

UNIVERSITY OF HAWAI‘I SYSTEM

ANNUAL REPORT



REPORT TO THE 2008 LEGISLATURE

Status Report on
Making an Appropriation for Energy Efficient Transportation Strategies

Act 254
Session Laws of Hawai'i 2007

November 2007

Status Report in Response to Act 254, 2007 Session Laws of Hawaii Making an Appropriation for Energy Efficient Transportation Strategies

Prepared by the Hawaii Energy Policy Forum
November 16, 2007

This document provides a status report in response to Act 254¹, 2007 Session Laws of Hawaii, entitled “Making an Appropriation for Energy Efficient Transportation Strategies”. Funding from Act 254 was released in the Fall of 2007 so work on this matter is currently still in progress. This report is therefore a status report of accomplishments to date. A final report will be submitted as soon as the working group has completed its final review and when the process for this issue is scheduled to be completed.

The Hawaii Energy Policy Forum at the University of Hawaii at Manoa was tasked with conducting a study on energy efficient transportation strategies for the State of Hawaii. 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) A cost-benefit analysis of each energy-efficient transportation strategy.

The Hawaii Energy Policy Forum (“HEPF”) 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. It invited representatives from the State Department of Transportation (DOT), the Department of Business, Economic Development and Tourism (DBEDT), each county’s transportation division, labor organizations, transportation planning organizations, petroleum companies, and from the automobile dealers and manufacturers industries.² These members comprise the Energy Efficiency Transportation Strategy Working Group (“working group”). From its first meeting in August 2007 through the writing of this status report, the working group has met three times and worked intensively with the consultant and HEPF during this period.

At its first meeting, DBEDT gave a presentation on the background of energy use in ground energy in Hawaii.³ The presentation included information on Hawaii’s petroleum consumption by various sectors, the fuel demand for Hawaii’s ground transportation sector, the average gallons of gasoline used per year per registered vehicle, the relationship between crude oil prices and gasoline prices, and transportation use projections.

¹ See attachment A for Act 254

² See Attachment B for a list of working group members.

³ See attachment C for text of DBEDT’s presentation

The message of DBEDT's 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) The working group should identify available data and 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.

It also 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 and self-powered conveyance in alternative combinations that provide mobility at acceptable cost".

The working group has met monthly since its inception and has made significant progress despite the short time frame and ambitious scope of work outlined in Act 254. A consultant from PB Consult/Parsons, Brinckerhoff, Quade & Douglas, Inc., an international firm with expertise in transportation and energy issues, was hired to help the working group conduct research, compile data, and develop strategies in accordance with the working group's requests.

During this period the working group established three goals on which the study would focus its efforts:

- (1) More choices in *modes of travel* will allow consumers to decide what mode of travel makes the most sense for any given trip;
- (2) More choices in *alternative fuels* will give consumers more options for vehicle and fuel purchase and use; and
- (3) Increasing the *fuel efficiency of Hawaii's vehicle population* by incentivizing consumers' choices as they make vehicle purchase decisions and decide which vehicle to use for any given trip.

Current transportation plans, best practices and other relevant information from within the United States and from international comparisons were reviewed to assess what other jurisdictions have developed and/or implemented as transportation strategies that promote energy efficiency.⁴ One of the more notable documents examined is the Western Governors Association's Resolution on Transportation Energy (2006), which contains seven goals that the working group agreed can provide direction in developing energy efficient transportation strategies. These goals are:

⁴ See Attachment D for a list of transportation plans and documents that were reviewed for this study.

- (1) Reverse our over-dependence on volatile foreign oil supplies;
- (2) Expand economic opportunities through the production and distribution of domestic renewable fuels to all regions of the West;
- (3) Diversify our reliance on petroleum and natural gas as feedstocks for petrochemicals by developing biofuels and coal-derived compounds;
- (4) Evaluate alternative transportation fuels' impacts, seeking to reduce greenhouse gas and other emissions and improve air quality and the environment;
- (5) Encourage distribution of alternative fuel refining and refueling facilities throughout the nation;
- (6) Promote the inclusion of higher renewable content blends in existing transportation fuels; and
- (7) Promote policies that result in more fuel-efficient vehicles and incentivize consumers to purchase hybrids or other fuel-efficient vehicles to reduce our per vehicle consumption of transportation fuel.

