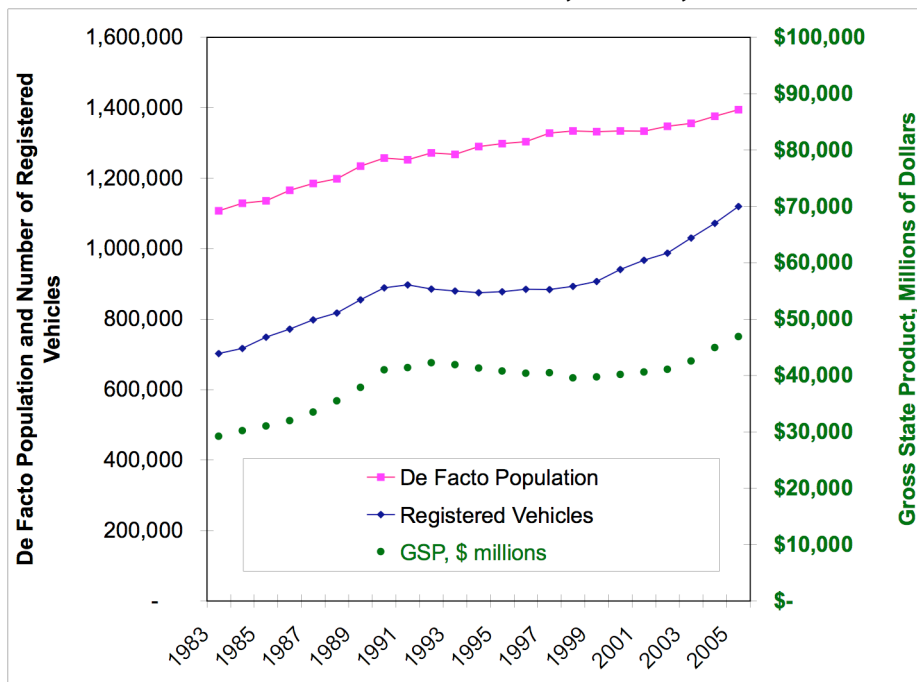
The annual change in gasoline has ranged from -3 percent to +5 percent between 1983 and 2006, with an average annual change of +1.8 percent. With gasoline now selling for about \$3.40 a gallon, this level of consumption now represents a cost of about \$1.6 billion a year.

The annual change in diesel demand fluctuates much more than gasoline, ranging from -17 percent to +19 percent, with an average annual change of +4.23 percent. In total, Hawaii consumed about 525 million gallons of gasoline and diesel in 2006 for ground transportation. For more detail on energy consumption and transportation, see Appendix III.

### 2.3 Population and Vehicles

Hawaii's de facto population and the number of registered vehicles in Hawaii are both increasing, as shown in Figure 3. Between 1983 and 2005, the number of registered vehicles increased 59%, significantly more than the 26% increase in population over the same period. Also shown in Figure 3 is the change in gross state product (61%) over the same period, including the economic downturn in the 1990s and recovery beginning in 1999.

**Figure 3. De Facto Population, Registered Vehicles, and Gross State Product, Hawaii, 1983-2005**



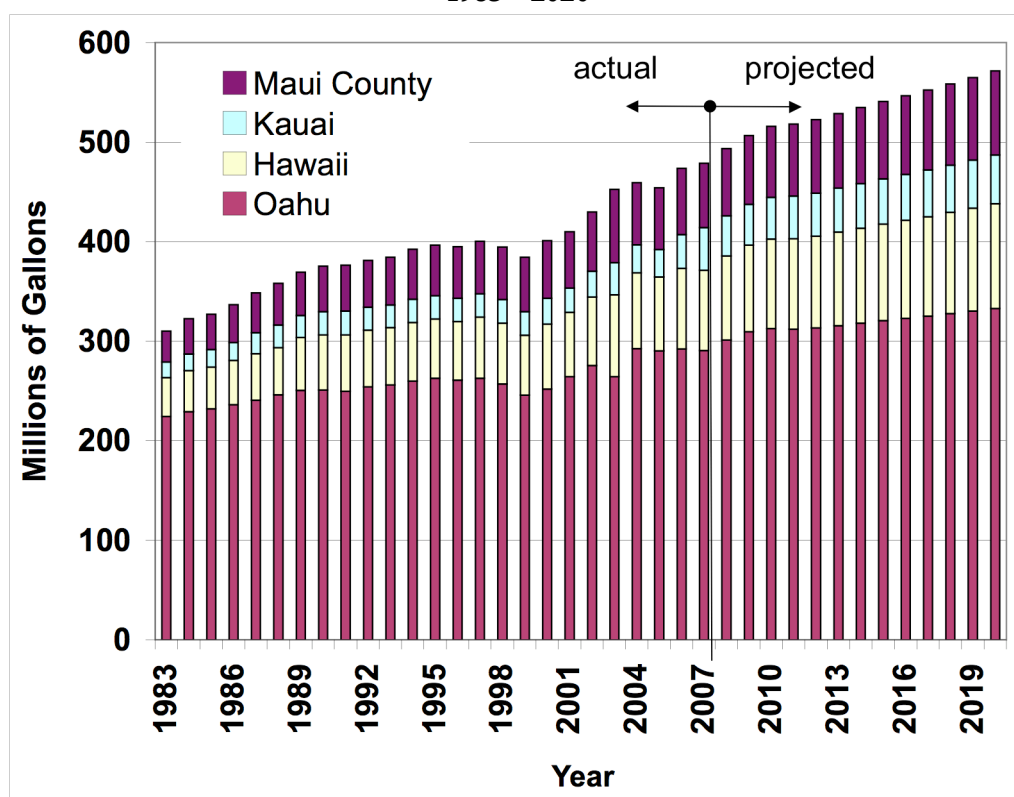
Source: Strategic Industries Division, DBEDT. Based on data from the Hawaii State Data Book, Tables 1.09, 18.07, and 13.02.

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## 2.4 Historical and Projected Gasoline Demand

The historical and projected gasoline demand in the State of Hawaii from 1983 to 2020 can be found in Figure 4. According to the State Energy Office, the gasoline and diesel forecast is based on historical trends, and does not include potential changes due to vehicle efficiency changes, fuel price changes, or changes in transportation and land use plans. Forecasts tied more closely to local, regional, or state transportation and land use plans have not been developed. As shown, the forecast, based on historical trends, indicates gasoline demand increasing by an annual average of 1.4 percent between 2007 and 2020.

**Figure 4. Historical and Projected Gasoline Demand in Hawaii, 1983 - 2020**



Source: Strategic Industries Division, DBEDT, State of Hawaii

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## 3.0 Overview of State, Regional, and Local Plans

### 3.1 Overview

A review of Hawaii's state, regional and local transportation plans indicated that, in general, the plans do not explicitly consider energy consumption or energy efficiency. However, the transportation plans in general have some elements that, if implemented, are likely to improve the energy efficiency of the transportation sector.

On the other hand, some elements in the plans, if implemented, would not support the goal of improving the energy efficiency of the transportation systems.

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### **3.2 Plans and Documents Reviewed**

The Working Group examined state, local, and regional plans to identify goals or policies relating to energy efficiency in the transportation sector; and, whether they addressed the major goals adopted by the working group.

See Appendix IV for a list of the plans and documents reviewed by the Working Group.

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### **3.3 Energy Efficiency-Related Goals and Policies**

The plans were reviewed to assess the degree to which energy efficiency is a key component or included in existing plans.

In general, state and local transportation plans do not focus on improving the energy efficiency of the transportation system. However, the Working Group found a number of goals and policies that have potential for impacting energy efficiency in transportation. These include:

#### **Statewide**

- Increase the efficiency of air, land, and water transportation systems (Hawaii Statewide Transportation Plan).
- Encourage production and use of locally produced biofuels (Hawaii 2050 Sustainability Plan).

#### **County of Hawaii (County of Hawaii General Plan)**

- Strive towards energy self-sufficiency (goal).
- Encourage the development of alternate energy resources (policy).
- Encourage the development and use of agricultural products and by-products as sources of alternate fuel (policy).
- Provide incentives that will encourage the use of new energy sources and promote energy conservation (policy).
- Strive to diversify energy supplies and minimize the environmental impacts from energy usage (policy).

#### **County of Maui (Maui Countywide Policy Plan)**

- Support the development of efficient, economical, and environmentally sensitive means of moving goods and people throughout the County and between islands (objective).

### **City and County of Honolulu**

- Develop and maintain Oahu’s island-wide transportation system to ensure efficient, safe, convenient, and economical movement of people and goods (goal). (Oahu Regional Transportation Plan 2030)
- Use building setback regulations to make room for a dedicated transit lane on Farrington Highway (major transit corridor), and encourage development of medium-density development near stations (Central Oahu Sustainability Communities Plan).

### **County of Kauai**

- Consider transportation alternatives to increasing the size and capacity of roadways. Alternatives include increased utilization of public transit (policy). (Kauai General Plan)

For more detailed description of these items in relationship to energy efficiency, see Appendix IV.

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## **4.0 Energy Efficiency Strategies from Other Jurisdictions**

The transportation sector accounts for a significant portion of energy consumption, particularly liquid fuels, in both the US and abroad. In the US, transportation accounts for about 28 percent of domestic energy consumption, and in OECD Europe, about 23 percent. To reduce dependence on fossil fuels and improve energy efficiency, countries and regions across the world have undertaken various strategies. The consultant researched strategies used or proposed in other jurisdictions:

### **Strategies Related to Modes of Travel**

A number of strategies may induce a shift towards more efficient modes and discourage unnecessary driving. Strategies may include: Transit, Pay-As-You-Drive (PAYD) insurance, national car registration quota, transportation system management, increased bike and pedestrian infrastructure, and commuter choice programs.

In addition, through dense, mixed-use, and transit-oriented development, appropriate land use strategies can also reduce overall vehicle-miles traveled by facilitating the shift to non-motorized transport and transit. Smart growth initiatives, “fix it first” funding, and some parking management schemes fall under this category. See Appendix V.

### **Strategies Related to Fuel Efficient Vehicles**

Other strategies may result in more fuel efficient vehicles by improving combustion technologies, using more efficient fuel sources, or enacting policies that encourage the purchase of more efficient vehicles (thereby improving fleet efficiency). The strategies in this category include: “Clean Car Programs,” the “Green Tax Program,”



feebate programs, diesel retrofits, and fuel efficient replacement tires. In addition, operational efficiency strategies reduce the amount of fuel consumed by vehicles per mile traveled by improving driver behavior. See Appendix VI.

### **Strategies Related to Diversifying Energy Sources**

A number of strategies result in more choices in alternative fuels, typically through increased reliance on alternative and renewable fuels, such as bio-diesel; or electric or plug-in hybrid vehicles (PHEV) that are recharged from power generating facilities (that could increasingly rely on wind power, solar power, geothermal, or other renewable energy sources). See Appendix VII.

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## **5.0 Energy Efficiency in Transportation: Goals and Benchmarks**

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### **5.1 Current/Existing State Goals**

The following are some of the current goals Hawaii has established with respect to energy efficiency:

- Hawaii's energy objectives as described in Chapter 226-18, Hawaii Revised Statutes (HRS):
  - Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people.
  - Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased.
  - Greater energy security in the face of threats to Hawaii's energy supplies and systems.
  - Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.
- Hawaii's Renewable Portfolio Standard (RPS), as described in Chapters 269-91 through 269-95, HRS: The electric utilities are to provide 10% of their electricity from renewable sources and energy efficiency by 2010, 15% by 2015, and 20% by 2020.
- Gasoline must contain 10% ethanol by volume (HRS 486J-10; Hawaii Administrative Rules 15-35).
- Act 234, SLH 2007, states that by January 1, 2020, the State of Hawaii shall reduce statewide greenhouse gas emissions to levels at or below the best estimations of the inventory of greenhouse gas emissions estimates for 1990.

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### **5.2 Preliminary List of Goals and Strategies**

The Working Group made significant progress in responding to the directives of Act 254, due in large measure to the enthusiasm and commitment of its members. Although a very diverse group, all members are unified in their dedication to developing a comprehensive energy-efficient transportation strategy for the state that will be a workable solution to meet everyone's needs and situations. They have even

been so bold as to envision Hawaii becoming an energy-efficient transportation paradise.

To meet that vision, the Working Group developed a preliminary list of goals and objectives as the driving force and incentive for developing comprehensive strategies and actions. While not finalized, they provide the guiding goals for an energy efficient transportation system for Hawaii.

### **5.2.1 Preliminary Goals and Objectives**

- Create more sustainable transportation systems.
- Advance more energy efficient transportation strategies.
- Reduce energy intensity of the transportation system, and wasted energy.
- Improve the energy efficiency of the transportation system while still protecting mobility and choice.
- Increase fuel security.
- Reduce carbon emissions.
- Transform Hawaii into an energy transportation paradise.
- Create more choices in modes of travel.
- Increase the fuel efficiency of vehicles.
- Diversify energy sources available to meet transportation energy needs.

