

Hawaii Refinery Task Force – Refinery Closure Report

Adopted June 18, 2013

Initial Report
June 30, 2013

Submitted to: Hawaii Department of
Business, Economic Development &
Tourism

Submitted by:
ICF International
9300 Lee Highway
Fairfax
Virginia 22031
&
Poten & Partners, Inc.
805 Third Avenue,
New York, New York 10022

ICF Contact
Tom O'Connor
757-903-4367



[This Page is Intentionally Left Blank]

Table of Contents

List of Exhibits.....	5
List of Acronyms and Definitions	7
Statement of the Issue Being Addressed with the Initial Report.....	9
Sources of Information for Phase 1.....	10
Information Integrity and Confidentiality	13
Summary: Key Issues Identified Based on Stakeholder Inputs to Date and ICF Assessments.....	14
Operational and Supply Issues	14
Price and Contractual Issues	15
Impact on Dependent Businesses	16
Strategic – Longer Term Considerations.....	17
The Hawaii Fuel Market.....	18
Overview	18
Supply Before Refinery Closure.....	18
Production and Distribution.....	20
Key Products Consumed in Hawaii	20
Overall Hawaii Demand Patterns	24
Initial Assessment of Transition to Terminal Operation.....	26
Operational Assessment	26
Post-Closure Liquid Fuel Supply	26
Potential Supply Issues Stemming from the Refinery Closure.....	27
Inventory Management	28
Potential Harbor Congestion.....	30
Market Assessment	30
Market Mechanisms	30
Initial Transition Impact on Markets	33
Price Trends of Key Product Markers for Hawaii Fuels.....	34
Freight Cost Trends for the Hawaii and Pacific Rim Market	41
Outlook Beyond the Initial Transition Period.....	43



Asset Disposition Alternatives.....	43
Implications on Hawaii long-term strategy to shift from fossil fuel supply for transportation and power needs.....	43
Clean Energy Consumption.....	44
Barriers to Clean Energy Adoption	45
Recommended Policies and Initiatives	46
Appendix 1: Tesoro Logistics Overview.....	48
Appendix 2: Hawaii Petroleum Supply Schematic.....	49



List of Exhibits

Exhibit 1: 2012 Tesoro Crude Oil Imports by Country (Mbbbl) ⁵	19
Exhibit 2: Hawaii Fuel Demand	25
Exhibit 3: Hawaii Retail Weekly Prices and Los Angeles/Portland Wholesale Average Previous Month Prices	32
Exhibit 4: Hawaii Retail Weekly Prices and U.S. Gulf Coast and Singapore Wholesale Average Previous Month Prices	33
Exhibit 5: Los Angeles and Singapore Jet Fuel Prices	35
Exhibit 6: Los Angeles CARB and Singapore 50 ppm Diesel Prices.....	36
Exhibit 7: Retail 50 ppm Diesel Prices in Hawaii, Los Angeles, and Singapore	37
Exhibit 8: Singapore RFO (0.3% Sulfur) and Minas and Duri Crude Prices	38
Exhibit 9: Los Angeles and Singapore 380 CST Bunker Fuel Prices.....	39
Exhibit 10: Singapore Naphtha Prices.....	40
Exhibit 11: Clean One Year Time Charter Weekly Rates.....	42
Exhibit 12: Hawaii Renewable Electric Power Industry Net Generation, by Energy Source, 2010, Thousand Megawatt-hours.	44



List of Acronyms and Definitions

Blendstocks	Motor gasoline blending components that are to be blended with oxygenates to produce finished gasoline. This can also refer to foreign gasoline that does not meet U.S. specifications and must be blended or re-refined to be sold in the United States.
CNG	Compressed Natural Gas
CPG	Cents per Gallon
Demurrage	“The cost of delaying a ship. Busy channels, occupied berths, commercial considerations, lack of shore tankage, pumping limitations, and a host of other eventualities related to how or where a charterer uses a vessel can prevent it from loading or unloading promptly. When they do, the ship's owner charges for a waiting time.” ¹
DBEDT	The Hawaii Department of Business, Economic Development, and Tourism
DOE	U.S. Department of Energy
E10	Gasoline composed of a certain proportion of fuel ethanol. E10 indicates gasoline with an ethanol content between 5 percent and 10 percent.
E15	Gasoline composed of a certain proportion of fuel ethanol. E15 indicates gasoline with an ethanol content between 10 percent and 15 percent.
E85	Gasoline composed of a certain proportion of fuel ethanol. E85 indicates gasoline with an ethanol content between 51 percent and 85 percent.
EIA	U.S. Energy Information Administration
EIIRP	Energy Industry Information Reporting Program
EPA	U.S. Environmental Protection Agency
HECO	Hawaiian Electric Company, Inc.
HELCO	Hawaii Electric Light Company, Inc.

¹ Poten & Partners. “Industry Glossary,” Accessed June 4, 2013. <http://www.poten.com/Content.aspx?id=17160>

HIBOB	Hawaii Blendstock for Oxygenate Blending
HFFC	Hawaii Fueling Facilities Corporation
HRTF	Hawaii Refinery Task Force
KIUC	Kauai Island Utility Cooperative
KPLP	Kalaeloa Partners
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LSFO, HSFO	Low Sulfur Fuel Oil, High Sulfur Fuel Oil
LR1, LR2, MR	Long Range 1, Long Range 2, Medium Range Vessel size. LR1, LR2, and MR are common refined product tankers.
Mbbbl	Thousand Barrels
MECO	Maui Electric Company, Ltd.
RFO	Residual Fuel Oil
SNG	Synthetic Natural Gas
SPM	Single Point Mooring
TBD	Thousand Barrels per Day
ULSD, LSD	Ultra-Low Sulfur Diesel, Low Sulfur Diesel
USD	U.S. Dollar
USGC	U.S. Gulf Coast
VMT	Vehicle Miles Travelled

Statement of the Issue Being Addressed with the Initial Report

According to Executive Order 13-01, the purpose of the Hawaii Refinery Task Force is to assess the impacts to changes in Hawaii's refinery capacity and to provide advice and recommendations on matters involving a future fuels ecosystem.

The Task Force is to serve as the principal advisory group to the Governor on the market disruptions facing the State associated with the changes in the State's refining capacity and ownership.

The Task Force will also advise the Governor on specific measures, alternatives and actions that the State should consider in a future fuels ecosystem to maintain adequate and affordable fuel supplies to meet the State's energy needs.

This initial report identifies the following:

1. Key issues associated with the closure of the Tesoro refinery;
2. Current status of the transition process to convert the refinery to a "terminal" operation, and Tesoro's role from a refiner/supplier/marketer to a supplier/marketer in Hawaii.
3. Overview of the Hawaii Fuel Market and impact of the transition to date

This "Phase 1" Report will be followed by initiation of work on Phase 2. The Phase 2 study will initially develop a Draft "Interim" Report due to DBEDT on or about September 30th, 2013, and a Draft Final Report due to DBEDT by February 28, 2014.

The very recent announcement of a potential sale of the Tesoro refinery to Par does not impact the publication of this initial report, as the available information on the sale is very limited at this time. Assuming the sale proceeds to closing in the third quarter, input from Par on their business plans as well as input from existing stakeholders will be integrated into the "Interim" and "Final" Phase 2 Reports.

The announced asset sale, after 18 months of work by Tesoro to locate a buyer, reinforces the requirement for the Task Force to develop specific policies and actions to provide assured energy and fuel supply to Hawaii consumers through traditional and new energy alternatives.

Sources of Information for Phase 1

The information included in this interim report was derived from public and private sources. The initial Hawaii Refinery Task Force (HRTF) meeting in April 2013 provided a reference point for the analysis. Members of the HRTF are noted here.