Based upon the work completed to date, the working group proposes to continue its work as follows:

- 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. 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 a (1) 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.
- 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. Regular monitoring can enable the State and counties to feel confident 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 organize and present data on the transportation sector's energy consumption and potentially in the future greenhouse gas emissions. The information system would also be a means to better assess the impact to the state and local economy of alternative strategies, and a means to compare the cost-effectiveness of alternative strategies. While not complete Attachment E provides a working draft of the discussion in process on data needs to develop a comprehensive plan.

Legislation proposed for the 2008 Session will therefore request a \$250,000 appropriation to determine data available among government and business sources, identify gaps in critical data, and develop a reasonable and workable plan for developing, using, and maintaining a statewide transportation energy information and monitoring system. The information and monitoring system would be maintained and updated by a responsible state agency.

- DOT and DBEDT as well as all current members of the working group have committed to continue to work together to ensure that funding will be used to further the vision and goals developed to date.
- The legislative proposal therefore includes the University of Hawaii as the expending agency with partners DBEDT and DOT as well as the county and private agencies represented on the working group.⁵
- The data system would include development of transportation sector energy efficiency information and a monitoring system.
- As part of the development of this information and monitoring system, the feasibility of and a plan for development of a statewide motor vehicles fleet fuel consumption model will be assessed and determined.
- The feasibility assessment will include an analysis of the availability of adequate data, and a plan for filling gaps in critical data needs.

The working group has made significant progress in responding to the directives of Act 254, due in large measure to the enthusiasm and commitment of its members. It is a very diverse group

⁵ Partners in addition to the DOT and DBEDT include: Honolulu Department of Transportation Services, City and County of Honolulu, Maui County Energy Office, Hawaii County Department of Research and Development, Hawaii County Transportation Office, Kauai County Transportation Office, Oahu Metropolitan Planning Organization, Office of Hawaiian Affairs, Energy Industries, Hawaii Natural Energy Institute of the University of Hawaii, Honolulu Clean Cities, Hawaii Center for Advanced Transportation Technologies, Hawaii State AFL-CIO, Hawaii Automobile Dealers Association, Hawaiian Electric Company, Hawaii Transportation Association, Alliance of Automobile Manufacturers, and Tesoro Hawaii Corp.

but 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. The working group members are committed to continuing the process through the 2008 Legislative Session and beyond. A final report on the directives of Act 254, along with proposed legislation, will be submitted prior to the 2008 Session.

Approved by the Governor

on JUL 5 2007

ACT 254 Attachment A

HOUSE OF REPRESENTATIVES
TWENTY-FOURTH LEGISLATURE, 2007
STATE OF HAWAII

H.B. NO. 869
H.D. 1
S.D. 2
C.D. 1

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.



H.B. NO.