### **5.2.2 Preliminary Strategy Ideas**

The Working Group identified a number of strategies to meet the State's goals and benchmarks. Members **agreed that more information and data are required before goals, objectives, strategies/initiatives, and benchmarks can be adopted.** The strategies listed below, while not accepted by the Working Group as a whole as the preferred strategies, are offered as ideas suggested for further examination:

#### *Strategies Supporting More Choices in Modes of Travel*

- Government incentives/subsidies.
- Car-sharing to reduce fleet (e.g., zipcar)
- Big island bus service innovations (free ridership)
- Increase transit ridership
- Increase use of shared ride modes of travel (carpools, vanpools, etc.) through innovative marketing strategies (for example, carpool sweepstakes, etc.)
- Telecommuting
- Build more bike lanes and establish requirement for more bicycle friendly programs
- Build HOV lane on all new highway segments
- Bikes on boats
- Bus and bike parking/lockers

- HOT-lane type elevated highways to increase vehicle throughput and manage traffic congestion

#### *Strategies Supporting More Choices in Fuel Efficiency of Vehicles*

- Government incentives/subsidies
- Incentives for fuel efficient cars (e.g. free parking) – Single Occupancy Vehicles (SOV) in ‘zipper’ lanes (like electric vehicles)

#### *Strategies Supporting Energy Source Diversity*

- Incentives to encourage development of alternative fuels

#### *Other Strategies (Big Picture or How to Get There)*

- Include energy assessment in transportation plans (including project fuel demand)
- Collect additional data i.e., ‘user satisfaction surveys’ on a regular basis (e.g. every other year)
- More and better data on how are we doing, and mine the data we are collecting on a regular basis
- Hawaii energy/transport model/scenario analysis

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### **5.3 Examples of Potential Benchmarks**

While the Working Group agreed that specific benchmarks for improving the energy efficiency of Hawaii’s transportation system must be established to monitor changes and adjust the course as necessary, it declined to develop benchmarks without additional data collection and analysis. It did however identify benchmarks used in other jurisdictions, which may be applicable for Hawaii. These require further assessment as to their appropriateness. They include the following:

- State of California: Reduce demand for on-road gasoline and diesel to 15 percent below the 2003 demand level by 2020, and maintain that level for the foreseeable future.
- State of California: Increase use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020, and 30 percent by 2030.
- City of Portland, Oregon: Reduce oil consumption by 50% in 25 years.
- Iceland: Power all cars and boats with hydrogen made from electricity drawn from renewable resources by 2050.
- Brazil: Power 80% of the transport fleet with ethanol derived mainly from sugar cane within 5 years.
- Sweden: Reduce consumption of oil in transport sector by 40 to 50 percent by 2020.
- U.S. January 23, 2007 State of the Union Address by President Bush: Reduce gasoline usage in the United States by 20 percent in the next 10 years.

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## 6.0 Next Steps and Recommended Actions

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### 6.1 Determine Goals and Benchmarks

The State should adopt specific goals and strategies for improving the energy efficiency of Hawaii's transportation system. Although the Working Group has developed preliminary goals and objectives (see Section 5.2.1), these constitute a starting point which require further analysis before specific strategies and benchmarks can be adopted.

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### 6.2 Identify Data Needed to Measure Performance

The Working Group considered a range of ideas to improve the energy efficiency of Hawaii's transportation system. Many of these ideas for programs and activities were already being undertaken through ongoing transportation system planning. The Working Group considered the contents of state, county, and city transportation plans and other relevant documents to determine what strategies have already been developed and/or implemented in the state. The Working Group made the following additional findings during the course of its meetings:

- There are already activities, programs, and projects in the State of Hawaii that would improve the energy efficiency of the transportation sector.
- Many of the existing activities, programs, and projects fit into the categories of goals the working group had agreed upon.
- Transportation plans generally do not explicitly consider energy consumption or estimate the impacts of changes on energy consumption or energy efficiency.
- Transportation plans in general have some elements that, if implemented, are likely to improve the energy efficiency of the transportation sector.

While the Working Group concluded that many ongoing and planned activities and programs in the State of Hawaii would have a positive impact upon the energy efficiency of the transportation system, it found that it was difficult to estimate or quantify the impact of these ongoing and planned activities and programs using the information and data currently available to them.

One of the major findings of the Working Group is that there is a lack of data upon which to establish goals and to track progress in meeting those goals. In their review of their existing data, Working Group members found significant gaps in the types of data needed to assess energy efficiency in transportation, and the lack of coordination among agencies in the collection and use of energy-related data. Thus, while there is a vast storehouse of data being collected throughout the State, these are fragmented, scattered, and not in usable format. Additionally, there is no

systematic means for bringing energy-relevant data together. As a consequence, the potential impact of current or future energy-efficient initiatives or practices in meeting goals or benchmarks cannot be fully evaluated.

Because of the importance of developing energy-efficiency policies and practices in transportation and the potential cost of these actions, it is imperative that the State invest in collecting and analyzing the necessary data to make sound policy decisions. Therefore the Working Group unanimously agreed that effort must first be devoted to obtaining the necessary data before transportation energy efficiency goals and benchmarks for the State can be determined.

Some examples of the types of data and information identified by the Working Group that would be useful in energy-related planning include the following:

#### Hawaii petroleum use by category

1. Amount of petroleum products (gasoline / diesel) used by passenger vehicles in Hawaii.
2. Amount of jet fuel used by aircraft serving Hawaii travelers.
3. Amount of petroleum products used by marine-borne transportation serving Hawaii.
4. Amount of petroleum used for generation of electricity (to be used for electric vehicles).
5. Amount of ethanol needed to replace one gallon of gasoline

#### Energy efficiency per mode of travel

1. BTU's per passenger mile / gasoline / diesel for passenger vehicles
2. BTU's per passenger mile for bus
3. BTU's per passenger mile for proposed Oahu rail
4. BTU's per ton / mile for cargo hauling vehicles
5. BTU's per passenger mile for air travel
6. BTU's per passenger mile for marine commute travel
7. Per passenger load counts on average passenger vehicle commutes
8. Load counts on average express bus commute
9. Projected load counts for proposed rail line on Oahu
10. Actual vehicle miles traveled (VMT)
11. Energy efficiency of vehicle fleet

#### Sensitivity Analysis

1. Change in fuel efficiency of vehicles purchased based on fuel prices
2. Change in VMT based on fuel prices

#### Motor Vehicle Fleet Projections

1. Estimated penetration of 35-mpg vehicles (city/highway) by 2012, 2015, 2020, 2030.

2. Estimated penetration of hydrogen fuel cell 35 mpg-equivalent (city/highway) vehicles by 2012, 2015, 2020, 2030.
3. Estimated penetration of all-electric passenger vehicles by 2012, 2015, 2020, 2030.

#### Energy Impacts of Roadway Congestion

1. Estimated amount of energy (petroleum based or electric or hydrogen fuel-cell) wasted by Hawaii roadway congestion
2. Estimated amount of energy (fuel), which would be saved by introduction of additional lanes (for commutes in Leeward, East Oahu, and congested Neighbor Island corridors).

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### **6.3 Develop Energy Efficiency Information and Monitoring System**

The Working Group unanimously agreed that there is a need for data and information to be collected statewide in a more consistent and coordinated manner to be useful in planning energy-efficient transportation strategies and initiatives. It therefore recommends that Hawaii should develop an *energy efficiency information and monitoring system* to provide a foundation for the on-going monitoring of improvements to the energy efficiency of the transportation system. Such a system would address the following:

- Data necessary to establish goals and benchmarks. In order to agree upon specific transportation energy efficiency goals and benchmarks for the State of Hawaii as required in Act 254 (SLH 2007), additional collection and review of relevant data is needed. The data that should be considered include transportation demand and fuel consumption data from the State, county, and regional jurisdictions and their respective government agency sources. In addition, specific data should be integrated on transportation energy demand and supply as may be available from business and commercial sources. Finally, in order to develop realistic and achievable performance improvement goals and benchmarks, the data should be analyzed in a manner to develop (1) a historical trend, (2) a baseline forecast, and (3) a set of scenarios for potential future patterns of transportation energy consumption. These potential future scenarios should be reviewed by the Working Group and compared against options for future goals and with respect to selected benchmarks.
- Regular monitoring of progress in meeting goals. The State will be more likely to meet its goals and make progress toward meeting long-term benchmarks if current information on transportation system energy efficiency is regularly available; and changes in energy efficiency of the transportation sector are regularly monitored. Regular monitoring can enable the State and counties to be confident that implemented strategies are proving effective. If the information and monitoring indicate that additional

work is needed, the State and counties can adjust infrastructure investment and other strategies as appropriate.

- Ongoing feedback on and assessment of strategies and initiatives in meeting goals and benchmarks. In order to regularly monitor progress toward meeting the recommended benchmarks, a statewide transportation energy efficiency information and monitoring system should not only be established but also maintained on an ongoing basis. The information and monitoring system would be designed to provide consistent and scientifically reliable information on transportation energy consumption and supply trends and provide feedback on progress in meeting the goals and benchmarks that the state agrees upon. The transportation energy information and monitoring system would provide a more reliable means to organize and present data on the transportation sector's energy consumption and, potentially in the future, on greenhouse gas emissions. The information system would also provide the data and mechanisms by which the state and counties can assess the impact to the state and local economy of alternative strategies, and to compare the cost-effectiveness of alternative strategies.

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#### **6.4 Near-Term Legislative Proposal: Statewide Transportation Sector Energy Efficiency Information and Monitoring System**

To begin the process of obtaining the necessary data and developing a statewide system for data collection and analysis, the Working Group therefore recommends that a legislative proposal be submitted to the 2008 Legislature requesting funding in the amount of \$175,000 to determine the energy-relevant data available among government and business sources; identify gaps in critical data; and develop and test models leading to the establishment of a reasonable and workable plan for a statewide transportation energy information and monitoring system. See Appendix VIII for draft proposed legislation and budget.

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#### **6.5 Future Strategies and Legislation**

Once goals and benchmarks have been established, the Working Group should continue to define strategies and future legislation, including determination of a permanent responsible agency to coordinate efforts to achieve the goals and benchmarks.

A few examples of potential future legislative strategies were presented by the consultant but were considered premature at this time. See Appendix IX for a copy of the legislative strategies presented by the consultant.

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# A BILL FOR AN ACT

MAKING AN APPROPRIATION FOR A STUDY ON ENERGY EFFICIENT  
TRANSPORTATION STRATEGIES.

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

1 SECTION 1. The legislature finds that transportation is  
2 responsible for an inordinate amount of fuel consumption,  
3 including fuel used in motor vehicles, buses, and jet planes.  
4 The legislature further finds that reducing the demand for fuel  
5 in transportation modalities would greatly reduce our dependence  
6 on oil.

7 The Hawaii energy policy forum, a part of the social  
8 sciences public policy center at the University of Hawaii at  
9 Manoa, proposes to conduct a study on energy-efficient  
10 transportation strategies in conjunction with the department of  
11 business, economic development, and tourism.

12 The purpose of this Act is to appropriate funds for the  
13 University of Hawaii to conduct a study on energy-efficient  
14 transportation strategies.

15 SECTION 2. (a) The Hawaii energy policy forum at the  
16 University of Hawaii at Manoa shall conduct a study on energy-





1 efficient transportation strategies in conjunction with the  
2 department of business, economic development, and tourism.

3 (b) The energy-efficient transportation strategies study  
4 under subsection (a) shall include but not be limited to:

5 (1) Developing tangible goals, objectives, desired  
6 outcomes, and actions to implement an energy-efficient  
7 transportation strategy;

8 (2) Developing implementation benchmarks for measuring  
9 outcomes of energy-efficient transportation  
10 strategies; and

11 (3) A cost-benefit analysis of each energy-efficient  
12 transportation strategy.

13 (c) The social sciences public policy center shall engage  
14 and integrate Hawaii's business, government, labor, and  
15 community leaders into the study on energy-efficient  
16 transportation strategies.

17 (d) The department of business, economic development, and  
18 tourism shall consult with and otherwise assist the social  
19 sciences public policy center at the University of Hawaii at  
20 Manoa on the energy-efficient transportation strategies study.



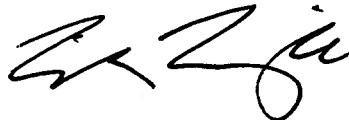
1 (e) The Hawaii energy policy forum shall submit a report  
2 on its findings and recommendations to the legislature no later  
3 than twenty days prior to the convening of the regular session  
4 of 2008.