NAME	COMPANY/DEPARTMENT	TITLE
Ms. Cecily Barnes	Hawaiian Electric Company	Biofuels Manager
Mr. David Bissell	Kauai Island Utility Cooperative	President & CEO
Mr. Robin Campaniano	Hawaii Clean Energy Initiative c/o CGI Technologies	Chair
Mr. Reggie Castanares	Plumbers & Fitters UA Local Union 675	Business Manager, Financial Secretary-Treasurer
Mr. Albert Chee Jr.	Chevron U.S.A. Inc.	Hawaii Manager - Policy, Government & Public Affairs
Mr. Mark Glick	Department of Business, Economic Development and Tourism	Administrator State Energy Office
Mr. Mike Hamnett	University of Hawaii Research Corporation	Executive Director, Research Corporation of the Univ. of Hawaii
Mr. Maurice Kaya	PICHTER	Project Director
Ms. Alicia Moy	Hawaii Gas	CEO
Representative The Honorable Chris Lee	State House of Representatives	Chair, Committee on Energy and Environmental Protection
Mr. David Leonard	Aluvion Energies, LLC	President
Mr. Richard Lim	Department of Business, Economic Development and Tourism	Director
Brigadier General Mark McLeod	Headquarters, US Pacific Command, J4	Brigadier General
Mr. Jeff Mikulina	Blue Planet Foundation	Executive Director
Mr. Blaine Miyasato	Hawaiian Airlines	Vice President, Product Development
Mr. James Moonier	Alpha Capital Research	Partner
Mr. Glenn Okimoto	Department of Transportation	Director
Mr. Jeffrey Ono	DCCA - Division of Consumer Advocacy	Consumer Advocate
Mr. Richard Parry	Aloha Petroleum	CEO
Mr. Ralph K. Saito	Leeward Petroleum	President
Mr. Jack Schirmer	Hawaii Fueling Facilities Corp	President
Mr. Pono Shim	Enterprise Honolulu	President & CEO

NAME	COMPANY/DEPARTMENT	TITLE
Mr. James Spaeth	US Department of Energy	Senior Advisor
Mr. Dwight Takamine	Department of Labor and Industrial Relations	Director
Mr. Hans Tobler	Kalaeloa Partners	President
Mr. Jim Tollefson	Chamber of Commerce	President & CEO
Mr. Allen Uyeda	Hawaii Business Roundtable	Chairman
Councilmember Michael Victorino	Maui County Council	Member - Economic Development, Energy, Agriculture, & Recreation Committee
Mr. Tom Weber	Tesoro	Vice President, Kapolei Refinery
Mr. Jim Yates	Mid-Pac Petroleum	President

In addition to the member of the HRTF listed above, a special thank you is also warranted to those who have contributed substantially to the formulation of this interim report. Those contributors are:

NAME	COMPANY/ DEPARTMENT	TITLE
Mr. Jon Arakaki	Hawaiian Electric Company	Director, Fuels Infrastructure Division
Mr. Michael Champley	Hawaii Public Utilities Commission	Commissioner
Mr. Jay Long	Alaska Airlines	Fuel Procurement Manager
Mr. Jason Maga	Aircraft Service International Group	General Manager - Honolulu
Mr. Alan Nakamura	Independent Gasoline Dealer	Owner
Mr. Mark Wilson	Tesoro	Vice President, Development

Feedback provided by stakeholders contributed substantially to the discussion and conclusions drawn in this report regarding the Hawaii petroleum fuels market.

Augmenting stakeholder input was data compiled from a variety of public and private sources used in the analysis and conclusions of this interim report. The Energy Industry Information Reporting Program (EIIRP) administered by the Hawaii Department of Business, Economic Development, and Tourism (DBEDT), compiles a wide-array of confidential information on the petroleum business reported by parties involved in the petroleum business. This information was relied upon during the formulation of this interim report. Other confidential information was gathered through separate communication with various stakeholders via email and phone conversations. All confidential information has been documented and securely stored so as only to allow access by personnel who have signed non-disclosure agreements (NDA).

Publicly available information was used to expand the geographic scope of petroleum activities to outside Hawaii and to cross-reference data reported under EIIRP and by respective stakeholders. Petroleum import data was used from the Energy Information Administration (EIA), the statistical arm of the U.S. Department of Energy, and from Poten and Partners as compiled from marine brokers. Hawaii sales data from EIA and Hawaii State tax records provided insight into end-use consumption within the State. Costs associated with marine transport were contributed by Poten and Partners. Pricing information in the various markets relevant to and including Hawaii was extracted from Bloomberg and Gasbuddy.com. Prior public reports on the Hawaii Petroleum Markets, including the PIMAR reports (2007-2009) and the 2003 Stillwater Report were used for background information and maps. Lastly, ICF expert understanding of petroleum markets and previous work for the State of Hawaii was relied upon during the preparation of this initial report.

Information Integrity and Confidentiality

This Refinery Closure Report was developed based on input provided from a number of Task Force members who are in the operational supply chain of fuel supply in the State of Hawaii. Discussions and attempted discussions focused on those parties due to the fact that the refinery closure has occurred and the transition to replacing refinery supply with import supply is underway.

In some cases Task Force members opted not to discuss their opinions or comments with ICF. This was due to different factors, including discussions underway of supply changes, lack of response to ICF communications, or concerns about confidential information. Other parties, including Tesoro, provided responses to questions that were complete and assisted in understanding the current business and operations in Hawaii fuel supply.

This initial report was put together using information made available to the Task Force at the April 10 Task Force meeting, input from multiple conference calls and questions responded to by Task Force members and affiliated parties. In some cases this report makes observations on the transition issues that are based on confidential information provided by parties. Obligations under Non-Disclosure agreements limit the ability to show in this report specific data or information which might be valuable to more fully understanding the petroleum supply chain and transition operation. However, the conclusions and comments herein reflect input from Task Force members and ICF's perspective given the information currently available.

Summary: Key Issues Identified Based on Stakeholder Inputs to Date and ICF Assessments

Based on input from multiple Task Force members to DBEDT and to ICF, the list below summarizes key issues associated with the closure of the Tesoro refinery. This Refinery Closure Report will address several of these issues, at least to frame the factors involved and the relative importance of developing resolution to the issues.

Operational and Supply Issues

- 1) The closure of the refinery and transition to a terminal operation will result in a lower “in-state” reserve of petroleum products – including refined products, semi-refined products and crude oil. This loss of local reserve could jeopardize supply to the State in the event of supply disruptions in markets where Hawaii replenishment cargoes would be sourced. With Hawaii’s distance from other markets, the exposure to supply shortages and price increases are a concern, although Hawaii’s month to month demands for petroleum are relatively stable and make import scheduling less uncertain than other markets. **Examination of Tesoro’s inventory and replenishment strategy in transition appears to be responsive to concerns, and should result in more physical saleable product in Hawaii than with the refiner operating. Moreover, there will be a continual volume of product cargoes “on the water” which will provide steady replenishment of finished products.**
- 2) The operation of the Tesoro assets in the transition period will result in increased jet fuel imports into Hawaii. Normally, about one cargo per month (300,000 barrels, or 1.26 million gallons) is received at Pier 51 in Sand Harbor. HFFC has indicated that Tesoro may not utilize the existing pipeline from the refinery to Honolulu for jet fuel, thereby requiring additional imports into Pier 51. This will add perhaps two additional cargo deliveries per month at Pier 51, and potentially more if smaller cargoes are delivered. The petroleum industry does not have primary rights at Pier 51; this belongs to Horizon, a major container shipment company. Therefore it is likely that the increased demand for Pier 51 may result in periodic delays in the receipt of jet fuel cargoes into Honolulu airport and increased risk of outages. **Pier 51 prioritization and operations should be reviewed by the Hawaii Department of Transportation, Harbors Division. Tesoro may wish to further consider the alternative approach of importing jet fuel through the offshore SPM and transfer to Honolulu via the current pipeline.**
- 3) In addition to the concerns related to jet fuel delivery at Pier 51, the increased importing of products (gasoline blendstocks, diesel, residual fuel oil) in addition to current ethanol imports may likely create added congestion at the Barbers Point Kalaheo Barge Harbor and Honolulu Harbor. The degree of impact may depend on the degree to which the Tesoro SPM is utilized to import products. Congestion and delays in offloading imports and loading barges to neighbor islands can be very disruptive to the stable supply of products. **There are already delays (over recent years) at the Barge Harbor and the potential for disruption in the future should be studied.**

Findings/Actions: Operational and Supply Issues:

Operational plans during transition appear reasonable and will need to be monitored to assure the import model sustains the planned higher product inventory levels. There are concerns with Pier 51 prioritization which should be closely monitored by HFFC and Hawaii DOT since jet fuel supply may be at risk. Increased traffic may be possible through the Barge Harbor as well and activity and delays there should also be tracked. Recommend that incidents of delay or disruption in fuel supply or container vessel supply in both Harbors should be 1) tracked and 2) that a process be established to resolve priorities when supply appears threatened (HFFC, Tesoro, DOT and others)