869
H.D. 1
S.D. 2
C.D. 1


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



Act 254 Working Group								
Name	Title	Organization	Address	Telephone	Fax	Email		
Bob	Arrigoni	Energy Coordinator	County of Hawaii, Dept. of Research and Development	75-5591 Palani Rd., Suite 2001	Kailua-Kona, HI 96740	808-327-3664	808-327-3667	rarrigoni@co.hawaii.hi.us
Tom	Brown	Transit Administrator	Hawaii County	630 E. Lanikaula St.	Hilo, HI 96720	808-961-8343	808-961-8745	tbrown@co.hawaii.hi.us
Mitch	Ewan	Hydrogen Systems Program Manager	HNEI	1680 East-West Road, POST 109	Honolulu, HI 96822	956-2337	956-2336	ewan@hawaii.edu
Barry	Fukunaga	Director	Dept of Transportation	869 Punchbowl Street, Room 509	Honolulu, HI 96813	587-2150	587-2167	dotpao@hawaii.gov
Mark	Glick	Dir., Econ.Dev.	OHA	711 Kapiolani Blvd-Ste 1430	Hon HI 96813	594-1911	594-1865	markg@oha.org
Mike	Hamnett	Executive Director	RCUH	2800 Woodlawn Dr. Suite 200	Honolulu, HI 96822	988-8311	988-8319	mhamnett@rcuh.com
Francis	Keeno	Deputy Director	Dept of Transportation	869 Punchbowl Street, Room 509	Honolulu, HI 96813	587-2154		Francis.Keeno@hawaii.gov
Darren	Kimura	President & CEO	Energy Industries	2660 Waiwai Loop	Hon, HI 96819	839-7300	839-7400	darren.kimura@energy-industries.com
Kal	Kobayashi	Energy Coordinator	County of Maui Managing Director's	200 South High St., Room 604	Wailuku, HI 96793	808-270-7832	808-270-7141	energy_office@mauicounty.gov
Gordon	Lum	Executive Director	Oahu Metropolitan Planning Organization	707 Richards Street, Suite 200	Honolulu, HI 96813	587-2015	587-2018	glumompo@hawaii.rr.com
Clyde	Omija		Honolulu Clean Cities	C & C of Honolulu, 1000 Ulukouia Street	Kapolei, HI 96707	484-7500	484-7506	comija@honolulu.gov
Randy	Perreira	President	Hawaii State AFL-CIO	888 Millilani St., Ste. 601	Honolulu, HI 96813	543-0003	528-0922	rperreir@hgea.org
Tom	Quinn	Director	Hi Ctr for Advanced Transportation Techonogies (HCATT)	531 Cooke Street	Honolulu, HI 96813	594-0100	594-0102	tquinn@htdc.org
David	Rolf	Executive Director	Hi Automobile Dealers Assn	1100 Alakea St. #2601	Honolulu, HI 96813	593-0031	593-0569	drolf@hawaiidealer.com
Janine	Rapozo	Transportation Manager	County of Kauai	4396 Rice Street, Suite 103	Lihue, HI 96766	241-6419		jrapozo@kauai.gov
Peter	Rosegg	Sr. Communications Consultant	HECO	P.O. Box 2750	Honolulu, HI 96840	543-7780	543-7790	peter.rosegg@heco.com
Gareth	Sakakida	Managing Director	Hi Transportation Assn	P.O. Box 30166	Honolulu, HI 96820	833-6628	833-8486	gareth@htahawaii.org
Gary	Slovin		Alliance of Automobile Manufacturers			547-5746		gslovin@goodsill.com
Lance	Tanaka	Mgr., Governmental Relations	Tesoro Hawaii Corp.	91-325 Komohana St.	Kapolei, HI 96707	547-3920	262-9967	ltanaka@tsocorp.com
Maria	Tome	Alternate Energy Engineer	DBEDT - SID	P.O. Box 2359	Hon, HI 96804	587-3809	587-3820	Mtome@dbedt.hawaii.gov
Richard	Torres	Deputy Director	DTS	650 S. King Street 3rd Flr	Hon., HI 96813	768-8304		rtorres1@honolulu.gov

Energy and Transportation
Maria Tome, Alternate Energy Engineer
State of Hawaii
Department of Business, Economic Development & Tourism
Text from Powerpoint Slides
Presented at August 29, 2007 Act 254 Working Group Kick-Off Meeting

Energy and Ground Transportation

- **Fuel is a necessity**
- **Global Factors**
affect transportation fuel supply & price
- **Transportation System & Vehicle Efficiency**
could reduce transportation fuel demand
- **Energy Efficient Transportation Project**
 - 1: identify available data
 - 2: quantify energy needs of transportation alternatives

Hawaii Petroleum Consumption by Sector, 2005

Petroleum is used in all parts of Hawaii's economy.

Reducing the petroleum intensity of our economy requires more than just a focus on the electricity sector; the transportation sector is also very important. Of course, there's not much the State can do to increase the efficiency of jet fuel use for international travel.

In-State Use of Transportation Fuels

...in-state use of transportation fuel, for which taxes were collected. Jet fuel used for international travel is not shown here. Also not shown is off-highway use of fuel, such as for marine transportation. On-highway use of gasoline and diesel are over 70% of the transportation sector fuel use, and there are significant opportunities for efficiency in this area.

Efficiency is often the lowest cost option for the electricity sector...

Energy efficiency is often the lowest cost option in the electricity sector.
It may be similar for transportation energy.

Highway Transportation

When we think of highway transportation, we usually think of people – specifically, drivers...And we think of vehicles. And of course we think of roadways. We don't often consider fuels to be part of the transportation system. But without it, the system doesn't work.

Highway Transportation

All these vehicles use quite a bit of fuel – in 2006, Hawaii's vehicles used 472 million gallons of gasoline and 52 million gallons of diesel fuel.

Hawaii's Ground Transportation Fuel Demand

Here you can see 40 years of history and 14 years of prediction, if nothing significant changes. It is expected that a portion of the fuel demand will be met by renewable fuels, in which case the

totals shown here would stay the same but there would be more fuels contributing to the totals. They were not included on this chart since they are not germane to this study.