5 SECTION 3. There is appropriated out of the general  
6 revenues of the State of Hawaii the sum of \$50,000 or so much  
7 thereof as may be necessary for fiscal year 2007-2008 for a  
8 study on energy-efficient transportation strategies.

9 The sum appropriated shall be expended by the University of  
10 Hawaii social sciences public policy center for the purpose of  
11 this Act.

12 SECTION 4. This Act shall take effect on July 1, 2007.

APPROVED this 5 day of JUL , 2007



GOVERNOR OF THE STATE OF HAWAII



## Appendix II - List of Working Group Members

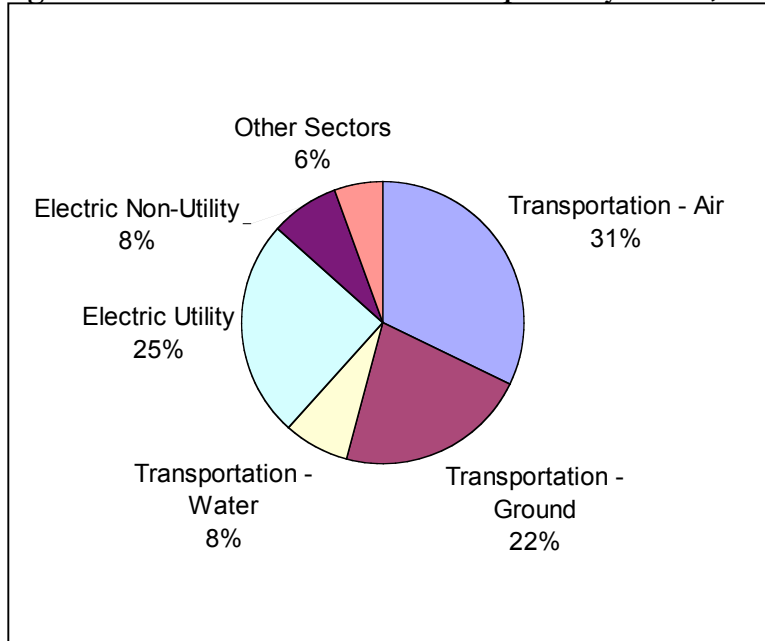
<b>Act 254 Working Group</b>								
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Glenn	Soma		Department of Transportation					<a href="mailto:glenn.soma@hawaii.gov">glenn.soma@hawaii.gov</a>
Robert	Tam							<a href="mailto:robert.tam@doh.hawaii.gov">robert.tam@doh.hawaii.gov</a>
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## Appendix III - Related Data on Energy Consumption

The following charts provide additional data on energy consumption and on the growth in the transportation sector.

I. **Hawaii's Energy Consumption.** Figure 1 shows the large share of Hawaii's petroleum consumption by the transportation sector. In 2005, 61% of the petroleum used was for transportation.

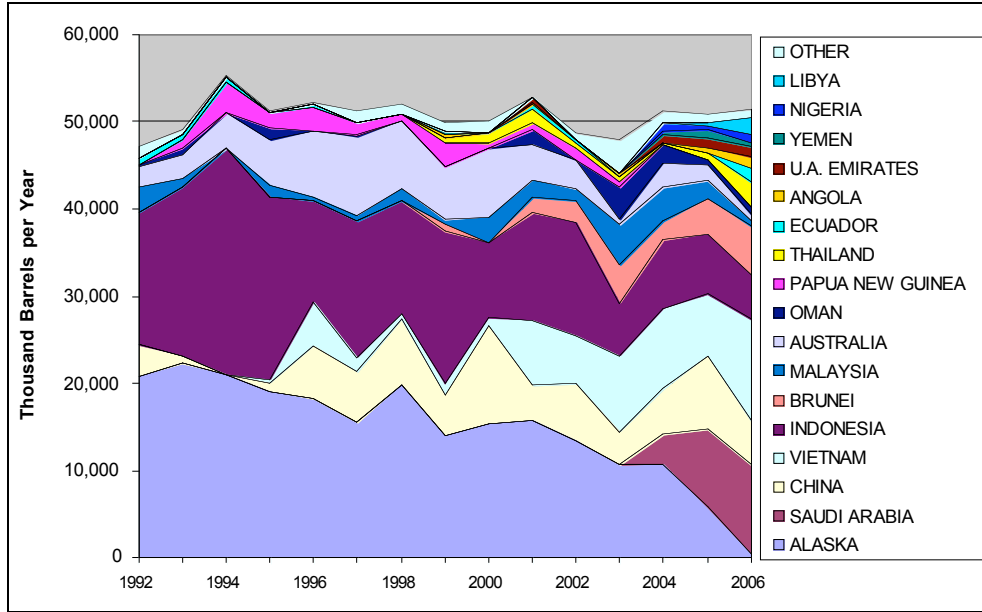
**Figure 1. Hawaii Petroleum Consumption By Sector, 2005**



**Source:** Strategic Industries Division, DBEDT, State of Hawaii

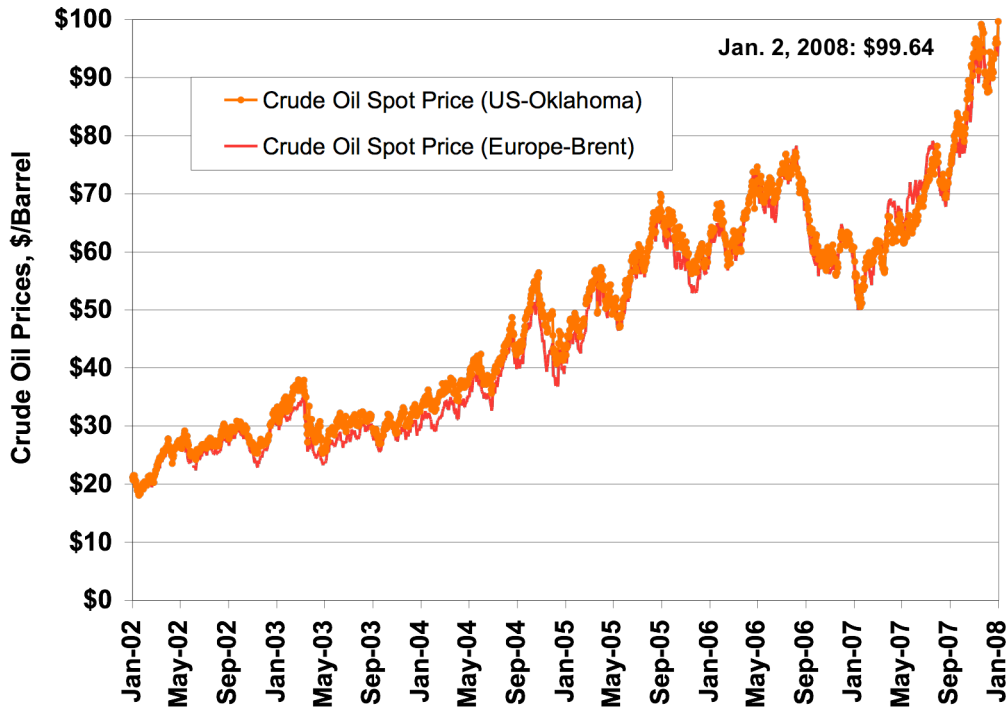
II. **Hawaii's Dependence on Foreign Oil.** One of the reasons for focusing on energy efficiency of its transportation system is Hawaii's increasing dependence on imported oil. As shown in Figure 2, Hawaii received a large portion of its crude oil from Alaska in 1992, but due to an increase in the demand for oil and the declining production of oil in Alaska, Hawaii must now import nearly all of its oil from foreign countries. This dependence on foreign oil could render Hawaii susceptible to supply shocks or continuing price increases. Also of concern is the increasing cost of crude oil, which was increased steadily from a low of less than \$20/barrel in January 2002 to a high of \$99.64/barrel in January 2008, as is shown in Figure 3.

Figure 2. Hawaii's Crude Oil Sources, 1992 to 2006



Sources: State of Hawaii Strategic Industries Division and U.S. Energy Information Administration, 2007

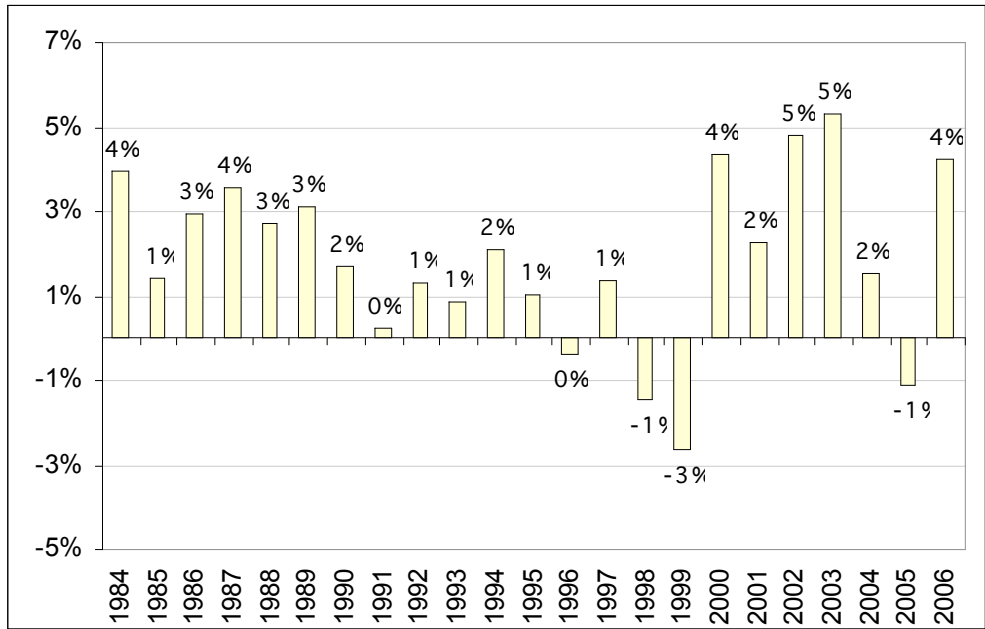
Figure 3. Crude Oil Prices 2002-2008



Source: US Energy Information Administration, Table pet\_pri\_spt\_s1\_d.xls

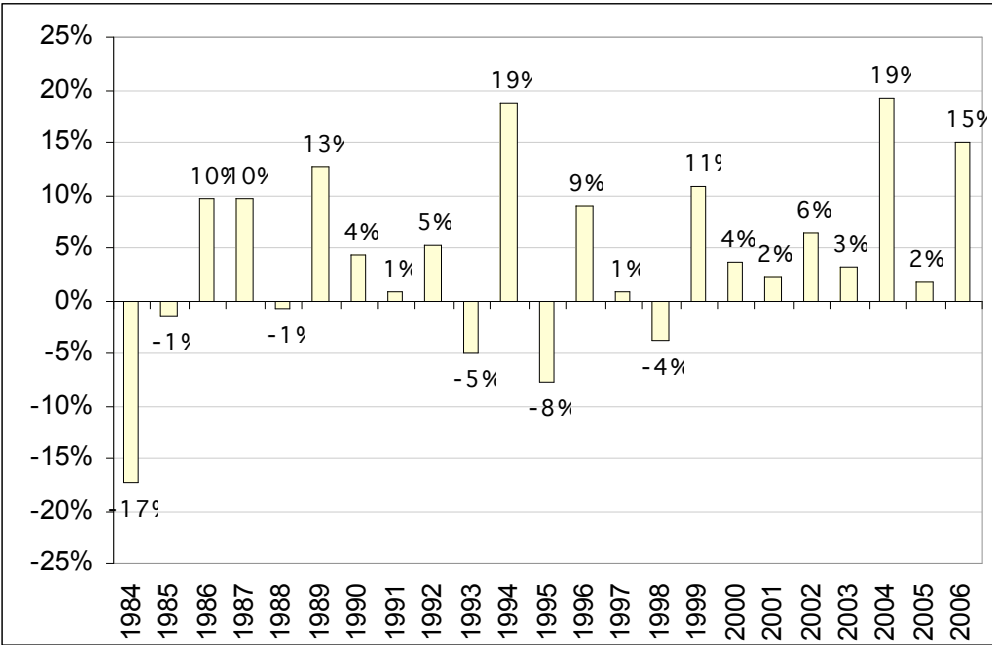
**III. Highway Gasoline and Diesel Demand.** In 2006 Hawaii consumed 525 million gallons of gasoline and diesel for ground transportation. Figure 4 presents the annual changes in gasoline demand from 1984 to 2006. The average annual change is +1.8 percent, ranging from -3 percent to +5 percent. Figure 5 presents the annual changes in diesel demand for the same period, showing the average change fluctuated more than gasoline, ranging from -17 percent to +19 percent, with an average increase of 4.23 percent.