Price and Contractual Issues

- 4) There is considerable uncertainty on the price of fuel in Hawaii following the closure. Since Tesoro is honoring existing contracts, some stability would be expected initially since contract formulas are fixed. More concern has been expressed over longer term pricing depending on the entity replacing Tesoro and their economic viability. Some contend imports and open markets may be a benefit to price; others are concerned prices may be pushed up to simply increase wholesale or retail profits, blaming the refinery closure. Prices should be carefully monitored to insure that changes in Hawaii fuels pricing stem from changes in the global fuel and freight markets which have driven Hawaii prices in the past and which should continue to drive them in the future as a fuel import based economy.
- 5) With Tesoro operating their assets in a transition period, there is considerable uncertainty among all participants in the gasoline supply chain. Parties without longer term contracts (for example, independent dealers) are exposed because when their contracts expire, they have limited options for alternative supply. The potential alternatives (Aloha, Chevron, and Mid-Pac) are uncertain where (and at what cost) they can supply an independent dealer and will potentially need to offer resupply at higher wholesale prices. As Tesoro exits contract commitments over the next 24 months, their customers may need to negotiate for other supply in highly uncertain conditions. **This situation could create significant financial stress for independent dealers who may have even fewer alternative supply source options with Tesoro leaving, and should be carefully monitored as the transition develops,**
- 6) Current Hawaii gasoline specifications are different than the U.S. mainland, and have not been updated since 1980. They do not account for the presence of ethanol in gasoline. The volatility and vapor pressure criteria are not consistent with the rest of the U.S. and lead to possible importers having to pay a higher price for procurement of Hawaii-grade gasoline. The more costly Hawaii gasoline is to produce will result in higher wholesale prices in Hawaii which will get passed through to consumers, **This has not been an issue in the past since Hawaii has rarely needed to import gasoline, however, the situation is now different and this needs to be a priority to resolve (Hawaii Department of Agriculture).**

Findings/Actions: Price and Contractual Issues:

Monitor retail gasoline and diesel price trends versus prices often used as wholesale contract benchmarks and advise when anomalies may occur. Identify what options, if any, may be available to assist independent dealers who may not have economic alternatives to Tesoro. Expedite with the Department of Agriculture and potential importers (Tesoro, Chevron, Aloha and Mid-Pac) what options exist to rapidly make Hawaii's gasoline specifications consistent with the rest of the United States (Western States Petroleum Association – WSPA – may be useful to coordinate the industry input)

Impact on Dependent Businesses

- 7) Closure of the refinery may jeopardize the economic viability of the Kalaeloa Partners (KPLP) power generation facility at Barbers Point. Loss of the refinery as an outlet for steam generated by the power plant results in an inefficient, higher cost operation. Moreover, while Tesoro is working to provide fuel oil to meet KPLP's rigid specifications through May 2016, after that time KPLP may need to import diesel fuel to meet their combined cycle turbine requirements. Since the KPLP contract with HECO to purchase power does not allow the higher fuel cost to be passed on, KPLP economic viability can be even more exposed. **These issues could jeopardize the economic operation of a facility that produces 20% of Oahu's power², lead to higher power prices and/or periodic power shortfalls since HECO may not have alternate power generation capacity and is in the State and consumers' interest to resolve.**
- 8) The Hawaii Gas SNG plant at Barbers Point relies on naphtha supply from Tesoro to operate the facility and supply natural gas to markets on Oahu. It is our understanding that the Public Utilities Commission (Decision and Order 31281) has approved a continuation agreement which permits Hawaii Gas to purchase remaining Tesoro naphtha until it is depleted. However, this only provides Hawaii Gas with naphtha through about the end of July. Alternative options for Hawaii Gas after this time period are limited and the time frame to arrange alternative supply is very tight. **This is a priority issue to resolve in the short term, at least until the Tesoro assets are sold and Hawaii Gas is able to negotiate with the buyer.**

Findings/Actions: Impacts on Dependent Businesses:

The short term issues at both KPLP and Hawaii Gas are not yet fully defined, but in one case (KPLP) cost recovery is important due to loss of steam revenue, and in the other, access to naphtha and likely need to resolve longer term access to Tesoro infrastructure – including post-Tesoro – are critical. The State should be prepared to assist as needed with expedited policy and/or permitting actions to enable both entities to continue to provide energy at competitive costs.

² PSEG Energy Holdings. "Kalaeloa Cogeneration Plant – Hawaii, USA." Accessed June 5, 2013. http://www.pseg.com/family/holdings/global/plants/kalaeloa_partners/

Strategic – Longer Term Considerations

- 9) The transition operation has some perceived risk because it is different and with longer supply lines, however, stakeholders generally believe that Tesoro is positioned to handle procurement and delivery of fuel into the State from global markets. The larger concern stems from the uncertainty of how the Hawaii fuels market will evolve depending on the nature of the specific entity that may acquire Tesoro's distribution assets. How will that entity control Tesoro's assets to either open up access to parties or to limit access? Will they have adequate financial and physical resources to manage ongoing supply into Hawaii (similar to the Tesoro transition model), or will the entity simply act as a distribution and terminalling business and not "own" product or market in Hawaii?
Whenever a sale is announced, it will be important to understand the buyer's business operation and how that may impact operations, markets and dependent businesses.
- 10) There is a fundamental trade-off between the desire expressed by some to still locate a buyer for the Tesoro refinery (preserve jobs, supply assurance and reserves in State, stable markets, etc.) and the possible benefits to the State of the closure (open access to global markets, potentially more competition, greater incentive to advance legislated green initiatives, etc.). There are pros and cons of each viewpoint.
- 11) Some parties on the Task Force have suggested that concessions be granted to refiners as a means of either attracting buyer interest in the Tesoro refinery and/or preserving the economic viability of the Chevron refinery. The interest in preserving jobs is certainly understandable, and this must be considered in the context of granting potential concessions in legislated or regulated requirements to improve environmental quality within the State.
- 12) Hawaii has made some significant commitments to cleaner fuels and reduced greenhouse gases. The urgency to implement these investments would be greater with the State reliant on one refinery rather than two. While this initial report focuses more on short term matters, the final section of this report ("Implications on Hawaii long-term strategy to shift from fossil fuel supply for transportation and power needs") includes input from Task Force members on possible steps that can be taken to remove barriers and accelerate renewable fuels in Hawaii. **These recommendations should be reviewed, considered and assessed for possible policy actions.**

Findings/Actions: Strategic – Longer Term Considerations

There is nothing immediate that must be done in this area, as it will be the focus of the Interim and Final reports. However, an announcement from Tesoro at any point in time regarding an asset sale will trigger the need to analyze the potential impact based on the specific business model of the buyer. Recommendations to identify alternative energy options with renewables will benefit more longer term, and these should be further assessed and developed.

The Hawaii Fuel Market

Overview

The Hawaii fuel market has been primarily supplied by petroleum products produced by the Tesoro and Chevron refineries. The Tesoro and Chevron refineries are located on Oahu at Barbers Point, west of Honolulu. The refineries store and refine imported crude oil into petroleum products which are stored in tanks located at the refineries. The petroleum products are then either transported by barge to the neighbor islands (via docks at the Barge Harbor at Barbers Point) or sent by pipeline from Barbers Point to Honolulu Harbor for storage at product terminals in Honolulu or at Sand Island or Honolulu Airport. From these locations, gasoline and diesel fuel are supplied via truck loading racks from three terminals (Aloha – formerly Shell, Chevron and Tesoro), and jet fuel supplied to Honolulu airport via the Hawaii Fueling Facilities Corporation's (HFFC) storage.

Supply Before Refinery Closure

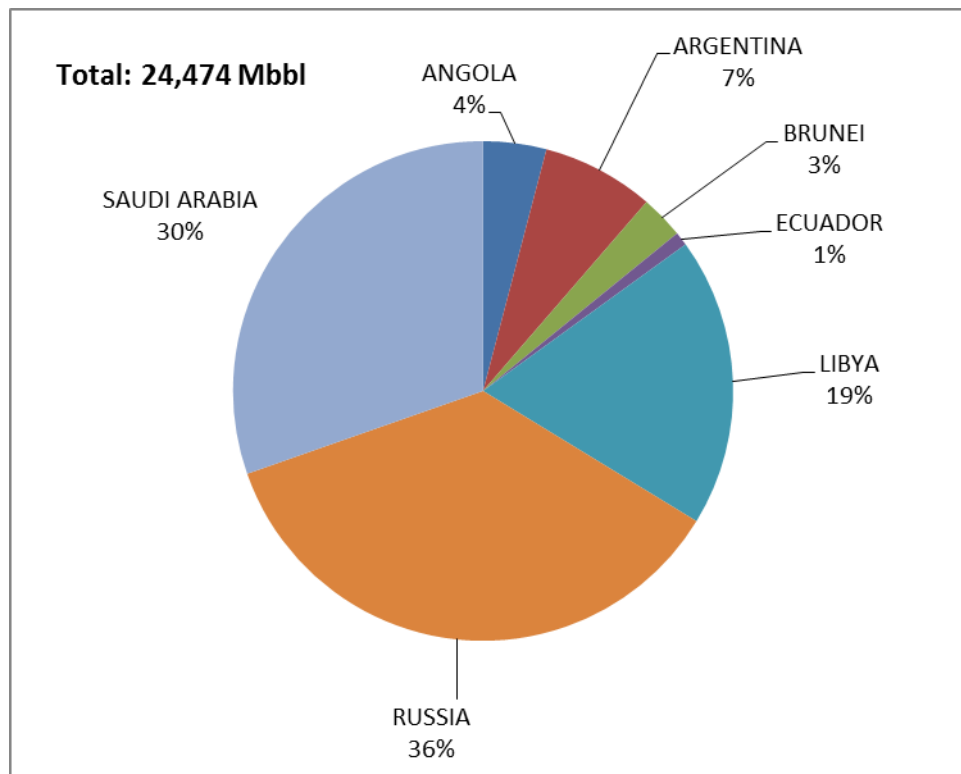
In 2012, the Tesoro and Chevron refineries imported crude oil feedstock from several countries. Tesoro uses a single point mooring (SPM) located 1.7 miles south off the coast of Barbers Point to receive crude oil and clean petroleum product imports. The SPM is located in 105 feet of water, which makes it conducive for large vessels that cannot operate easily in congested harbors or exceed harbor requirements (i.e. length, draft, etc.). Once the crude tanker is connected to the SPM, the crude oil is pumped into a 30-inch subsea pipeline that terminates at the refinery's storage tanks. In 2012, crude oil tankers would deliver crude oil loads to the Tesoro refinery averaging 525 thousand barrels (Mbbbl) per delivery via the SPM.³