Gasoline Demand by County

The gasoline demand on the neighbor islands has been increasing faster than on Oahu. In 2006, 62% of the gasoline was used on Oahu; 17% was used on the Big Island; 7% was used on Kauai; and 14% was used on Maui.

Gasoline and Diesel are Refined from Petroleum (Crude Oil)

Gasoline and diesel fuel are made from petroleum. We have two refineries in Hawaii, on Oahu. The crude oil comes to Oahu ...

Movement of Petroleum to Hawaii - 2006

...from many countries, thousands of miles away. We are becoming more dependent on oil from the Middle East, as you'll see in the next slide.

World Oil Consumption Growth

Global demand for oil has accelerated as emerging economies, especially in China and India, have developed an appetite for oil that is expected to surpass that of the US. Worldwide energy demand is projected to increase to over 600 quadrillion Btu by 2020 - an increase of almost 50%.

Crude Oil Spot Prices, January 1, 1998 through August 21, 2007

Here's some world oil price history. You can see that oil prices have gone from about \$25 per barrel to round \$60 per barrel – more than doubling in the space of 5 years. Will they double again? Or will they flatten out? Here's what some experts have projected...

World Oil Price, 1980-2030 (2005 dollars per barrel)

The EIA "reference" case is often used as a baseline, although if the futures market is significantly different, it may make sense to use that as the short-term baseline instead. As we all know, oil prices have an effect on fuel prices...

Oil Price Affects Gasoline Price

... and these fuel prices can make motorists downright grouchy, especially if they have chosen very "thirsty" vehicles.

Adjusted Fuel Economy by Model Year

This graph shows fuel economy trends over almost 30 years, for cars and trucks. You can see the steep increase in mpg in the late '70s and on into the '80s. But then, in the 90's, more and more folks started buying trucks and SUVs, so the combined fuel economy of the on-road vehicles in the U.S. (the pink line) actually got worse.

One of the important questions in estimating Hawaii's future energy use is: how sensitive are vehicle purchasers to fuel price? Also: to what extent can or will drivers change their vehicle use and mileage? If there is a fuel price spike or shortage, will they – or can they – use alternate modes? Actual Hawaii data on vehicle miles traveled, and the fuel economy of vehicles purchased, will be very helpful in understanding and projecting future fuel demand.

Vehicle Weight, Performance, and Fuel Economy

The prior slide might have given the impression that not much has happened in vehicle technology. That is not necessarily true. The red line shows the zero-to-60 times have gone from over 14 seconds to under 10 seconds, on average. Over the past 20 years, the vehicles have also gotten heavier. It is not “natural” that heavier vehicles are able to go faster ... and still get the same fuel economy. There has been a great deal of progress in vehicle engineering.

Vehicle Weight, Performance, and Fuel Economy

“Automotive manufacturers continue to apply technological innovations to the new light-duty vehicle fleet to increase ... weight and performance...”

“EPA estimates that had the new 2005 light-duty vehicle fleet had the same distribution of performance and the same distribution of weight as in 1987, it could have achieved about 24 percent higher fuel economy.”

Here’s the Environmental Protection Agency has to say about it: If the advancements had gone to fuel economy instead, we could be using about 24% less gasoline.

New Passenger Vehicle Fuel Economy

Here are some of the fuel economy figures for the US and other countries ... The United States is there at the bottom. Partly because we’ve built our cities around cars and trucks...

Retail Gasoline Prices

And we also have relatively low gasoline prices. Many other countries have much higher gasoline prices, primarily due to high rates of taxation. Many of these other countries also have a variety of transportation options, including mass transit, and even different land use policies. So, gasoline-powered vehicles are just one part of the question.

Transportation projections

It is understood and respected that transportation plans are the result of a complex process, and a great deal of planning and analysis. The energy needs and impacts of transportation plans are also important.

Quantifying Energy Intensity May Help With Quantifying Greenhouse Gases

Given the increased focus on greenhouse gases, and efforts to quantify and cap emissions, this and future work may be very helpful to the State and County agencies who will be working in this area. Also, it may be possible to attract funding from Federal or other sources to support work in this area.

ACT 234 of 2007 “Establishes as state policy statewide greenhouse gas emissions limits at or below the statewide greenhouse gas emissions levels in 1990 to be achieved by January 1, 2020. Establishes greenhouse gas emissions reduction task force to prepare a work plan and regulatory scheme to achieve the statewide greenhouse gas emissions limits.”