**Figure 4. Annual Change in Gasoline Demand 1984 to 2006**



Source: Department of Business, Economic Development, and Tourism, State of Hawaii

**Figure 5. Annual Change in Highway Diesel Demand 1984 to 2006**

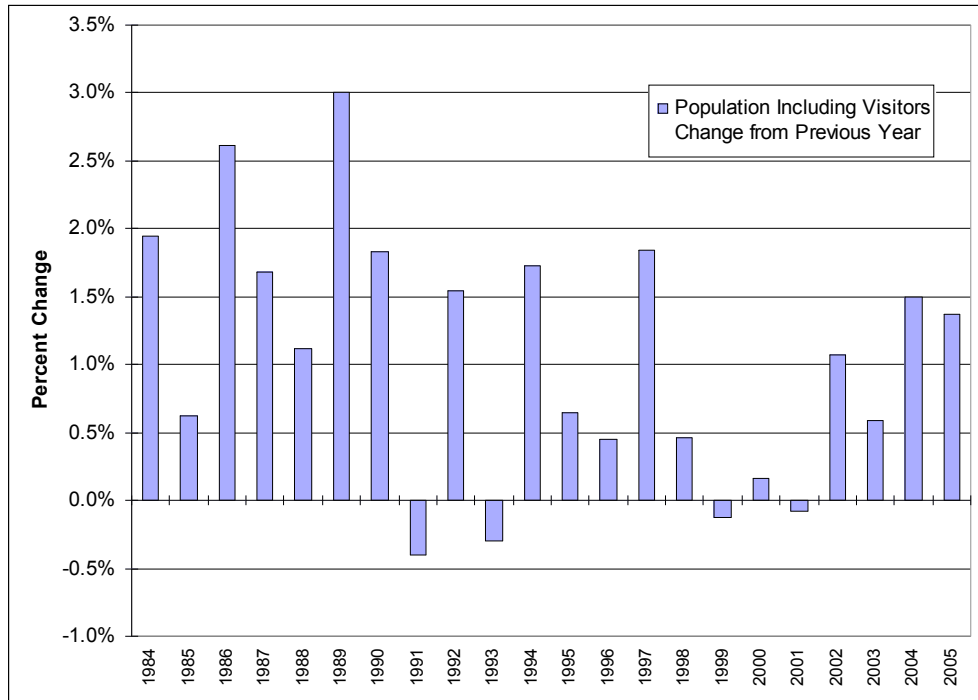


Source: Department of Business, Economic Development, and Tourism, State of Hawaii

**IV. Population and Vehicle Registration and Energy Consumption**

Looking at a somewhat longer timeframe for population changes, as shown in Figure 6, the population has increased at a somewhat faster rate of 1.1 percent per year on average since 1984, with annual changes varying from about -0.5 percent to +3 percent.

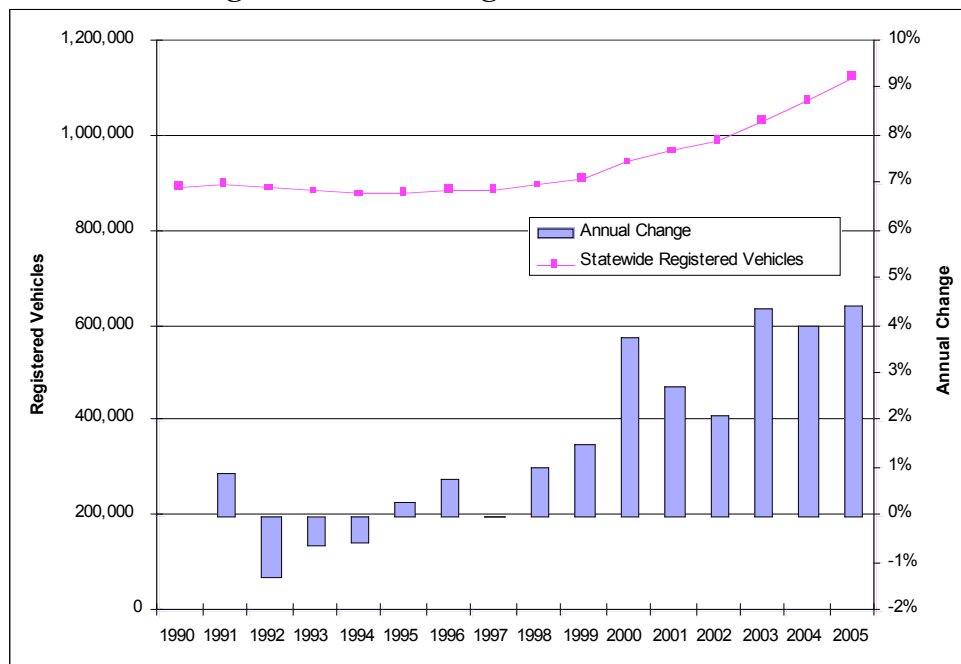
**Figure 6. Annual Percent Change in Population Including Visitors 1984-2005**



Source: Department of Business, Economic Development, and Tourism, State of Hawaii

Figure 7 presents statewide vehicle registrations from 1990 to 2005, and the annual change. During this time period, the average annual increase in vehicle registrations was +1.5 percent. However, as shown below, vehicle registration has increased more quickly since the year 2000 (an average annual increase of 3.6 percent during the most recent years). In either case, vehicle registration has increased faster than the increase in population. Note that no annual change is indicated for 1990 since that was the first year for which data were available. In 1992, 1993, 1994, and 1997 there were decreases in registered vehicles, perhaps due to a slowdown in the Hawaiian economy during that period.

**Figure 7. Vehicle Registrations 1990 to 2005**

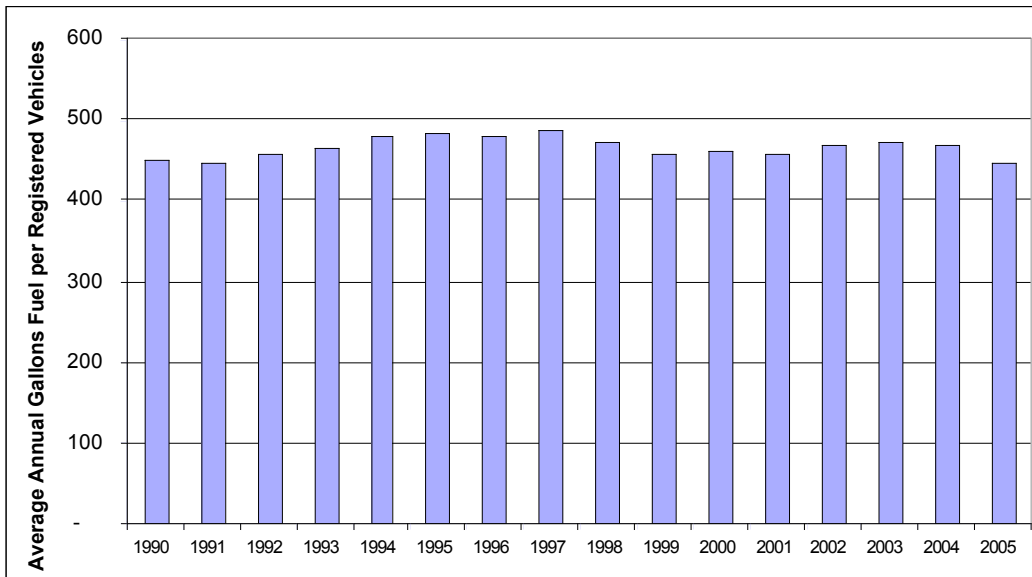


Source: Department of Business, Economic Development, and Tourism, State of Hawaii

Figure 8 presents average annual gasoline consumption per registered vehicle from 1990 to 2005. As shown in Figure 8, gasoline consumption per vehicle has remained fairly constant over this time period, although fluctuating very slightly from year to year. Although there was a slight decrease in average vehicle gasoline consumption in the year 2005, according to DBEDT (based on State of Hawaii report of fuel tax collections), fuel consumption in 2006 and 2007 has been on the increase again.



**Figure 8. Average Annual Fuel Consumption Per Registered Vehicle  
1990 to 2005**



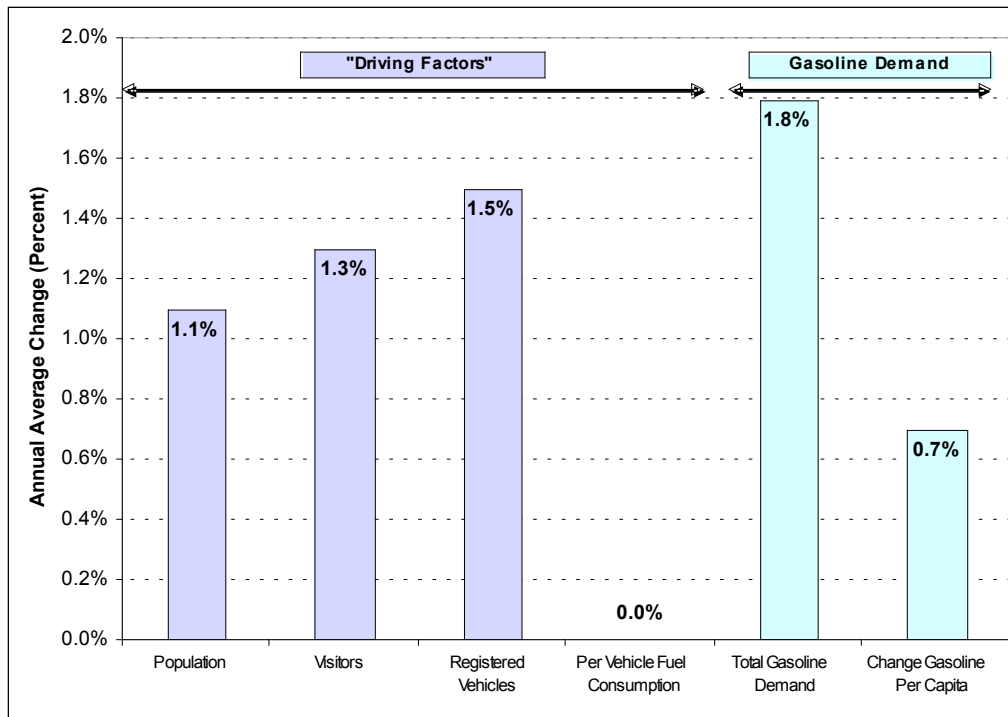
Source: Department of Business, Economic Development, and Tourism, State of Hawaii

## **V. Summary of Hawaii Transportation and Energy Trends**

The following is a summary of gasoline demand as it relates to population and vehicles. As shown in Figure 9, gasoline consumption is rising to a greater degree as a result of more vehicles in the fleet, and to a lesser extent because of population increases, as opposed to average vehicle fuel consumption:

- Since 1984, the population (including visitors) has increased by about 1.1 percent annually, while daily visitor count has increased by about 1.3 percent annually.
- Since 1990, the number of registered vehicles has increased by about 1.5 percent a year, with most of the increase in registered vehicles occurring since the year 2000.
- Since 1990, gasoline consumption per vehicle has fluctuated only slightly from year to year, but on average has remained about the same.
- Since 1984, the demand for gasoline has increased by an average of 1.8 percent a year, while gasoline consumption *per capita* has increased by about 0.7 percent a year.

Figure 9. Summary Chart: Average Annual Changes in Population, Registered Vehicles, and Gasoline Demand (1984/1990 to 2005/2006)



Source: Parsons Brinckerhoff, based on data from DBEDT

## **Appendix IV - Plans and Documents Reviewed**

### **State and Local Plans and Documents Reviewed**

The following plans and documents were reviewed to determine the goals and policies relevant to achieving energy efficient transportation:

#### **Statewide**

- Hawaii Statewide Transportation Plan (HDOT; Counties of Hawaii, Kauai, and Maui, Oahu MPO; 2002)
- Bike Plan Hawaii (HDOT, 2003)
- Hawaii 2050 Sustainability Plan (Hawaii 2050 Sustainability Task Force, In Process)

#### **County of Maui**

- County of Maui General Plan 2030 (in progress), includes:
  - Countywide Policy Plan (County of Maui, 2007)
  - Proposed Roadway Development Program (County of Maui, 2007)
  - Maui Island Plan 2030 (County of Maui, 2007)
  - Short-Range Transit Plan (County of Maui, 2005)
- 1997 Long Range Transportation Plan (HDOT and County of Maui, 1997)

#### **County of Hawaii**

- County of Hawaii General Plan (County of Hawaii, 2005)
- 1998 Long Range Transportation Plan (HDOT and County of Hawaii, 1998)
- Hawaii County Energy Sustainability Plan (County of Hawaii Council, 2007)

#### **County of Kauai**

- Kauai General Plan (County of Kauai, 2000)
- 1997 Long Range Land Transportation Plan (HDOT and County of Kauai, 1997)

#### **County of Oahu**

- Oahu Regional Transportation Plan 2030 (Oahu MPO, 2006)
- Mayor's Energy and Sustainability Task Force (Mayor Hannemann, 2007)
- Sustainable Communities Plans (City and County of Honolulu, In Process)

#### **Other Local Publications**

- Publications from the Hawaii Automobile Dealers Association
- Hawaii at the Crossroads: A Long-Term Energy Strategy (Hawaii Energy Policy Forum, 2004)

## Summary of Energy Relevant Goals and Policies in State & Local Transportation Plans

Energy-relevant goals and policies in the various plans and documents reviewed are as follows:

### *Hawaii Statewide Transportation Plan (2002)*

Summary of policies related to energy efficiency or mode share/land use changes:

- Most relevant goal:
  - Achieve an integrated multi-modal transportation system that provides mobility and accessibility for people and goods.
- Most relevant objectives:
  - To increase the efficiency of the air, land, and water transportation systems' operations.
  - To promote alternative air, land, and water transportation mode choices.