In 2012, Tesoro imported 24,474 Mbbbl of crude oil from Algeria, Angola, Argentina, Brunei, Ecuador, Indonesia, Libya, Russia, and Saudi Arabia. This equates to about 67 TBD⁴ of crude imports. The majority of the crude oil imported by Tesoro in 2012 was from Saudi Arabia, Russia, and Libya making up 85 percent of Tesoro's imports (See Exhibit 1). Chevron imported 19,091 Mbbbl of crude oil from Argentina, Azerbaijan, China, Gabon, Indonesia, Libya, Thailand, and Vietnam in 2012. The majority of Chevron's crude oil imports in 2012 were from Thailand, Vietnam, and Argentina, making up 74 percent Chevron's total crude oil imports in 2012.⁵

³ Poten and Partners

⁴ TBD is thousands of barrels per day

⁵ EIA-814 "Company Level Imports," Last Updated May 30, 2013. Accessed May 31, 2013.
<http://www.eia.gov/petroleum/imports/companylevel/>

Exhibit 1: 2012 Tesoro Crude Oil Imports by Country (Mbbl)⁵

Source: EIA-814 "Company Level Imports"

The sources of crude oil into the Tesoro refinery in 2012 ranged from distances as close as Russia (about 3,845 miles) to Saudi Arabia (9,567 miles) and Libya (10,406 miles) and Angola (10,393 miles)⁶. In other words, the Tesoro supply chain into Hawaii has already extended halfway around the world to bring fuel products to Hawaii consumers.

While a large portion of Tesoro and Chevron's Hawaii operations are supplied by foreign sources of crude oil, there are periodic movements back and forth to the U.S. Mainland. In order for Hawaii petroleum companies to ship to or from other U.S. states, the vessels used must comply with the Jones Act. The Jones Act requires that vessels operating between two U.S. ports meet certain requirements such as the percentage of crew members that must be U.S. citizens, the vessel must be built in the U.S., etc. These requirements tend to increase the cost of shipping compared to use of foreign flag vessels, in part due to more limited available tonnage of Jones Act vessels.

Finally, in addition to crude oil imports by Chevron and Tesoro, the HFFC uses Pier 51 at the Honolulu Harbor to coordinate imported jet fuel. In 2012, jet fuel was primarily imported from South Korea.

⁶ Port distances provided by Poten and Partners

Production and Distribution

From these crude oil imports, the Tesoro refinery produced 20 TBD of gasoline blendstock, 19 TBD of jet fuel, 13 TBD of diesel, and 18 TBD of heavy fuel oils and residual products in 2012.⁷ These products are stored in tanks located at the refinery at Barbers Point, and are either transported by barge to the neighbor islands or sent by pipeline to Honolulu Harbor or storage at Sand Island and Honolulu Harbor.

Tesoro has four proprietary pipelines that carry petroleum products from the refinery tanks to the Barbers Point Harbor for barge loading. These four pipelines are also used to access the Hawaiian Electric (HECO) tank farm, the Aloha terminal, and Chevron refinery. The Barbers Point Harbor can also be used to offload petroleum product imports from small tankers. The Barge Harbor can accommodate ships up to 740 feet length overall (LOA) and draft of 36 feet.

From the Barge Harbor, barges transport products to the neighbor islands, and to customers and storage facilities near Honolulu. The destination terminals on the outer islands include: Tesoro's Hilo terminals, Chevron's Hilo Terminal, Aloha's Hilo terminals, Mid-Pac's Kawaihae terminal, Tesoro's Kahului terminal, Chevron's Kahului terminal, and Aloha's Nawiliwili terminal. Although Tesoro relies on barges for downstream transportation to these terminals, they do not own these barges. Instead, Tesoro contracts a third party to operate and maintain the barges and tugs used for inter-island trade.

In addition to the inter-island barges, Tesoro operates the Honolulu pipeline, a 10-inch pipeline that carries clean petroleum product from the Barbers Point facilities to the Honolulu International Airport, military facilities, Tesoro Sand Island terminal and the Aloha Honolulu terminal.⁸

The graphic presented by Tesoro at the April 10 Task Force meeting is repeated as Appendix 1.

Appendix 2 shows a supply schematic for petroleum movements throughout the State, including key petroleum assets discussed in this initial report.

Key Products Consumed in Hawaii

About 75 percent⁹ of the petroleum products consumed in Hawaii are on the island of Oahu. The remainder are barged to and consumed on the neighbor islands in Hawaii. The main consumers of petroleum products in Hawaii are airlines, power plants and the shipping industry, gasoline consumers and the military. The following section discusses each fuel market in Hawaii.

⁷ Tesoro Investor Relations, Supplemental Financial and Operational Information, "Refineries by Region," Accessed May 30, 2013. <http://phx.corporate-ir.net/phoenix.zhtml?c=79122&p=irol-supplementalFinancial>

⁸ Tesoro Presentation during 1st Hawaii Task Force Meeting, April 10, 2013.

⁹ ICF International. (2009). 2009 Report on the Hawaii Petroleum market under the Petroleum Industry Monitoring, Analysis and Reporting (PIMAR) Program.

Jet Fuel

The HFFC owns and operates the storage and delivery facilities for jet fuel used at Honolulu International Airport. On behalf of the airlines, the HFFC manages jet fuel storage and delivery needs to ensure the supply contracts agreed upon between the Airlines and the Suppliers are properly coordinated and managed. HFFC operates 16 jet fuel storage tanks on Sand Island in Honolulu and 10 additional jet fuel storage tanks at Honolulu International Airport (HNL) with a total of 42 million gallons of usable storage capacity. Most of this storage is at Sand Island.

Chevron and Tesoro use their respective clean petroleum product pipelines to deliver jet fuel to HFFC facilities on Sand Island. In addition to jet fuel from the refineries, HFFC also coordinates imports of jet fuel from Tesoro, Chevron or other suppliers at Honolulu Harbor's Pier 51 to meet demand in Oahu. Prior to the Tesoro closure, imports have averaged about one 300 Mbbbl cargo per month to supplement normal refinery production. The HFFC transports jet fuel from their Sand Island tanks into the tanks at Honolulu Airport using two pipelines which can both pump about 1,500 barrels per hour, more than adequate to meet airport demand. The demand at HNL averages about 33 TBD, or roughly a million barrels per month. The combined demand for all the other Hawaiian Islands is about 7 TBD.

Tesoro currently supplies jet fuel to the Kauai and Maui airports. Tesoro delivers jet fuel to Kauai Airport, Maui Airport, and the two airports on the Big Island using their contracted inter-island barges.¹⁰ On Maui, according to the HFFC, "Tesoro has the only tanks at the [Kahului] terminal with enough volume to adequately supply the current Maui Airport demand."¹¹ On the Big Island, Tesoro delivers jet fuel to Hilo for storage and distribution to Kona International Airport and Hilo International Airport.

The delivery of jet fuel to the Military is contingent upon the refiners having a contract to supply jet fuel.

Gasoline

The gasoline market in the state of Hawaii is dominated by wholesale suppliers Chevron, Tesoro, Mid-Pac Petroleum, and Aloha Petroleum. In 2012, the Chevron and Tesoro refineries supplied all the motor gasoline in the State of Hawaii; none was imported (with the exception of ethanol blendstock).

Tesoro markets gasoline under the Tesoro and the "2GO" convenience store brands. Tesoro reported to the Task Force in April that they have 31 retail locations throughout Hawaii¹². Tesoro also provides gasoline to Aloha Petroleum and other jobbers and independent dealers.

Chevron supplies its own branded retail gas station dealers and also, from various stakeholder comments,¹³ supplies gasoline to Mid-Pac and Aloha. While Chevron has not responded to questions

¹⁰ Tesoro Presentation during 1st Hawaii Task Force Meeting.