Alternatives

We need to quantify the effect of vehicles, transit, and alternatives on overall transportation fuel needs. This can be quite interesting, since they can all effect each other. Telecommuting, ridesharing, mass transit, mixed use development, congestion reduction measures -- or increases

in congestion – or increases in road capacity – or development of new urban centers – tunnels – ferry systems - can affect the demand for fuels, and types of fuels. Conversely, significant increases in fuel price can affect the attractiveness of alternatives.

1995

Twelve years ago, the “Hawaii Energy Strategy” included a transportation energy project. The 1995 Transportation Energy Strategy looked at transportation energy demand, potential for energy conservation, potential production of alternative fuels, and what the effectiveness of various policies might be, particularly for alternative fuels. The project started out looking at all sectors – air, ground, and marine – but found that the sector in which State policies would be most effective was the ground transportation sector.

From 1995 Project

Although the 1995 project discussed energy intensities of various modes of travel, little was done to quantify Hawaii’s travel modes. Only one of the values on this graph is from Hawaii: the energy intensity of TheBus (first column). Compare that to the national average for transit bus (fourth column) and you can see that Hawaii numbers may be different.

1995 – Transportation Energy Strategy

The “Potential of Conservation” section of the 1995 study did not quantify the energy demand of the alternatives. Also, it did NOT include elements such as ferries, tunnels, the current mass transit plan, segways, or even hybrid electric vehicles, because they weren’t commercially available at that time. So, there’s a great deal of work to be done on this project – and your help is needed.

Alternative Transportation Fuels

Although important, alternative fuels will be covered elsewhere. ACT 240 of 2006: a consultant has been selected “to conduct a statewide multi-fuel biofuels production assessment of potential feedstocks and technologies, the economics of the various renewable fuels pathways, and the potential for ethanol, biodiesel, and renewable hydrogen production to contribute to Hawaii’s near-, mid-, and long-term energy needs.”

ACT 253 of 2007: “The bioenergy master plan shall address the following outcomes: (1) Strategic partnerships for the research, development, testing, and deployment of renewable biofuels technologies and production of biomass crops; (2) Evaluation of Hawaii's potential to rely on biofuels as a significant renewable energy resource; (3) Biofuels demonstration projects, including infrastructure for production, storage, and transportation of biofuels; (4) Promotion of Hawaii's renewable biofuels resources to potential partners and investors for development in Hawaii as well as for export purposes; and (5) A plan or roadmap to implement commercially viable biofuels development.

The bioenergy master plan shall address the following issues: (1) Specific objectives and timelines; (2) Water resources; (3) Land resources; (4) Distribution infrastructure for both marine and land; (5) Labor resources and issues; (6) Technology to develop bioenergy feedstock and biofuels; (7) Permitting; (8) Financial incentives and barriers and other funding; (9) Business partnering; (10) Policy requirements necessary for implementation of the master plan; and (11) Identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns.”

Juris:Muni	Juris:State	J:Nation	Agency	PlanType	Title	Date:Mo	Date:Yr
N/A	Oregon	U.S.	Oregon DOT	TranspPlanSup	Oregon Transportation Plan Update, Sustainable Transportation and Sustainable Development	Sept.	2006
Honolulu Co.	Hawai'i	U.S.	Oahu Metropolitan Planning Organization	TranspPlan	Oahu Regional Transportation Plan 2030	April	2006
N/A	Mass.	U.S.	Executive Office on Transportation	TranspPlan	Commonwealth of Massachusetts Long-Range Transportation Plan, The	March	2005
Honolulu Co.	Hawai'i	U.S.	Oahu Metropolitan Planning Organization	TranspPlan	Oahu Regional Transportation Plan 2030, Amendment #1	May	2007
N/A	N/A	Japan		Statute	Law Concerning the Rationalization of Energy Use	August	2005
N/A	N/A	E.C.		PolicyAnalysis	Action Plan for Energy Efficiency: Realising the Potential	October	2006
N/A	N/A	U.K.	Dept. of Trade & Industry	PolicyAnalysis	Meeting the Energy Challenge: A White Paper on Energy, May 2007	May	2007
Hawaii Co.	Hawai'i	U.S.	State of Hawaii Department of Transportation	TranspPlan	Hawaii Long Range Land Transportation Plan	May	1998
Maui Co.	Hawai'i	U.S.	Co. of Maui and Hawai'i DOT	TranspPlan	Countywide Transportation Planning Process for Maui County	Dec	1977
Hawaii Co.	Hawai'i	U.S.	Co. of Hawai'i and Hawai'i DOT	TranspPlan	Countywide Transportation Planning Process for Hawaii County	Dec	1977
N/A	Hawai'i	U.S.	Hawaii Energy Conservation Council;DPED	PolicyAnalysis	Saving Energy in Transportation	January	1980
N/A	N/A	Singapore	Land Transport Agency	PolicyAnalysis	Electronic Road Pricing	n.m	2003
Stockholm	N/A	Sweden	Stockholmsforsoket	PolicyAnalysis	Stockholmsforsoket	n.m	n.y.
N/A	N/A	Sweden	Vagverket (Swedish Road Admin.)	PolicyAnalysis	Trial Implementation of a Congestion Tax in Stockholm 3 January - 31 July 2006	August	2006
London	N/A	U.K.	Transport for London	CustomerInfo	Congestion Charging...	n.m.	n.y.
N/A	N/A	U.S.	U.S. Env. Protection Agency	PolicyAnalysis	Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2006	July	2006
N/A	N/A	U.S.	Texas Transportation Institute	PolicyAnalysis	Benefits From Public Transportation Service and Operations Strategies for Honolulu, HI	Sept	2007