### *Hawaii 2050 Sustainability Plan (2007)*

- Encourage “smart growth” concepts in land use and community planning.
- Encourage production and use of locally produced biofuels.

### *Bike Plan Hawaii (2003)*

Proposes to increase bike lanes statewide from 331 existing to 1,722 miles by (not a 2020 constrained network, but the complete network), most built on existing roadways, and some of which may be beyond 20 years out.

### *County of Kauai General Plan (2000)*

#### Summary of projects (or categories of projects) that would impact the systems energy efficiency

A number of new roadways or expansion of existing roadways, just a few of which are:

- A new two-lane connector road between Port Allen and Poipu.
- Widening of Koloa By-Pass/Maluhia Road to 4 lanes.
- Construct a new 2-lane Lihue-Hanamaulu By-Pass Road.
- Widen Kapule Highway to a 4-lane divided roadway.
- Construct a new 4-lane Kapaa By-Pass Road.

Transit service/facilities:

- Increased bus service in Koloa/Poipu;
- Increased paratransit service in various regions of the island;
- Improvements to pullover areas along roadways in order to create safe and accessible bus stops; and
- Designated areas at housing projects (particularly those with elderly and disabled residents) that provide safe and accessible paratransit stops.

Bike and pedestrian facilities:

- A number of new bike lanes as identified in the master plan *Bikeplan Hawaii 2003*.

### *County of Hawaii General Plan (2005)*

Energy Goal: strive towards energy self-sufficiency.

Most Relevant Policies:

- Encourage the development of alternate energy resources.
- Encourage the development and use of agricultural products and by-products as sources of alternate fuel.
- Provide incentives that will encourage the use of new energy sources and promote energy conservation.
- Strive to diversify the energy supply and minimize the environmental impacts associated with energy usage.

Transportation System Goals:

- Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.
- Make available a variety of modes of transportation that best meets the needs of the County.

Most Relevant Policies:

- The agencies concerned with transportation systems shall provide for present traffic and future demands, including the programmed development of mass transit programs for high growth areas by both the private and public sectors.
- Develop a comprehensive, island wide multi-modal transportation plan that identifies the location and operation of automobile, mass transit, bicycle and pedestrian systems, in coordination with appropriate Federal and State agencies.
- Improve the integration of transportation and land use planning in order to optimize the use, efficiency, and accessibility of existing and proposed mass transportation systems.
- Support and encourage the development of alternative modes of transportation, such as enhanced bus services and bicycle paths.

### Summary of projects (or categories of projects) that would impact the systems energy efficiency

- The general plan identifies potential transportation improvements for each district. Various state and county roadway systems located throughout the island were identified for improvement, including the reconstruction of Saddle Road (Highway 200) and the widening of Queen Kaahumanu Highway (Highway 19) to four lanes between Waikoloa Road and Kona International Airport at Keahole.
- The Hawaii Long-Range Land Transportation Master Plan recommends that additional routes be provided to link Waimea town and the towns in North Kohala with Kailua-Kona and the resorts located along the South Kohala coast.
- Bike/pedestrian: A number of new bike lanes as identified in the master plan *Bikeplan Hawaii 2003*.

*County of Maui General Plan 2030 (In Progress) – Includes Countywide Policy Plan (2007), Maui Proposed Roadway Development Program (2007), Short-Range Transit Plan (2005)*

From Countywide Policy Plan:

Goal: Diversify Transportation Options

Objectives:

- (1) Build capacity in today's roadway system through multi-modal transportation facilities (with five supporting policies).
- (2) Require high quality and attractive design in all transportation infrastructure (with five supporting policies).
- (3) Support the development of efficient, economical, and environmentally sensitive means of moving goods and people throughout the County and between islands (with four supporting policies).

Goal: Promote Sustainable Land Use Planning and Development

Objective: utilize public transit, pedestrian, bicycle, and public right-of-ways as design elements to make neighborhoods and community plan areas attractive and unique (with four supporting policies).

From Maui Island Plan:

Goal: Maui Island will have a uniquely Maui transit service that addresses the mobility needs of all local residents and contributes to sustainable land use planning by proactively coordinating future growth and transit planning.

Relevant objectives include:

- 1) Provide transit services, facilities, and roadway infrastructure, which meet the needs of all Maui's people (with six supporting policies).
- 2) A transit system and planning process that effectively promotes sustainable development and reduces traffic congestion (with seven supporting policies).
- 3) Increased ridership through the establishment of a transit service that accommodates and celebrates island lifestyle (with four supporting policies).
- 4) A robust transportation planning program capable of providing public transit service at levels sufficient to accommodate projected population growth (with four supporting policies).

Summary of projects (or categories of projects) that would impact the systems energy efficiency

From County of Maui Proposed Roadway Development Plan:

Planned or proposed long-range roadway improvements include improvements to a number of roadways including: Haleakala; Kihei Corridor, realignment of Honoapiilani, Keawe Street extension, Mill Street extension, Paia bypass, Mokulele widening, Kihei North-South collector road; Waiale Extension, Honoapiilani widening, Waiale/Kuihelani Highway Connector; Lono Avenue extension; Imi Kala/Piihana extension; Imi Kala/Waiale – Mill Street extension; Paniolo

connector; Kehekili Highway widening; Maui Lani parkway; Kuikahi Drive extension; Kehalani collector road; and Kehalani Loop Road.

From Maui Island Plan:

Examples of proposed actions/strategies include:

- Relocate rental car facilities to West and South Maui and provide transit from airport to new facilities.
- Conduct a study to identify future rail corridors and transit stations.
- Prepare a system-wide Transit Master Plan.
- Amend the County Subdivision Code to include requirements for transit supportive roadway infrastructure.
- Require private transit services for large residential developments.
- Conduct ongoing community surveys to assess successes and deficiencies of transit service.
- Enhance bus stop amenities system-wide.
- Establish HOV lanes within major arterials.
- Implement Guaranteed Ride Home Program.
- Establish additional park-n-ride facilities in key locations.

From County of Maui Short Range Transit Plan:

- In short-term (within next five years), phasing in of enhancements to fixed route service (fixed route circulator service; islander service; and villager services) and paratransit service.

Bike/pedestrian:

- A number of new bike lanes as identified in the master plan *Bikeplan Hawaii 2003*.

*Oahu Regional Transportation Plan 2030 (City and County of Honolulu) (2006)*

Summary of policies related to energy efficiency or mode share/land use changes

Three overarching goals:

1. Transportation Services System: Develop and maintain Oahu's island-wide transportation system to ensure efficient, safe, convenient, and economical movement of people and goods.
2. Environment and Quality of Life: Develop and maintain Oahu's transportation system in a manner that maintains environmental quality and community cohesiveness.
3. Land Use and Transportation Integration System Goal: Develop and maintain Oahu's transportation system in a manner that integrates land uses and transportation.

Policies that encourage greater use of transit and nonmotorized modes of transportation are forecast to result in an increase in the percentage of trips by transit and a decrease in the percentage of people making trips by auto (from 83.6% in 2005 to 81.4% in the ORTP 2030). However, there is still projected to be over 540,000 additional auto trips. The added population growth in the ORTP 2030 will generate more travel during the day, resulting in a 22% increase in both vehicle miles traveled (VMT) and vehicles hours traveled (VHT).

Summary of projects (or categories of projects) that would impact the systems energy efficiency

- New fixed guideway providing transit service between East Kapolei and Ala Moana.
- An additional 280 lane miles on Oahu's roadways, including increasing the capacity of H-1 with new interchanges, additional High Occupancy Vehicle (HOV) lanes, freeway widening, and operational improvements at key locations; expansion of the North-South Road and Kapolei Parkway; widening of Farrington Highway, Fort Barrette Road, and Kunia Road; and expansion of Kamehameha Highway.
- Intra-island commuter ferry from Ewa to downtown Honolulu and the Nimitz flyover HOV facility.
- Bikeway plan to provide an integrated network of on-road bike lanes and off-road shared-use paths. Many specific bike lanes identified in the master plan *Bikeplan Hawaii 2003*.
- Development of pedestrian plan for Oahu.
- Bus system expansion.

*City of Honolulu Sustainability Plan – Mayor's Energy & Sustainability Task Force (2007)*

Current transportation/energy related efforts and on-going projects:

- Install a tire pressure monitoring system on all City fleet vehicles as part of standard equipment by 2009.
- Establish Vehicle Usage Guidelines to minimize the amount of fuel consumed by City operations by December 2007.

Guidelines include:

- Assign smallest vehicle appropriate to the task.
- Purchase fuel-efficient vehicles.
- Increase driver awareness of fuel-efficient driving techniques.
- Reduce trips.
- Reduce fleet size.
- Use alternatives to driving.
  - Implement a vehicle "Greening" 5-year program that sets the paradigm for use of alternate fuels and alternate fueled vehicles within the City's fleet.
  - Promote and support strategic development of alternate fuels and emerging technologies that allow for an efficient fleet mix of efficient, low emission vehicles that lower use of petroleum fuels as well as reduce emission of air pollutants and greenhouse gasses through a combination of regulatory compliance, purchasing policies and proven product demonstrations.
  - Encourage bus use as an alternative to the single occupant Automobile (e.g. employer-centered BONUS commuter program; University UPASS program).
  - Make transit operations "cleaner".
  - Plan a fixed guideway transit system.
  - Make Honolulu a pedestrian-and-bicycle-friendly city.

Future city actions:

- Plan, design and construct multi-modal transportation to include pedestrian and bicycle friendly options to improve the quality of life for the communities of Oahu.



- Fixed guideway transit system
- Continue to pursue alternative fuel vehicles for the City's bus fleet.
- Encourage employers to provide incentives to employees who use alternative methods of transportation.
- Encourage use of alternative fuel vehicles including hybrids and biodiesel-fueled vehicles.

*Sustainable Communities Plans*, City and County of Honolulu (Ongoing):

***Central Oahu Policies:***

Reduction in Automobile Use.

Reliance on the private passenger vehicle should be reduced by:

- Provision of circulation systems with separated pedestrian and bicycle paths and convenient routes for public transit service;
- Design of street systems in new development areas with layouts to facilitate bus routes and encourage pedestrian travel;
- Provision of supporting facilities and amenities for pedestrian, bicycle, and public transit use (bicycle racks at commercial centers, bicycle storage facilities at employment centers, and bus shelters at bus stops will be encouraged);
- Preservation of existing right-of-way and establishment of setback areas sufficient to permit future development of a dedicated transit right-of-way on Farrington Highway; and
- Support for medium-density and high-traffic land uses along the Farrington Highway transit corridor, especially within a quarter-mile of the transit nodes.

Transportation Development Priorities. Projected demand for peak-hour transportation in Central Oahu should be met by:

- Increased use of transit; and
- Transportation demand management through:
  - HOV facilities, including HOV lane on length of H-2.
  - Park-and-ride facilities, including the transit center at Mililani Mauka, which has 176-stalls, and the 50-stall Wahiawa park-and-ride lot, across from Wheeler A.F.B.
  - Other programs, which encourage reduced use of the private automobile.

Relying on adding private automobile commuting capacity to meet the projected growth in demand from Oahu's Leeward areas would be prohibitively expensive and have undesirable results. To increase commuting capacity from Central Oahu to Honolulu would require widening or double-decking the freeways in the Aiea/Pearl City area, between the H-201 (Moanalua Freeway) and H-2 junctions of H-1, and other major works. Even if this extra capacity was added in the Aiea/Pearl City area, destructive, divisive, and expensive street widening would have to be done in Central Honolulu to create sufficient capacity to absorb the extra cars that the expanded freeways could bring to the central city.

Planning Principles:

- Increased Arterial Capacity for Transit.
- Land Use Anticipating Dedicated Transit Lanes on Farrington Highway.
- Transit-Oriented Community Street Systems.