¹¹ Interview with Hawaii Fueling Facility Corporation.

¹² Tesoro. "Hawaii Tesoro Station Locations" Accessed June 3, 2013.
www.tsocorp.com/tsocorp/ProductsandServices/Locations/RetailLocations/HAWAIIRETAILLOCATIONS

related to this report, it has been anecdotally reported that Chevron has about 60 retail branded stations in Hawaii.

Mid-Pac Petroleum is a petroleum marketer and distributor based in Hawaii with exclusive rights to the 76 brand in Hawaii. Mid-Pac Petroleum supplies seventy-one 76 gas stations, of which Mid-Pac owns 37 and operates 15. Mid-Pac's website indicates they supply 12 percent of the Hawaiian retail gasoline market.¹⁴ Mid-Pac owns gasoline and diesel storage at Molokai, Nawiliwili in Kauai, Kawaihae on the Big Island, and Hilo. Mid-Pac shares tankage with Aloha at the Barbers Point Terminal Kalaeloa on Oahu, and leases 100 percent of its terminal in Hilo on the Big Island to Tesoro. From these terminals, Mid-Pac trucks deliver regular, mid-grade, and premium gasoline and diesel to its customers.

Aloha Petroleum is an independently owned gasoline, diesel, biodiesel, ethanol, and CITGO lubricants distributor, which supplies about 30 percent of the Hawaii retail gasoline market. They currently supply about 98 stations of which 42 are operated by Aloha and the rest are lessee dealers comprised of a mix of Shell, Aloha, and Maholo brands on Oahu, the Big Island, and Maui.

Ethanol

In 2012, 261 Mbbl of fuel ethanol (a bit over 10 million gallons) was imported from foreign sources (all from Brazil), which equates to slightly over 0.7 TBD of supply. According to EIA, Hawaii's gasoline consumption was about 28 TBD in 2012 of which an estimated 10% would have been ethanol due to mandated blending requirements. Consequently, total ethanol demands were about 2.8 TBD with the balance above foreign imports being supplied from the U.S. West Coast, based on data from the DBEDT EIIRP database,

Based on preliminary information from several parties in the supply chain¹⁵, it is not anticipated that the ethanol supply chain will change during the transition period. This supply process is expected to continue as it has with ethanol being sourced primarily from the U.S. West Coast, with other supply options being foreign sources and future in-state production.

Diesel Fuel for Transportation and Other Uses

Diesel fuel is produced by both refineries in Hawaii. Stakeholders have indicated that Tesoro is the primary supplier of ULSD¹⁶ diesel fuel in Hawaii, which is used for all commercial applications for both on and off-road fuel. Both Tesoro and Chevron also produce diesel fuel which is suitable for use in utility or marine fuel customers.

¹³ Interview comments from several stakeholders; privileged and confidential

¹⁴ Mid-Pac Petroleum. (2013) About Us. <www.midpacpetroleum.com/about.php>

¹⁵ Interview comments from several stakeholders; privileged and confidential

¹⁶ ULSD is diesel fuel with under 15 ppm sulfur and is the primary diesel fuel product produced in the U.S

While there is some consumption of on and off-road diesel fuel in Hawaii, information from EIA¹⁷ indicates that a significant amount of diesel fuel products in Hawaii are used for ship bunkering as well as power generation (diesel used for these purposes is not required to be ULSD quality).

Tesoro has indicated that they plan to import diesel fuel of required quality to meet their customer demands.

Fuel Oil for Power Generation

Hawaii generates the majority of its electricity from residual fuel oil. The Hawaiian Electric Company, Inc. (HECO) and its subsidiaries Maui Electric Company, Ltd. (MECO), and Hawaii Electric Light Company, Inc. (HELCO), serve 95 percent of the state of Hawaii's residents on all islands except Kauai.¹⁸ HECO and its subsidiaries have four power plants on Oahu, five power plants on the Big Island (i.e., Hawaii), two power plants each on Maui and Lanai, and one power plant on Molokai. The larger power plants operated by HECO on Oahu are driven by residual fuel oil (LSFO), however, other subsidiary power plants on neighbor islands are driven by diesel or IFO (a higher sulfur fuel oil). The Campbell Park site on Oahu uses biodiesel. HECO meets its residual fuel oil and diesel demands from contracts established with both Tesoro and Chevron. The fuel oil and diesel supplied by Tesoro and Chevron are loaded onto an inter-island barge contracted by the Utilities and operated by a private carrier for subsequent delivery to Molokai, Maui, and the Big Island. The fuel oil and diesel are then transported from the receiving terminals to the respective power plants by pipeline and truck¹⁹.

The remainder of the petroleum driven electrical generation in the state of Hawaii is from independent power producers on Honolulu, the Big Island, and utilities on Kauai.

The Kalaeloa Cogeneration power plant (KPLP) sells 208 MW of electricity to HECO and sold steam to the Tesoro refinery for heating purposes when the refinery operated. Tesoro provided the KPLP plant with low sulfur fuel oil (LSFO) which was treated in refinery equipment to lower metals content to KPLP's strict requirements.

The Kauai Island Utility Cooperative (KIUC) provides power to the island of Kauai via two power plants one at Kapaia and the other at Port Allen. The Kapaia plant uses naphtha for fuel, and Port Allen runs on a low sulfur diesel (LSD). KIUC currently purchases all its fuel from Chevron and therefore has no direct impact from the Tesoro refinery closure.

¹⁷ EIA. "Sales of Distillate Fuel Oil by End Use." Energy Information Administration. Last Updated November 30, 2012. Accessed on May, 31 2013. http://www.eia.gov/dnav/pet/pet_cons_821dst_dcu_SHI_a.htm

¹⁸ HECO. "Power Facts." Accessed June 3, 2013. www.heco.com/vcmcontent/StaticFiles/pdf/PowerFacts_52011.pdf

¹⁹ HECO responses to ICF questions

Fuel Oil for Ship Bunkering

In 2011, the demand for residual fuel oil for bunker fuel in Hawaii was 42,383 thousand gallons, or almost 3 TBD.²⁰ This does not include over 88,000 thousand gallons of diesel range fuel used in bunker applications (mentioned in the diesel discussion).

Naphtha Sales

Naphtha is a product from the distillation of crude oil. It is normally refined into a high octane gasoline blending component called reformate, however it may also be used as feedstock for synthetic natural gas production or for combustion to generate electric power. In Hawaii, Chevron sells naphtha to utilities in the neighbor islands, including Kauai Island Utility Cooperative²¹. Tesoro sells naphtha to Hawaii Gas, who converts the naphtha to synthetic natural gas for use of consumers in Hawaii.

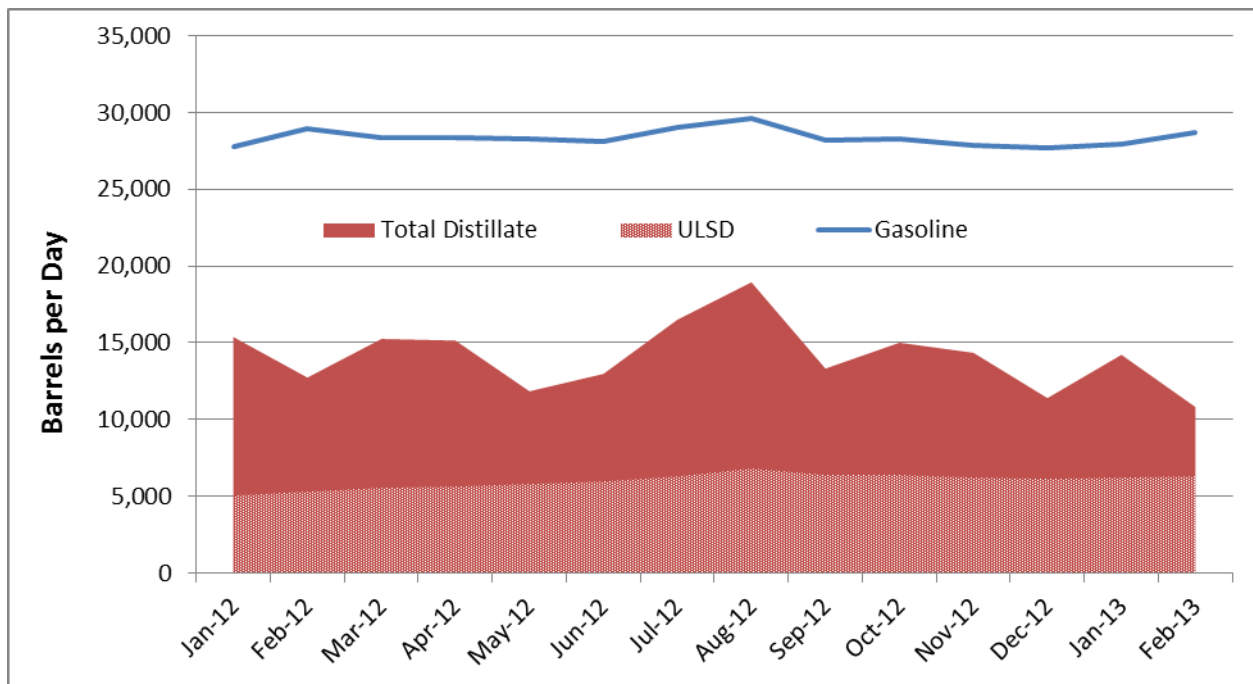
Overall Hawaii Demand Patterns

Exhibit 2 shows Hawaii fuel demand reported to EIA by product. As seen since January 2012, Hawaii maintains fairly stable demands for gasoline. Fluctuations in gasoline in other markets can be caused by seasonality, but Hawaii's consistent annual weather moderates this impact. Jet fuel and Total Distillate (including ULSD) demand fluctuated more throughout the period (possibly due to demand changes for utilities or ship bunkering), but also remained fairly consistent. The monthly demand for ULSD for on and off road uses was also very consistent.²²