N/A	N/A	U.S.	Texas Transportation Institute	PolicyAnalysis	2007 Annual Urban Mobility Report	Sept	2007
N/A	Conn.	U.S.	Transportation Strategy Board	TranspPlan	Moving Forward: Connecticut's Transportation Strategy	January	2007
Houston	Texas	U.S.	Greater Houston Partnership	PolicyAnalysis	Houston's Travel Rate Improvement Program, "Toolbox" of Improvement Strategies, Increase System Efficiency	n.m.	n.y.
N/A	Hawai'i	U.S.	State of Hawaii Department of Transportation	TranspPlan	Hawaii State Transportation Plan	Sept	2002
Kauai Co.	Hawai'i	U.S.	State of Hawaii Department of Transportation	TranspPlan	Kauai Long-Range Transportation Plan	May	1997
Maui Co.	Hawai'i	U.S.	State of Hawaii Department of Transportation	TranspPlan	Maui Long-Range Transportation Plan	Feb	1997
Kauai Co.	Hawai'i	U.S.	Co. of Kauai and Hawai'i DOT	TranspPlan	Countywide Transportation Planning Process for Kauai County	Dec	1977
N/A	California	U.S.	CalTrans	TranspPlan	California Transportation Plan 2025	April	2006
N/A	Hawaii	U.S.	The Office of the Auditor, State of Hawaii	Report to Legislature	Hawaii 2050 Sustainability Plan	Sept	2007
Honolulu Co.	Hawai'i	U.S.	Honolulu Mayor's Office	Sustainability Plan	Energy & Sustainability Task Force Report	Sept	2007
Hawaii Co.	Hawai'i	U.S.	HNEI (Hawaii Natural Energy Insitute)	Transportation Model	Hawaii Roadmap Phase I: Assessment of the Electric & Transportation Infrastructure for the Big Island of Hawaii	Sept	2007
Hawaii Co.	Hawai'i	U.S.	County of Hawaii	Sustainability Plan	Hawaii County Energy Sustainability Plan		
Honolulu	Hawai'i	U.S.	City of Honolulu	Goals & Objectives	21st Century Ahupua'a: Environmental & Cultural Balance		