## Summary of Projects that would impact systems energy efficiency

- Widening of several roadways (including Kamehameha Highway, Kunia Road, Waipahu Street, and various interchanges).
- Expansion of transit service, including construction of new transit centers. Four significant transit facilities currently exist:
  - Mililani Mauka, 95-1101 Ukuwai St. Covered waiting area, 176 parking stalls.
  - Mililani Town Center, Meheula Parkway. Covered waiting area, restrooms. Adjacent to major shopping center (opened August 2007).
  - Royal Kunia park-and-ride lot. 149 stalls. This has also become a site for a regular “farmer’s market” and a recyclable collection center.
  - Wahiawa park and ride. A shared-use facility with the Hawaii National Guard, on Leilehua Road, located across from Wheeler A.F.B.
- An additional transit center has been proposed for a location at Wahiawa to be designated in the future.
- Expansion of bike facilities.
- Land development decisions, including:
  - Future development of Mililani Mauka lands east of H-2.
  - Possible development of former Dole pineapple lands along Kunia Road. (Dole suddenly closed operations in November 2006)
  - Redevelopment of Wahiawa, a depressed small urban area.

### ***East Honolulu (Ongoing)***

*East Honolulu is an area in which, due to geography, relatively little change in land use or transportation is expected over the next several decades. Little additional land is available for residential use, other than areas presently dedicated for parkland, including Ka Iwi State Scenic Shoreline. Also, as neither a controlled-access highway or fixed-guideway transit line is proposed for the area, nor any major employment centers, substantially increasing the population is not feasible. The most substantial change is expected to be a steady shift out of older residents by a replacing population of younger households with some children.*

General policies and guidelines.

General policy:

- Commuter travel.
  - Reduce reliance on private passenger vehicles by promoting transportation system management (e.g., the HOV lane from the west end of Hawaii Kai to H-1) and travel demand management (e.g., mass transit, carpool, and vanpool programs).
  - Provide more frequent, larger capacity, and more comfortable vehicles and expansion of improved park-and-ride facilities.
- Local trips.
  - Modify residential neighborhood street design, where appropriate, to provide more safe, accessible, convenient and comfortable pedestrian routes, bus stops, and bike routes, even if this requires somewhat slower travel speeds or less direct routes, and

fewer on-street parking spaces for automobiles. This may require review and revision of city street standards.

- Provide more convenient pedestrian paths within commercial and other high-activity areas (e.g., from the park and ride facility to the Hawaii Kai Town Center) to encourage people to walk between buildings instead of moving their car. Construct paved paths around the Hawaii Kai Marina to improve accessibility to various waterfront locations.
- Implement traffic calming measures in residential areas to reduce average motor vehicle speeds, thereby increasing safety and enjoyment for pedestrians and bicyclists.

#### Planned roadways:

- Extend Hawaii Kai Drive to Kamilonui Place, and thence on to Lunalio Home Road, to create a more direct and safe bicycle route from Lunualio Home Road and the Kalama Valley to points west.

#### Neighborhood commercial centers, resorts, and institutions:

- Provide street frontage improvements for bus stops, including a bus shelter and a dedicated pull-out area, along all bus routes.
- Provide clearly marked paths from bus stops to commercial center entrances. Pathway should be clearly indicated with special paving or markings and covered to provide weather protection, if not incorporated into commercial center buildings.
- Develop a pedestrian route along the Hawaii Kai marina, especially between Hawaii Kai Towne Center and the Hawaii Kai Shopping Center. This route should incorporate a pedestrian bridge across the Hawaii Kai lagoon to provide convenient access between the two centers, and enhance the recreational value of the marina.
- Provide bicycle racks that securely protect bicycles and are visible from streets outside commercial centers.

#### Summary of projects (or categories of projects) that would impact the systems energy efficiency

- Expansion of transit service.
  - One significant transit facility currently exists: Hawaii Kai Park and Ride, 240 Keahole Street. Covered waiting area, 134 parking stalls.
  - In May 2007, the City and County of Honolulu announced that East Honolulu bus service would be revamped to speed travel between East Honolulu and the principal urban region. A new Route 1L bus will provide peak-hour express service between Kahala Mall, along the western edge of the East Honolulu district, and Chinatown, running local thence to Hawaii Kai. The existing Route 1 will be terminated at Kahala Mall when Route 1L is operating.
  - Route 1 and 1L will cease diverting into Aina Haina, and this area will be served by the new Route 233 circulator.
  - Two circulators in Hawaii Kai, Routes 231 and 232 will eliminate much local running in Hawaii Kai by Route 1.
  - Circulators Route 234 and 235, will replace Route 21 in Waialae Iki.

- Route 58, running half-hourly from Waikiki and Kahala to Sea Life Park, just north of Makapuu Point, will be replaced by an hourly Route 23 and coordinated better with Route 22 service between Waikiki, Kahala, Hawaii Kai, and Hanauma Bay.
- Expansion of bicycle facilities, including new bicycle lanes in Aina Haina, Niu Valley, and throughout Hawaii Kai, and a separate bicycle route through the new Ka Iwi State Scenic Shoreline park between Hawaii Kai and Makapuu Point.
- Land development decisions, including:
  - Development of Ka Iwi State Scenic Shoreline Park, which may convert Kalaniana'ole Highway to a scenic parkway.
  - Expiration of long-term leases committing lands, mostly east of Hawaii Kai, to agricultural use.
  - A proposal, active since 2003, to convert the last 87 acres of Kamilonui Valley on the north side of Hawaii from nurseries and other agriculture to housing.

## Appendix V - Strategies from Other Jurisdictions: Modes of Travel

### Overview

#### **United States**

In the United States, the implementation of vehicle efficiency measures have proven to be some of the most effective strategies to improve energy efficiency in the transportation sector. State improvements in vehicle energy efficiency have been shown to reduce energy consumption from 9 to 15 percent. These improvements are achieved through strategies that target total vehicle miles traveled, and the amount of fuel consumed per mile of travel.<sup>1</sup> In some regions, the formation of strategic partnerships has also been key to enhancing or enforcing state energy efficiency goals. Some of these regional partnerships include the Conference of the New England Governors and Eastern Canadian Premiers (NEG-ECP), Northeast States for Coordinated Air Use Management (NESCAUM), Western Climate Initiative (WCI), and Regional Greenhouse Gas Initiative (RGGI).

#### Northeastern United States

In the northeast region of the U.S., states are working together to reduce energy consumption through NESCAUM, NEG-ECP and RGGI. NESCAUM is an association of air quality agencies in the northeast with Air Board Directors from eight northeastern states (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont). NESCAUM provides scientific, technical, analytical, and policy support to the air quality programs in each respective state.

The New England Governors' (NEG) Conference, on the other hand, is a forum for the Governors of Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine to work together to respond to regional issues. The NEG Conference, in partnership with the Eastern Canadian Provinces, developed a region-wide action plan to reduce energy consumption. In 2001, the New England Governors' Conference and the Eastern Canadian Premiers (NEG-ECP) set a region-wide goal of reducing energy consumption by at least 10 percent below 1990 levels by 2020 for the whole economy, including the transportation sector. As part of the action plan to achieve this goal, the NEG-ECP developed a variety of programs and policies, including the Regional Greenhouse Gas Initiative (RGGI). RGGI is the first U.S. mandatory cap and trade program for carbon dioxide.

#### Western United States

In the western region of the U.S., states like Arizona, California, Colorado, Montana, New Mexico, Oregon, Utah and Washington have created state action plans to reduce their reliance on petroleum and increase energy efficiency in the transportation sector. A western regional partnership, similar to that of the RGGI in the northeastern states, has also been formed with the region-wide goal of reducing energy consumption by 15 percent below 2005 levels by 2020 across all sectors, including transportation. Members of this partnership, known as the Western Climate Initiative (WCI), have committed to vehicle efficiency measures such as the Clean Car Program, and plan to institute

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<sup>1</sup> Source: PB using data analyzed from State Climate Action Plans of Arizona, California, Connecticut, New Mexico, New York, and Rhode Island.

regional market-based mechanisms to enhance the effectiveness of the states' individual action plans.

## **International**

### Asia Pacific

Since the Asia-Pacific region is home to both some of the poorest and wealthiest countries in the world, energy efficiency benchmarks and strategies are not yet coordinated among the different countries. That said there are a number of regional organizations and programs that have been established to encourage energy-efficiency through collaboration, education, grant funding, soft loans, and data provision. For example, the Asia-Pacific Economic Cooperation (APEC) is currently establishing guidelines for the development of bio-diesel standards for the APEC region, surveying transport efficiency policies in APEC economies, and developing alternative transport fuels implementation guidelines. Other multi-lateral efforts include the Asian Environmental Compliance and Enforcement Network (ASCEN), which promotes improved compliance with environmental legal requirements in Asia; the World Bank Asia Alternative Energy Program (ASTAE), which provides financing for alternative energy projects; and the Clean Air Initiative Asia (CAI Asia), which promotes and demonstrates innovative ways to improve air quality throughout Asia.

In recent years, two countries in the Asia-Pacific region have been particularly active in promoting energy-efficiency: Singapore and Japan.

Like Hawaii, Singapore is an environmentally-conscious island economy, with limited space to grow and relatively high fuel costs. Since the mid-nineties, the Singaporeans have initiated a series of programs and regulations intended to integrate land use and transport planning, encourage transit use, improve fleet efficiency, and reduce car ownership.

Japan has virtually no domestic oil or natural gas reserves, and in 2005, Japan was the second largest net importer of crude oil in the world. In the past few decades, Japan has significantly improved energy conservation and is widely considered a global leader in the development and implementation of energy efficiency innovations. Between 1995 and 2004, average vehicle fuel efficiency in Japan has improved by 22%.

### European Union

The European Community, together with its Member States, is working to improve energy efficiency in all sectors, while increasing use of renewable energies. While there is no formal, mandatory target for energy consumption reduction across the Union, the European Commission-endorsed Green Paper on Energy Efficiency states the European Union (EU) could, by 2010, reduce its present energy consumption by 20 percent in a cost-effective manner, equivalent to EUR 60 billion per year, or the present combined energy consumption of Germany and Finland.

There are at least two EU-wide schemes that induce better energy efficiency in road transport, namely fuel economy standards (which, unlike other countries, are voluntary and are based on CO<sub>2</sub> emissions) and emissions-based toll-charging. The EU directive for tolling schemes requires that fees are scaled both according to the duration of the use made of the infrastructure and to vehicles' emission classes (Non-EURO, EURO I, EURO II, etc.). Although the application of tolls and user

charges is not mandatory for member states, any state wishing to implement tolls is expected to follow the directive.

In October 2003, the EU Parliament and Council issued Directive 2003/87/EC, establishing an emissions trading scheme which became operational in January 2005. Although mobile (e.g., transport) emissions are not currently included in the scheme, proposals have been made for inclusion after 2012.

Most of the following examples, which are illustrative of the European Union's innovation and leadership in energy efficiency strategies, have been drawn from the United Kingdom.

The UK is the largest producer of oil and natural gas in the EU. However, after years of being a net exporter of both fuels, the UK became a net importer of natural gas in 2004, and may now be (or soon will be) a net importer of oil. In response, the government has begun a multi-pronged strategy to address predicted domestic shortfalls, including a series of programs and regulations targeted at the transportation sector. Working closely with the UK Department for Transportation to design, promote, and implement these strategies is the Energy Saving Trust, which also provides free consultancy services to public and private sector parties.

## **Providing More Choices in Modes of Travel**

### **United States**

#### Northeastern United States

In the transportation sector, the Northeast is taking steps to increase transportation system efficiency through commuter trip reduction initiatives and VMT (vehicle miles traveled) reduction measures.

Rhode Island, in particular, is reducing vehicle use through a state-wide Commuting Trip Reduction Initiative. The Rhode Island Department of Administration set up a Committee on State Employee Transportation consisting of Directors of the Departments of Administration, Transportation, Environmental Management, Health, and Statewide Planning, the General Manager of the Rhode Island Public Transit Authority (RIPTA)<sup>2</sup>, or their designees, and a representative from a state employee union. The Committee was charged to develop, publicize, and implement a plan giving incentives to state employees to reduce vehicle miles in commuting to work. The Committee investigated employee incentives offered by other public entities around the country, such as practices developed by EPA's Best Workplaces for Commuters Program. The Committee also considered the implementation of carpool, flex time, telecommuting, guaranteed-ride-home, bike-to-work and walk-to-work programs. Additionally, the plan will offer a RIPTA transit pass to employees in lieu of parking privileges.