²⁰ EIA. "Sales of Residual Fuel Oil by End Use." Energy Information Administration. Last Updated November 30, 2012. Accessed on May, 31 2013. http://www.eia.gov/dnav/pet/pet_cons_821rsda_dcu_SHI_a.htm

²¹ Shimogawa, D., "Tesoro Refinery closure leaves Hawaii Gas Looking for New Supplier," *Pacific Business News*. Published May 1, 2013. Accessed June 3, 2013. <http://www.bizjournals.com/pacific/blog/2013/05/tesoro-refinery-closure-leaves-hawaii.html?page=all>

²² Energy Information Administration. "Prime Supplier Sales Volumes," Last Updated May 21, 2013. Accessed June 4, 2013. http://www.eia.gov/dnav/pet/pet_cons_prim_dcu_SHI_m.htm

Exhibit 2: Hawaii Fuel Demand


Source: Prime Supplier Sales Volumes, EIA.

Information from EIA on residual fuel sales is inconsistent and not reliable due to the fact that a great deal of the data is withheld due to confidentiality. EIA data on jet fuel demands is under the actual jet fuel consumption reported to ICF by HFFC, so it is not shown. HFFC has indicated that overall demands in Honolulu as well as the neighbor islands is also relatively stable.

Overall, the ratable demands for key products in Hawaii makes a transition from local refinery supply to import based supply less of a risk than in other markets prone to seasonality effects.

Initial Assessment of Transition to Terminal Operation

Operational Assessment

The closure of the Tesoro Kapolei refinery has spurred a number of concerns and potential business transformations within the Hawaii liquid fuels market. Throughout the supply chain in Hawaii, market participants are closely analyzing how supply patterns will change over the coming years and how they can best adapt to take advantage of potential opportunities. The following section presents the changes that are underway with the Tesoro refinery closed and Tesoro operating in a transitional period. In addition, Tesoro's operating plans for supply and for inventory management were assessed as they shift from being a refiner to a transition model. Lastly, this section will provide an initial review of the concerns regarding harbor congestion that may arise due to increased traffic from petroleum product imports.

Please note that at this early stage of the transition period, the report can only convey an initial perspective on the transition and impacts on supply, price and businesses.

Post-Closure Liquid Fuel Supply

Tesoro has stated their commitment to continue to honor current supply contracts within Hawaii. In order for Tesoro to continue fulfilling these supply agreements and for the various entities to sustain competitive business plans into the future, a number of product flow and infrastructure changes are being put in place in response to the changes in supply. These include:

- Tesoro will import products to sustain customer needs
- Tesoro has three pipelines from the offshore SPM to different service to accommodate product imports; a 30-inch line for LSFO and HSFO; a 20-inch clean product²³ line and a 16 inch Black oil line converted to diesel service.²⁴
- Tesoro is cleaning several crude oil tanks for potential product service
- Hawaii Gas has entered into an agreement with Tesoro to continue receiving feedstock supply through mid-summer.
- HFFC has indicated that Tesoro is arranging jet fuel deliveries via Pier 51 into Sand Island storage, rather than supplying jet fuel from the Tesoro Honolulu pipeline from Kapolei

²³ "Clean" products are generally referred to as gasoline, diesel, jet fuel, etc., Black or "Dirty" products would include residual fuel oil, crude oil, asphalt, etc.

²⁴ Tesoro Presentation during 1st Hawaii Task Force Meeting.

In all other aspects, during the transition period Tesoro is planning to continue to deliver product via the Honolulu pipeline, or via the four pipelines from the refinery to the Kalaeloa Barbers Point Harbor (and to HECO's Barbers Point Tank Farm), similar to current operations. This will sustain direct deliveries of LSFO to HECO and Kalaeloa Partners, and barge movements of all products to neighbor islands, other HECO facilities and Honolulu bunker fuel customers.

These long term changes include bolstering product storage capacity for regular gasoline, jet fuel, and high-sulfur fuel oil (HSFO) used for power generation, which in ICF's view should provide more flexibility to handle imported cargoes.

Potential Supply Issues Stemming from the Refinery Closure

The Kalaeloa Partners (KPLP) combined-cycle power generation plant is an impacted Tesoro customer in two ways. First, the KPLP plant has very specific requirements regarding metal concentrations in the low-sulfur fuel oil (LSFO) the plant burns. Tesoro is planning to acquire LSFO product and treat the product in the refinery desalting unit on an on-going basis to reduce metals to acceptable levels for KPLP. Second, the refinery purchased steam from KPLP and with operation of the refinery stopped, there is minimal demand for the steam for terminal operations. The loss of revenue from sales of the steam impacts KPLP's cost to generate power. It is unclear at this time what other ramifications the loss of a steam outlet will have on KPLP.

Hawaii Gas has received naphtha feedstock from Tesoro for producing natural gas at the adjacent Hawaii Gas SNG facility. At this time, the only mechanisms to deliver naphtha feedstock into the SNG plant reportedly require the use of Tesoro assets²⁵. Tesoro and Hawaii Gas have reached an agreement whereby Hawaii Gas will receive all remaining naphtha inventory from the Tesoro refinery (this arrangement has been approved by the Public Utilities Commission under Decision and Order 31281). However, this volume of naphtha may last only until about August 1. In ICF's view, after August 1, Hawaii Gas options would seem to be 1) purchase of naphtha on the global market or from Chevron's local refinery and execution of a terminalling agreement with Tesoro until the Tesoro assets are sold; 2) Purchase of naphtha from Tesoro who would arrange imports as they are doing for other products that were produced at the refinery or 3) purchase of additional volumes of propane for SNG feedstock rather than naphtha.

Given the lead time required for acquisition and transport of both naphtha and propane imports, and the inventory depletion by late July, alternative supply must be arranged in the very near term. Due to the critical nature of SNG to consumers and industry, it is important that a sustained solution be provided through the transition period.

For jet fuel supply to the HFFC, HFFC has indicated that Tesoro is planning on import cargo deliveries into HFFC storage at Sand Island. These imports and HFFC inventory are managed and operated by Aircraft Service International Group (ASIG). Previously, jet fuel cargoes into this terminal averaged

²⁵ Conversation with Hawaii Gas, June 3, 2013

about one per month, but will increase to about three per month under the new supply flows. Moreover, this route will supply the vast majority of jet fuel demand at the airport. This terminal currently has about 1 million barrels of storage capacity (~30 days' supply) and feeds into two pipelines for delivery across the Kalihi Channel to replenish storage at the airport. In order to accommodate the increase in jet fuel imports, HFFC is working to update their terminal infrastructure to re-commission two storage tanks, upgrade the pumping systems, and allow for barges to be loaded at Pier 51 for jet fuel movements to outer islands.

The issue with increased jet fuel deliveries is that HFFC and importers do not have priority rights at Pier 51; that belongs to Horizon, who uses the Pier for Container vessel deliveries. The change in jet fuel delivery patterns from ratable supply of about 70% of demands to a model where large bulk cargo deliveries may be over 85% of supply may leave the jet fuel supply chain at risk if container cargoes do not work with HFFC/ASIG to develop flexibility for critical deliveries.

On gasoline, in the short term transition Tesoro is continuing to honor their supply contracts to the Tesoro dealers, Aloha, who they supply gasoline to on a wholesale basis, and others. Supply will be managed by imports through the SPM into the refinery tanks and then shipped via pipeline to Honolulu or via the Barge harbor to terminals on the neighbor islands. There are no indications at this time that this process is not working smoothly.