Title	Media	Source
Oregon Transportation Plan Update, Sustainable Transportation and Sustainable Development	pdf	www.oregon.gov/ODOT/TD/TP/docs/otpPubs/SustainTransDev.pdf
Oahu Regional Transportation Plan 2030	pdf	oahumpo.org/ortp/ORTP2030/ORTP_2030.pdf
Commonwealth of Massachusetts Long-Range Transportation Plan, The	pdf	http://www.eot.state.ma.us/default.asp?pgid=content/longplanIndex&sid=level2
Oahu Regional Transportation Plan 2030, Amendment #1	pdf	http://oahumpo.org/ortp/ORTP2030/Amendment_1_final.pdf
Law Concerning the Rationalization of Energy Use	html	http://www.eecj.or.jp/databook/2004-2005e/04_03.html
Action Plan for Energy Efficiency: Realising the Potential	pdf	http://ec.europa.eu/energy/action_plan_energy_efficiency/doc/com_2006_0545_en.pdf
Meeting the Energy Challenge: A White Paper on Energy, May 2007	pdf	www.berr.gov.uk/files/file39564.pdf
Hawaii Long Range Land Transportation Plan	bound	HE213.H3 H36 1998 and CD-ROM
Countywide Transportation Planning Process for Maui County	bound	HE213.H3 V66 1977b
Countywide Transportation Planning Process for Hawaii County	bound	HE231.H3 V66 1977
Saving Energy in Transportation	bound	HE213.H3 H35
Electronic Road Pricing	web	http://www.lta.gov.sg/motoring_matters/index_motoring_erp.htm
Stockholmsforsoket	web	http://www.stockholmsforsoket.se/templates/page.aspx?id=183
Trial Implementation of a Congestion Tax in Stockholm 3 January - 31 July 2006	pdf	http://www.stockholmsforsoket.se/upload/Infomaterial%20VV/Booklet%20eng.pdf
Congestion Charging...	web	http://www.cclondon.com/
Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2006	pdf	http://www.epa.gov/otaq/fetrends.htm
Benefits From Public Transportation Service and Operations Strategies for Honolulu, HI	pdf	http://mobility.tamu.edu/ums/congestion_data/tables/honolulu.pdf

2007 Annual Urban Mobility Report	web	http://mobility.tamu.edu/ums/
Moving Forward: Connecticut's Transportation Strategy	pdf	http://www.ct.gov/opm/lib/opm/tsb/reports_tsb/tsb2007report.pdf
Houston's Travel Rate Improvement Program, "Toolbox" of Improvement Strategies, Increase System Efficiency	pdf	http://mobility.tamu.edu/ums/trip/toolbox/increase_system_efficiency.pdf
Hawaii State Transportation Plan	pdf	http://www.state.hi.us/dot/stp/hstp.htm
Kauai Long-Range Transportation Plan	pdf	CD-ROM
Maui Long-Range Transportation Plan	pdf	CD-ROM
Countywide Transportation Planning Process for Kauai County	bound	HE213.H3 V66 1977a
California Transportation Plan 2025	pdf	http://www.dot.ca.gov/hq/tpp/ctp2025/CTP_2006.pdf
Hawaii 2050 Sustainability Plan	pdf	http://hawaii2050.org/images/uploads/2050_Plan_Draft.pdf
Energy & Sustainability Task Force Report	pdf	www.honolulu.gov/mayor/ahupuaa/mayorsenergysustaib4.pdf
Hawaii Roadmap Phase I: Assessment of the Electric & Transportation Infrastructure for the Big Island of Hawaii	bound	HNEI
Hawaii County Energy Sustainability Plan	web	http://learning.kohalacenter.org/ (check under "Latest News")
21st Century Ahupua'a: Environmental & Cultural Balance	pdf	Richard Torres, Mayor's Office

**Data Needs as Assessed
By Act 254 Working Group Members and Parsons Brinckerhoff**

Hawaii petroleum use by category

1. Amount of petroleum products (gasoline / diesel) used by passenger vehicles in Hawaii (could be roughly extrapolated from miles driven per vehicle).
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.
5. Amount of ethanol needed to replace one gallon of gasoline (I've seen this figure somewhere and could probably find it readily).
6. Amount of energy (petroleum) used to create electricity for Hawaii's buildings (air conditioning, lighting, appliances, etc.)

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. Amount of energy needed to produce the hydrogen necessary to move a typical fuel-cell passenger vehicle 35 miles (the proposed CAFE standard).
11. Amount of energy needed to produce a gallon of ethanol.
12. Carpools, vanpools

Assessment of Different Modes

1. Pedestrians, bicyclists, teleworkers
2. Transit ridership and quality of transit service (travel time on transit versus driving)

Manufacturer 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.

Roadway congestion

1. Estimated amount of energy (petroleum based or electric or hydrogen fuel-cell) wasted by Hawaii roadway congestion (present, projected for 2012, 2015, 2020, 2030, with no build of add'l lanes).
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).

Facilities

1. Pedestrian/bike facility inventory
2. Pedestrian facilities within 1/4 mile of bus stop (quality)
3. Parking (how easy to find parking, how expensive)

Incentives/Legislation

1. Use of incentives to encourage more energy efficient travel (how many employers provide free bus passes, guaranteed ride home programs, free parking for carpoolers)
2. Is there any legislation requiring or providing incentives for more energy efficient travel?