Land use is another factor that is important in changing mode choice. The Northeast region's transportation and land use strategies can best be depicted through transit-oriented development and improved bicycle and pedestrian infrastructure. New York is a good example for smart growth planning and reduced VMT growth. For New York, slowing VMT growth through efficient land

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<sup>2</sup> Rhode Island Greenhouse Gas Process.

<http://rihg.raabassociates.org/events.asp?type=grp&event=Stakeholder%20Committee>.

use planning involves targeted infrastructure investments (invest in more energy efficient alternatives and less in energy inefficient modes), enforcing integration of land use development and efficient transportation modes (by requiring reporting pursuant to the State Environmental Quality Review Act (SEQRA), Transportation Improvement Programs and Long Range Transportation Plans)<sup>3</sup>, and initiating an annual competitive grant solicitation for local governments and private companies to propose energy saving ideas. Implementing a number of these “smart growth” strategies has the potential to reduce transportation energy consumption up to 11 percent.

### Western United States

Many states in the Northeast and Western regions of the US are focusing on land and location-efficient growth strategies. Some of these strategies used in the West include infill and urban brownfield redevelopment; transit-oriented development, including multi-modal transit proposals; targeted open space protection; and smart growth planning and tools that allow and support location efficient growth in communities that are proximate to household amenities (i.e., jobs, shopping, school, services, entertainment) as opposed to growth in areas that require greater travel distance and have less mode choice. These strategies allow for mixed land uses with a range of housing opportunities and multiple transportation options including increased pedestrian and bicycle access. Western states that have adopted these measures have seen increases in energy efficiency in the range of 3 to 11 percent.

Another strategy that could encourage the use of alternative modes is Pay-As-You-Drive (PAYD) insurance. PAYD is a form of variable priced insurance whereby a portion of vehicle insurance payments are assessed on a per mile basis. PAYD has been promoted by a variety of groups for reasons that include emissions reductions, safety (through decreased driving), and fairness (by changing insurance costs to more closely track the portion of individuals' risk that is created by miles driven). PAYD insurance is available through GMAC for GM car owners in at least 34 states and pilot programs have or are currently being run by other insurance companies in Arizona, Oregon, Washington and a few other Midwest states. Progressive Insurance, for example, has seen reductions in driving of about 20 percent as a result of an initial 5,000 car pilot project.

### **International**

#### Asia Pacific

Singapore has led the region for many years with its innovative strategies for reducing vehicle miles traveled. The two most well-known schemes are the national car registration quota, which both restricts the number of cars that may be purchased each year and substantially increases the cost of ownership, and electronic, dynamic congestion charging, which discourages car travel in central parts of the city during select times of the day. In addition to these, Singapore has also initiated smaller schemes to reduce driving, such as a park and ride program, which includes the sale of convenient combined parking and transit monthly passes, and personalized RFID (Radio Frequency ID) fare cards that can be used for all transit and taxi fares, as well as downloading coupons and making store purchases. There are also private sector-led initiatives that reduce overall vehicle miles

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<sup>3</sup> Recommendations to Governor Pataki for Reducing New York State Greenhouse Gas Emissions, 2003. [http://www.ccap.org/pdf/04-2003\\_NYGHG\\_Recommendations.pdf](http://www.ccap.org/pdf/04-2003_NYGHG_Recommendations.pdf).



traveled, e.g., a competitive car sharing program and a new, high-tech bicycle sharing scheme, similar to the program recently initiated in Paris.

In Japan, the private sector has created efficiencies in the transport system, through promotion of transit use. For example, strict government control of fares have led private transit operators in Tokyo and Osaka to diversify their businesses by introducing services linked to their train operations and entering other sectors, including road-based transit services, suburban residential development near stations, and retail services and “leisure centers” near train stations – all of which promote transit-oriented development and additional ridership.

In an attempt to better integrate land use and transportation planning, in 1995, the Singaporean government created the Land Transport Authority (LTA) by merging four separate public entities: Registry of Vehicles, Mass Rapid Transit Corporation, Roads and Transportation Division of the Public Works Department, and Land Transport Division of the then-Ministry of Communications. With the ultimate goal of encouraging transit use, the LTA oversees both private surface transport and public transport, and is permitted to manage real estate / urban development activities in areas adjacent to transit hubs and stations.

### European Union

In general, transit ridership and non-motorized trip rates tend to be much higher in the EU than in the US. While there are many historical, cultural, and geographical reasons for this difference, there are also a myriad of policies that favor non-motorized and transit travel rather than automobile ridership – e.g., charging relatively high fuel taxes, dedicating fuel taxes to transit capital expenditures, developing universal fare card systems for transit, charging high parking fees, and investing in extensive bicycle lane networks.

While most European cities tend to feature the dense development and mixed uses that are conducive to transit ridership as well as targeted transit-oriented plans, Denmark and Sweden are often credited for having the most visible, successful transit-oriented development strategies, which focus pedestrian-friendly town and neighborhood development around light and heavy rail stations.

One of the most internationally visible examples of strategies that can encourage the use of alternative modes and VMT reduction in Europe is London’s successful Congestion Charge, which discourages automobile travel to the urban center and designates a portion of collected congestion fees toward transit improvements. Similar schemes have been established in Stockholm, Oslo, and Trondheim (Norway).

Less visible but also effective are the Pay-as-You-Drive (PAYD) Insurance schemes, where a portion of auto insurance premiums are linked to miles driven (while the remaining portion is a “fixed cost” as under current practice). Active schemes may be found in the UK, Italy, and the Netherlands. PAYD schemes are advantageous from an energy efficiency standpoint in that they provide a financial incentive to both commercial and non-commercial drivers to drive less. Also, management and costs are typically borne by the private sector.

## Appendix VI – Strategies from Other Jurisdictions: Fuel Efficient Vehicles

### United States

#### Northeastern United States

A variety of vehicle efficiency measures have been implemented in this part of the country, including the Clean Car Standards, California Low Emission Vehicle (LEV) II Emissions Standards, feebates, incentives for advanced technology vehicles, and congestion pricing. A common vehicle efficiency strategy considered among the northeastern states of Rhode Island, Connecticut and New York, was a statewide feebate program. Feebate programs are applicable to the purchase of new vehicles and institute a schedule of fees and rebates to the consumer based on a vehicle's fuel economy.

Although feebate programs work best under multi-state participation, the program also acts as a backstop to programs and policies like the Clean Car Program, which has the potential to reduce energy consumption within the range of 12-19 percent, based upon the changeover of the entire fleet.

In addition, region-wide, many states are improving operational efficiency by adopting anti-idling laws for heavy-duty trucks and buses and implementing truck stop electrification/plug-in areas for heavy-duty vehicles and hybrids. In addition, states such as New York and Connecticut are educating the public about energy efficient driving practices through public education programs and driver education courses.<sup>4</sup> Energy efficient driving behavior involves practices like eliminating “jack rabbit” starts, coolest temperature fueling, speed limit observation, proper vehicle maintenance, including proper tire inflation, fuel efficient tires, and regular tune ups.

#### Western United States

Over the past decade, some of the more stringent vehicle efficiency standards have come from California legislation. In 2002, AB 1493, the “Pavley Standards,” introduced by Assemblywoman Fran Pavley, was signed by the Governor. The Pavley Standards, also known as the Clean Car Program and the CA GHG Tailpipe Standards, will require a 30 percent reduction in emissions from all new passenger vehicles. This reduction is a result of improved technology design in new vehicles that also result in greater fuel economy, with a reduction in fuel consumption of about 15 percent. If approved by the US EPA, the stronger standards will be phased in from 2009 to 2016. New cars and light trucks in all states must comply with federal emission standards, and, generally speaking, states have the choice of adopting a stronger set of standards applicable in California. Thus far, seventeen states have already adopted the California Clean Car Program Standards including:

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<sup>4</sup> Recommendations to Governor Pataki for Reducing New York State Greenhouse Gas Emissions, 2003.

[http://www.ccap.org/pdf/04-2003\\_NYGHG\\_Recommendations.pdf](http://www.ccap.org/pdf/04-2003_NYGHG_Recommendations.pdf)

Connecticut Climate Change Action Plan, 2005: Transportation and Land Use Sector.

[http://www.ctclimatechange.com/documents/TransportationSector\\_CCCAP\\_2005.pdf](http://www.ctclimatechange.com/documents/TransportationSector_CCCAP_2005.pdf)

Arizona, California, Colorado, Connecticut, Florida, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Utah, Vermont and Washington.<sup>5</sup>

This part of the country is also adopting the Low Rolling Resistance (LRR) Replacement Tire Program in some areas. Currently, vehicle manufacturers use LRR tires on new vehicles, but they are not easily available to consumers as replacement tires. When installing original equipment tires, carmakers use LRR tires to meet federal corporate automobile fuel economy (CAFE) standards. When replacing the original equipment tires, consumers often purchase less fuel-efficient tires and potentially, more costly tires (depending on annual vehicle miles traveled). At present, tire manufacturers and retailers are not required to provide information about the fuel efficiency of replacement tires. The LRR Replacement Tire Program sets minimum energy efficiency standards for replacement tires and requires that greater information about LRR replacement tires, including the availability of all season/all weather LRR tires, be made available to consumers at the point of sale. The goal of this strategy is to improve the fuel economy of the light duty vehicle (LDV) fleet by setting minimum energy efficiency standards, which can result in up to 4.5 percent fuel savings.

Like many others, those in the western region are also adopting operational standards for heavy-duty and passenger vehicle fleets. Anti-idling measures and slower speed limits have been enforced for heavy-duty vehicles, particularly commercial trucks. These measures have been implemented to conserve energy during operations as much as possible and enforcing slower speed limits for commercial trucks can reduce energy consumption up to 13 percent. In efforts to lead by example, state government agencies have also set stronger standards for their own fleet vehicles.

## **International**

### Asia Pacific

To improve the vehicle efficiency of the nation's passenger fleet, the Singapore National Environment Agency sponsors a Fuel Economy Labeling Scheme for passenger vehicles, which helps consumers easily recognize and compare the fuel economy of different vehicles.

In 1999, Japan introduced the "Top Runner" program, which applies to multiple goods, including passenger and freight vehicles. The scheme sets future fuel efficiency standards higher than the performance of the best product among those currently commercially available in the same product category. Manufacturers who have not achieved the standards by the set deadline are given technical advice, publicly announced, and/or fined a sum less than or equal to US\$8,700.<sup>6</sup>

In 2002, Japan initiated a "Green Tax" program, which includes a combination of tax incentives and penalties for fuel and energy efficient passenger and commercial vehicles. Sales tax reductions for hybrid passenger cars are about 2.2%, and reductions for electric, CNG, and hybrid trucks are about 2.7%. Tax penalties for Diesel, gasoline, and LPG vehicles older than 10 years are about 10%.<sup>7</sup> As of

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<sup>5</sup> States Poised to Adopt California Vehicle GHG Standards.

[http://www.pewclimate.org/what\\_s\\_being\\_done/in\\_the\\_states/vehicle\\_ghg\\_standard.cfm](http://www.pewclimate.org/what_s_being_done/in_the_states/vehicle_ghg_standard.cfm).

<sup>6</sup> Japan Ministry of Economy, Trade, and Industry; Energy Conservation and Renewable Energy Department. 6 December 2006. "Energy Efficiency and Conservation Policy in Japan."

<sup>7</sup> Japan National Institute for Environmental Studies. May 2006. Global Carbon Project. "Japanese Efforts to Reduce CO2 from the Transportation." Power Point Presentation given at Regional Workshop on Climate Change Mitigation in the Transport Sector.

2006, hybrids, such as the Toyota Prius, accounted for almost 11 million, or 21 percent, of all autos on Japanese roads.<sup>8</sup>

Average vehicle fuel efficiency in Japan has improved by 22% between 1995 and 2004.<sup>9</sup>

To improve operational efficiency of vehicles, starting in 2003, Japan introduced the “Eco-Drive” program, which includes a public awareness campaign and partial government subsidies for purchasing cars equipped with a system for tracking fuel efficiency.

### European Union

Similar to the fuel economy labeling programs in Singapore and Japan, in the UK, new cars feature labels that highlight the fuel efficiency. In addition, labels also feature information on how much drivers can expect to pay in fuel bills in a typical year for a particular car, and whether the car qualifies for a reduction in Vehicle Excise Duty.

Fuel efficient and cleaner fuel vehicles are also promoted in the UK through a special “add-on” to the London Congestion Charge infrastructure. For example, Transport for London offers a 100 percent discount on the US\$16 charge for vehicles on the “PowerShift” Register. Register approval is based on the particular combination of vehicle (make, model and model year), equipment (LPG, NG or hybrid) and manufacturer or converter. Full electric vehicles are not included on the PowerShift register since they are already exempt from the congestion charge scheme.