However, parties in the gasoline supply chain and others have expressed concerns. Independent dealers with contracts for supply from Tesoro may be at risk when their contracts expire because it is not clear where they can go to get competitive supply. It has been observed that Chevron already sells all their gasoline to branded dealers or other wholesale suppliers, and both Aloha and Mid-Pac are dependent on Tesoro and/or Chevron for their supply. Parties have indicated to ICF that it is difficult to commit to new customers when it is unclear what volumes (or prices) Tesoro, Chevron or a new entity may be willing to commit to in the future.

Much will depend on the ultimate disposition of the Tesoro assets, which at this point is unclear. This uncertainty cascades down to the independent dealers, since it is possible neither Aloha nor Mid-Pac can confidently predict what the potential volumes they may have to offer, or the price level.

While some parties on the Task Force have indicated that Aloha may be in a good position to arrange imports given their tankage of 460,000 barrels at Barbers Point, it is not clear that they will be able to import as cost effectively as Tesoro without access to the Tesoro SPM and refinery tanks. Increased traffic with gasoline imports through the Barge Harbor docks would also need to be assessed for its possible impact on supply (potential delays, etc.).

Inventory Management

Product imports and movements among the islands are critical to Tesoro's continuing operations. Similarly, Tesoro's management of inventory will also be crucial to ensure that customers are supplied in a timely manner.

As discussed earlier in this report, fuel demands in Hawaii are fairly ratable, meaning they are consistent throughout the year. Unlike other markets that may experience seasonality or other cyclical effects on demands, product consumption in Hawaii is relatively stable. Since demands are predictable, managing an import based supply model may not be a difficult transition for Tesoro (with known customer demands through the transition period). In effect, crude cargoes in transit will be replaced with product cargoes in transit, and this could in fact result in higher levels of finished product available than was the case with the Tesoro refinery running (since the imports on the water can directly enter the distribution system rather than requiring processing).

In order to study the “transition” inventory replenishment plan, ICF was able to examine the historical Tesoro inventory information reported by Tesoro through the EIIRP database through January 2013. In addition, Tesoro provided detailed day-by-day inventory projections (including planned cargo arrival dates and volumes, as well as demand/lifting estimates for customers) through August 2013.

Tesoro’s actual inventory history as well as their forward replenishment plans are highly confidential, so specific data cannot be provided within this report. However ICF’s review of the transitional plan and operation to date indicates the following:

- 1) There is a defined plan for cargo replenishment for all key products which, to date, appears to be working very well with increased cargoes of products
- 2) Tesoro’s scheduling of cargo loading and arrival times appear reasonable given the available storage capacity
- 3) Total in-state average product inventory (refinery, terminals, etc) targets appear to be several hundred thousand barrels higher than average inventories before the refinery closure.
- 4) While Tesoro crude oil and unfinished stocks will no longer be available in storage to refine, data indicate that at any point in time, there may be as much as one million barrels of additional products in transit and ready to be put directly into the product distribution system on arrival. These are in addition to the higher in-state volumes of supply.

The import model operates in a different manner than ratable (daily) delivery of product into the system from a refinery. Inventories will vary from higher levels just after a cargo receipt to relatively low levels just before a cargo receipt. Consequently, a potential drawback to the import model is that supply disruptions resulting from delays in cargo loadings, delivery of off-specification product and so on could lead to possible supply issues. These issues can occur from time to time due to weather or other unpredictable situations. When detected, alternative supply can be arranged or other cargoes diverted, however this risk may be no greater than the risk that one or both of the refineries may shut down due to an operational problem or power outage. While the initial transition plan appears reasonable from an inventory management perspective, and is progressing well to date, it will be important to monitor the delivery program and get feedback from stakeholders if there are situations where supply may be at risk due to possible delivery delays.

Potential Harbor Congestion

An obvious fact regarding the transition of the Tesoro refinery to a terminal is the need for more product imports. Although the increase in product cargo movements may be mitigated to some degree by the decrease in crude movements, product movements are typically delivered on smaller ships. Smaller vessels mean more vessels to move the same amount of product. This increase in freight activity could lead to more congestion within the various harbors.

As outlined in the key issues and concerns, jet fuel deliveries into Pier 51 are already constrained. Jet fuel deliveries are only allowed to be scheduled during two regular windows per week when the container ships are not using the pier. Moreover, even if a jet fuel delivery is scheduled and within its window to discharge, container vessels can assume right-of-way to unload. The priority of container ships at Pier 51 has led importers to demand that shippers pay demurrage costs (fees associated with late deliveries) in order to reduce their risk exposure to the highly constrained harbor system.

Parties have indicated that “Harbor managers give petroleum lower priority. May not be able to do that in the future” Also, berthing or shipment delays can occur at the Barge Harbor piers where in some cases coal shipments can block access to petroleum docks.

The interim report will attempt to better define the congestion issue after more time with actual operations under the transition plan.

Market Assessment

Fuel prices in Hawaii – regardless of the fuel – are built on a specific premise. That premise is that the wholesale prices from the refineries are determined based on negotiated contracts between sellers (the refiners) and buyers. The buyers for gasoline are wholesale suppliers like Aloha, Mid-Pac and in the past, Shell and others. The buyers for jet fuel are the airlines. Buyers for residual fuel oil include the utilities as well as shipping companies. Diesel fuel buyers include the gasoline wholesale suppliers for on and off-road uses, as well as utility purchases of higher sulfur level diesel fuels.

Market Mechanisms

Refiners negotiate contracts with these parties at different time periods and often on very different bases. The overall intent is to achieve a mutually agreed price basis for ongoing supply of fuel, with the terms such that the refiner feels they are getting a fair market price and the buyer feeling the same. In general, this price mirrors the price of a similar commodity in a market where wholesale/spot prices are transparent and freight costs into Hawaii can be estimated by both parties.

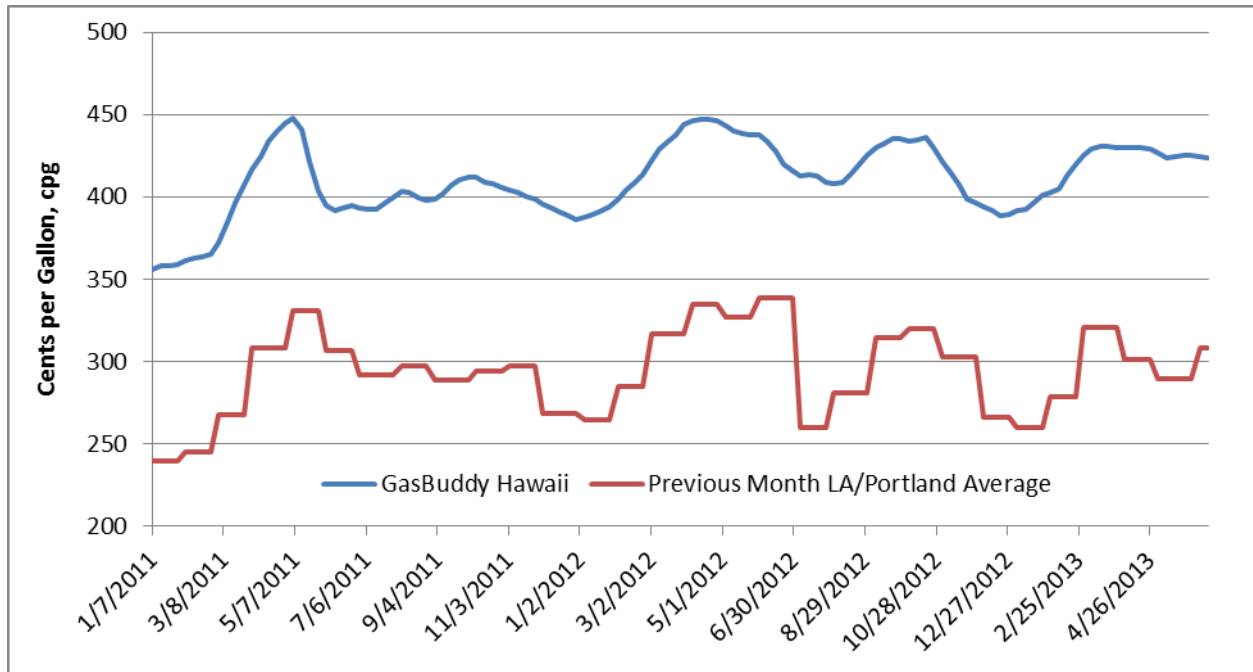
For example, a seller and a buyer of jet fuel may agree that the price of jet fuel transferred to the buyer in Hawaii is based on a posted price of jet fuel in Singapore plus some differential to reflect freight and/or quality differences. Similarly, a seller of wholesale gasoline may agree with a buyer that the price of gasoline sold in Hawaii will be based on a west coast or Singapore published price plus some factor for freight and for differences in quality.