The UK Department for Transport is introducing new vehicle excise duties and company car taxes that are graduated according to CO2 emissions – which would, by default, reduce dependence on fossil fuels and/or improve energy efficiency.<sup>10</sup>

Finally, the UK Energy Savings Trust, partially funded by the Department for Transport also offers free “green fleet reviews” to provide organizations with tailored fleet management advice to help lower running costs, reduce environmental impact and enhance corporate social responsibility.

The UK Department for Transport actively promotes an anti-idling (e.g., the “Switch it Off”) campaign, and other countries, such as Sweden and Germany, may enforce anti-idling in commercial vehicles.

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<sup>8</sup> Faiola, Anthony. 16 February 2006. Washington Post. “Japanese Putting All Their Energy into Saving Fuel.” <http://www.washingtonpost.com/wp-dyn/content/article/2006/02/15/AR2006021502762.html>

<sup>9</sup> Japan Ministry of Economy, Trade, and Industry; Energy Conservation and Renewable Energy Department. 6 December 2006. “Energy Efficiency and Conservation Policy in Japan.”

<sup>10</sup> UK Department for Transport. Accessed 2007. “Delivering better transport: a summary of priorities 2004/05 .” <http://www.dft.gov.uk/about/publications/priorities/deliveringbettertransport200405?page=5>

## Appendix VII – Strategies from Other Jurisdictions: Diversifying Energy Sources

### United States

#### Northeastern United States

Some of the most innovative alternative energy production strategies have come from the northeast region of the United States. Alternative fuel incentive programs, state procurement of bio-diesel production, renewable fuel standards of 25 percent by 2025 (also known as the 25x25 program), and the development of infrastructure to handle low emission, alternative fuels are just a few of the strategies being implemented in the region. In Pennsylvania, for example, Governor Rendell created a public-private partnership to develop the East Coast's first state-of-the-art biofuels injection facility. The facility opened last fall and received \$219,908 in state aid. The plant will replace 3.2 million gallons of foreign oil with domestically produced biodiesel and keep \$6 million worth of energy dollars in the state by reducing the state's need to purchase imported fuels.

#### Western United States

Similar to the Northeastern United States region, the western region also has goals of decreasing petroleum dependency and increasing fuel diversity in the transportation sector. Like Pennsylvania's efforts to increase in-state alternative energy resources, western states are also setting goals to cut petroleum consumption and provide an increased diversity of alternative transportation fuels in the market. California, for example, created the Low Carbon Fuel Standard (LCFS) to address the growing need for petroleum independence. LCFS is a fuel neutral, market- and performance-based strategy to reach a 10% reduction in carbon intensity of motor fuels by year 2020<sup>11</sup>. Low carbon fuels include, but are not limited to, biodiesel, cellulosic ethanol, hydrogen, compressed natural gas, liquefied petroleum gas, electricity, and low carbon blends such as E10 or E85. Additionally, California is seeking to further reduce petroleum consumption by converting some of its rail lines from diesel to electric service (e.g. Caltrain) and considering a high speed rail line in which Californians will vote on next year.

Other parts of the western region have also adopted aggressive goals of cutting oil usage. Areas like Portland, Oregon just recently announced its goal to cut oil and natural gas use by 50 percent over the next 25 years. Commissioner Adams will offer an implementation plan regarding transportation-related issues responsive to the Peak Oil Task Force recommendation in 2008<sup>12</sup>.

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<sup>11</sup> The Role of the Low Carbon Fuel Standard. <http://gov.ca.gov/index.php?/fact-sheet/5155/>. For other reports on LCFS, please visit: [http://www.energy.ca.gov/low\\_carbon\\_fuel\\_standard/](http://www.energy.ca.gov/low_carbon_fuel_standard/).

<sup>12</sup> Peak Oil Task Force. <http://www.portlandonline.com/osd/index.cfm?c=ecije>.

## **International**

### Asia Pacific

Both Japan and Singapore actively promote the use of alternative fuels. In Singapore, since 2003, the National Environment Agency has sponsored a Green Vehicle Rebate scheme, which reimburses consumers for purchasing vehicles that use energy sources other than petroleum and diesel, such as compressed natural gas (CNG), electricity, methanol, hydrogen, or solar energy.<sup>13</sup> In Japan, the Green Tax program (mentioned previously) provides both tax incentives and penalties to encourage the use of alternative fuels and hybrid vehicles.

### European Union

The UK Energy Savings Trust has recently established “Alternative Fueling Station” grants to help organizations install refueling or recharging stations for alternative, cleaner fuels.

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<sup>13</sup> Japan Ministry of Economy, Trade, and Industry; Energy Conservation and Renewable Energy Department. 6 December 2006. “Energy Efficiency and Conservation Policy in Japan.”

# Appendix VIII - Draft Legislative Proposal and Budget for the 2008 Legislature

TWENTY-THIRD LEGISLATURE  
REGULAR SESSION OF 2008  
STATE OF HAWAII

\_.B. NO.

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## A BILL FOR AN ACT

MAKING AN APPROPRIATION FOR A STUDY ON ENERGY EFFICIENT  
TRANSPORTATION STRATEGIES.

### **BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII**

SECTION 1. Act 254, 2007 Session Laws of Hawaii appropriated funds to the Hawaii energy policy forum at the University of Hawaii at Manoa to conduct a study on energy-efficient transportation strategies in conjunction with the department of business, economic development, and tourism. Act 254 required that the study include the following criteria in its analysis:

- (1) Developing tangible goals, objectives, desired outcomes, and actions to implement an energy-efficient transportation strategy;
- (2) Developing implementation benchmarks for measuring outcomes of energy-efficient transportation strategies; and
- (3) A cost-benefit analysis of each energy-efficient transportation strategy.

The Hawaii energy policy forum thus convened a working group in August 2007 to develop the parameters of the study. The energy-efficiency transportation strategies working group is a diverse group whose members include representatives from the state department of transportation, the department of business, economic development and tourism, each county's transportation division, labor organizations, transportation planning organizations, petroleum refineries, and from the automobile dealers and manufacturers industries.

The working group developed a vision of "an energy efficient transportation system that integrates effective community input and planning (demand), and offers people of all ages and walks of life flexible options (supply) including mass transit, private and public vehicles and self-powered conveyance in alternative combinations that provide mobility at acceptable cost".

The working group also established three goals on which the study should focus: (1) Increase choices for modes of travel, multiple modes of travel permit greater public choice for efficient and flexible trip planning; (2) Increase fuel efficiency of vehicle population, incentives to improve the fuel efficiency of Hawaii's vehicle population will influence consumer behavior in favor of buying and using more efficient vehicles; and (3) Diversify energy sources available to meet



transportation energy needs, greater diversity of energy sources provides additional flexibility in meeting the energy needs of the transportation sector.

The working group also agreed upon the following:

- (1) In order to agree upon specific transportation energy efficiency benchmarks and goals for the State of Hawaii as required in Act 254, additional review of relevant data is needed. The data that should be considered by the working group includes transportation demand and fuel consumption data from the State, county, and city jurisdictions and their respective government agency sources.
- (2) The State will be more likely to meet these goals and make progress toward meeting long-term benchmarks if current information on transportation system energy efficiency is regularly available and changes in energy efficiency of the transportation sector are regularly monitored; and
- (3) In order to regularly monitor progress toward meeting the benchmarks that would be recommended, a statewide transportation sector energy-efficiency information and monitoring system should be established and maintained.

The purpose of this Act is to appropriate funds for the Hawaii energy policy forum to continue its work with the energy-efficiency transportation strategies working group created by Act 254, 2007 Session Laws of Hawaii, to develop energy-efficient transportation strategies.

SECTION 2. (a) The Hawaii energy policy forum at the University of Hawaii at Manoa shall conduct a study on energy-efficient transportation strategies in conjunction with the department of business, economic development, and tourism, the department of transportation, and members of the energy-

efficient transportation strategies working group. The working group is comprised of representatives from the following:

- (1) Each of the counties;
- (2) Office of Hawaiian Affairs
- (3) research corporation of the University of Hawaii;
- (4) Hawaii Natural Energy Institute;
- (5) Oahu Metropolitan Planning Organization;
- (6) Honolulu Clean Cities;
- (7) Hawaii Center for Advanced Transportation Technologies;
- (8) Hawaii State AFL-CIO;
- (9) Hawaii Auto Dealers Association;
- (10) Hawaii Transportation Association;
- (11) Alliance of Automobile Manufacturers;
- (12) Energy Industries;
- (13) Tesoro Hawaii Corporation; and
- (14) Hawaiian Electric Company.

(b) The energy-efficient transportation strategies study under subsection (a) shall include but not be limited to:

- (1) Determining data available among government and business sources;
- (2) Identifying gaps in critical data; and
- (3) Developing a reasonable and workable plan for developing, using, and maintaining a statewide

transportation energy information and monitoring system.

(c) The social sciences public policy center shall continue to engage and integrate the energy-efficiency transportation strategies working group comprised of Hawaii's business, government, labor, and community leaders into the study on energy-efficient transportation strategies.

(d) The department of business, economic development, and tourism, the department of transportation and the members of the working group listed under Section 2(a) shall consult with and otherwise assist the social sciences public policy center at the University of Hawaii at Manoa on the energy-efficient transportation strategies study.

(e) The Hawaii energy policy forum shall submit a report on its findings and recommendations to the legislature no later than twenty days prior to the convening of the regular session of 2009.

SECTION 3. There is appropriated out of the general revenues of the State of Hawaii the sum of \$175,000 or so much thereof as may be necessary for fiscal year 2007-2008 to collect and analyze data and to develop a plan for developing, using, and maintaining a statewide transportation energy information and monitoring system.

The sum appropriated shall be expended by the University of Hawaii social sciences public policy center for the purpose of this Act.

SECTION 4. This Act shall take effect on July 1, 2008.

INTRODUCED BY:

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## 2008 Budget

	Person - Mo.	Salary	Fringe	Total	cost share
<b>A1. Senior Personnel</b>					
Sharon Miyashiro	1.5	14,250	5,452	0	19,702
Susan Char	9.00	45,000	17,217	62,217	
Subtotal A1		59,250	22,669	62,217	
<b>A2. Other Personnel</b>					
Junior faculty (overload + CBO)				15,000	
Grad Student				17,000	
Admin Support				10,000	
Subtotal A2		0	0	42,000	
<b>Total Salary, Wages, and Fringe</b>		<b>59,250</b>	<b>22,669</b>	<b>104,217</b>	
<b>C. Travel</b>				<b>15,000</b>	
1. Domestic				15,000	
2. Foreign				0	
<b>D. Permanent Equipment</b>				<b>0</b>	
<b>E. Materials and Supplies</b>				<b>5,000</b>	
Postage & Supplies				5,000	
<b>F. Subcontracts</b>				<b>40,000</b>	
Consultant				40,000	
<b>H. Other Direct Costs</b>				<b>10,000</b>	
Stakeholder Meetings				10,000	
				0	
				0	

<b>I. Total Direct Costs (A-G)</b>	174,217
<b>J. Indirect Costs (0%)</b>	0
<b>K. Total Direct and Indirect Costs</b>	<b>174,217</b>

## Appendix IX – Legislative Initiatives from Other Jurisdictions

### State Transportation Energy Efficiency Incentive Fund

- Modeled after federal Congestion Mitigation and Air Quality Improvement Program (CMAQ)<sup>14</sup> and California Carl Moyer programs
  - Model projects and programs are funded according to the following criteria:
  - Programs and projects result in documented shift in mode of travel from more energy intensive to less energy intensive mode.
  - Programs and projects result in documented trip reduction through telecommuting, electronic commerce, etc.
  - Programs and projects result in replacement of less fuel efficient fleet vehicles to more fuel efficient fleet vehicles
  - Programs and projects result in documented reduction in size of existing fleets through carsharing and other fleet economizing measures.
  - Incentive programs and projects result in documented replacement of less fuel-efficient vehicles with more fuel-efficient vehicles by individual households and consumers.
  - Other programs and projects to be determined by the Department to be consistent with the vision and goals stated in this legislation.

### Gold Star Program (“Top Runner”)

Based on Japan’s “Top Runner” program, the program would set future fuel efficiency standards higher than the performance of the best product among those vehicles that are currently commercially available in the same product category.<sup>15</sup> Manufacturers who have not achieved the standards by the set deadline are given technical advice, publicly announced, and/or fined.

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<sup>14</sup> Intermodal Surface Transportation Efficiency Act of 1991. <http://ntl.bts.gov/DOCS/ste.html>. For guidance documents, visit: United States Department of Transportation, Federal Highway Administration “Congestion Mitigation and Air Quality Improvement Program.” <http://www.fhwa.dot.gov/environment/cmaqpgs/>.

<sup>15</sup> Japan Ministry of Economy, Trade, and Industry; Energy Conservation and Renewable Energy Department. 6 December 2006. “Energy Efficiency and Conservation Policy in Japan.”