These arrangements vary based on the products involved and buyer and seller issues. However there are several general observations related to these contracts and Hawaii markets based on initial feedback:

- 1) Wholesale prices for fuel in Hawaii rise and fall based on prices in other markets – typically the West Coast and Singapore or Gulf Coast markets. In some cases these changes are direct pass through to utilities and airlines; in other cases price increases and decreases are passed on to wholesale suppliers like Aloha and Mid-Pac, who then pass these on to branded and independent retail dealers.
- 2) The timing of contract renewals vary. Airline contracts are typically re-negotiated annually in the Spring. The Tesoro closure announcement complicated these negotiations. Utility supply contracts are often of longer duration.
- 3) The cost of imported supply will also be affected by the freight market and product quality issues. In a tight freight market, the cost to transport gasoline or other fuels to Hawaii could be higher by as much as 5 cents per gallon than in a weak freight market. Freight rates are a key consideration in contracts between buyers and sellers.
- 4) For product quality, buyers and sellers may use a published price such as MOPS (Mean of Platt's Singapore) for gasoline, however the Singapore gasoline cannot directly be used in Hawaii because Hawaii requires HIBOB blendstock (to be blended with ethanol at Hawaii terminals). The HIBOB specifications require the refinery in Singapore (or India, Korea) to modify their operation to make Hawaii product. There will typically be a premium for this service. Several parties have advised the Task Force that Hawaii's outdated (1980) product specifications will make it more difficult and costly to arrange import purchases.

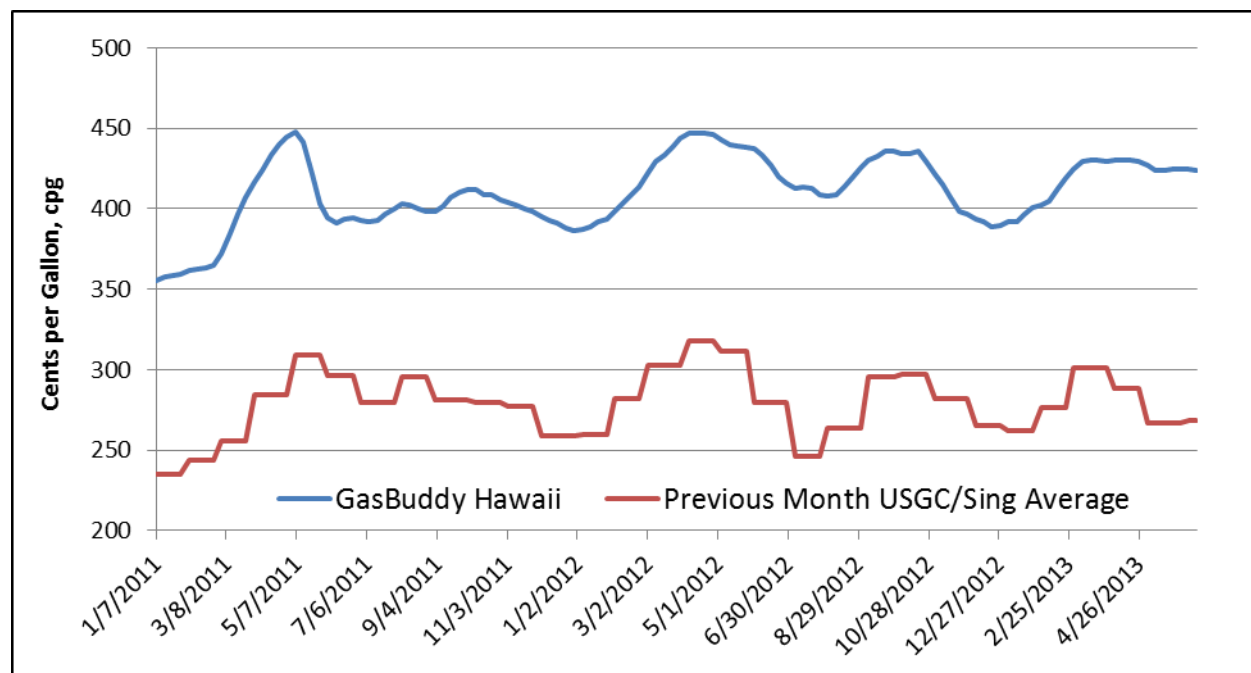
Prices to utilities and airlines are not normally visible to State residents, however retail gasoline prices are very visible. ICF examined gasoline prices over the past several years for Honolulu based on retail prices reported by GasBuddy.com²⁶ as well as spot market wholesale prices on the West Coast and Singapore. These are presented in Exhibit 3 and Exhibit 4 below. Please note that Retail prices will be much higher due to Federal, State and Local Taxes, as well as wholesale and retail margins required to cover business costs as well as profit margins.

²⁶ GasBuddy.com. "Find Hawaii Gas Prices," Accessed May 30, 2013. http://gasbuddy.com/Gas_Prices/Hawaii/index.aspx

Exhibit 3: Hawaii Retail Weekly Prices and Los Angeles/Portland Wholesale Average Previous Month Prices


Source: GasBuddy Honolulu, HI Regular Gasoline pricing; Bloomberg Los Angeles (LA) 85.5 octane CARBOB Prompt Gasoline pricing (ticker symbol: MOGLCB85 Index); Bloomberg Portland Sub-octane Gasoline Pricing (ticker symbol: MOGHS87P Index).

Exhibit 4: Hawaii Retail Weekly Prices and U.S. Gulf Coast and Singapore Wholesale Average Previous Month Prices



Source: GasBuddy Honolulu, HI Regular Gasoline pricing; Bloomberg U.S. Gulf Coast (USGC) CBOB 87-octane Gasoline pricing (ticker symbol: MOIGC87P Index); Bloomberg Singapore 92 Gasoline Pricing (ticker symbol: MOGFC92S Index).

Both these charts show that Hawaii retail gasoline prices tend to rise and fall following the pattern of wholesale prices in different markets. The relationship is strong, and it appears that at times prices in Hawaii do not fall at the retail level quite as rapidly as they rise, however that is not necessarily a phenomena unique to Hawaii.

Initial Transition Impact on Markets

As a result of the refinery closure, Hawaii's Fuel market transitions from one where the two refiners provided essentially all petroleum requirements (supplemented by a cargo per month jet fuel imports), to one in which roughly 60-70 percent of the fuel is imported.

In the initial transition, the following appear to be preliminary market-related impacts of the closure:

- 1) Tesoro is honoring existing contracts for supply of all fuels.
- 2) Tesoro has arranged for and is executing purchases and cargo movements of products into Hawaii to fulfill obligations to customers. As Tesoro had indicated to the Task Force on April 10th, most of this volume is from the Asian market.

- 3) Based on input from some airline stakeholders, some contracts for jet fuel purchases, renegotiated in recent months after the refinery closure announcement, have been shifted to a larger reliance on Singapore prices than the more traditional US West Coast prices. While stakeholders commented that this change is consistent with where jet fuel may be imported from, the impact on their fuel costs of the new contracts appears less favorable.
- 4) Some gasoline independent dealers are presently finding it difficult to secure alternative supply contracts due to the uncertainty concerning alternative suppliers. After a transition period, this may change as future conditions come into clearer focus. However it is unclear whether that change will be positive, or when it may occur.
- 5) Tesoro is working with utilities to provide an LSFO product that can be imported and treated to meet the strict requirements of KPLP's facility as well as all HECO facilities. Tesoro is also importing an HSFO product which can meet higher sulfur power generation requirements as well as ship bunkering needs.

Under existing contracts, overall the initial price impact on Hawaii may be minimal. As noted, Hawaii prices may rise or fall with markets in the United States or Singapore/Asia based on prevailing contract terms between Chevron and Tesoro with Hawaii customers, however those pricing changes will occur regardless of whether the Tesoro refinery is operational.. There will be some impact on jet fuel prices to airlines (each airline may have a different impact), and independent dealers may struggle financially if they cannot get assured supply at historical price relationships.

Price Trends of Key Product Markers for Hawaii Fuels

In discussions with Task Force members and key stakeholders, several parties discussed the formulas that are used to determine the prices of gasoline, jet fuel, diesel and residual fuel that are sold in the wholesale market in Hawaii. The information provided was in some cases specific formulas and in others the reference price upon which the formula was based (for example Los Angeles spot market jet fuel price). The specific formulas and factors used represent confidential contractual relationships between buyers and sellers and details are protected under confidentiality agreements.

However, it is reasonable to use the knowledge of the pricing bases to examine the trends in price over time. Charts shown below reflect several actual marker price locations for fuel contracts in Hawaii as well as several others which may or may not be used. The gasoline prices shown earlier compared actual prices at the pump in Hawaii with wholesale spot market prices, and provide a visible tracking of the relationship between source markets and Hawaii prices.

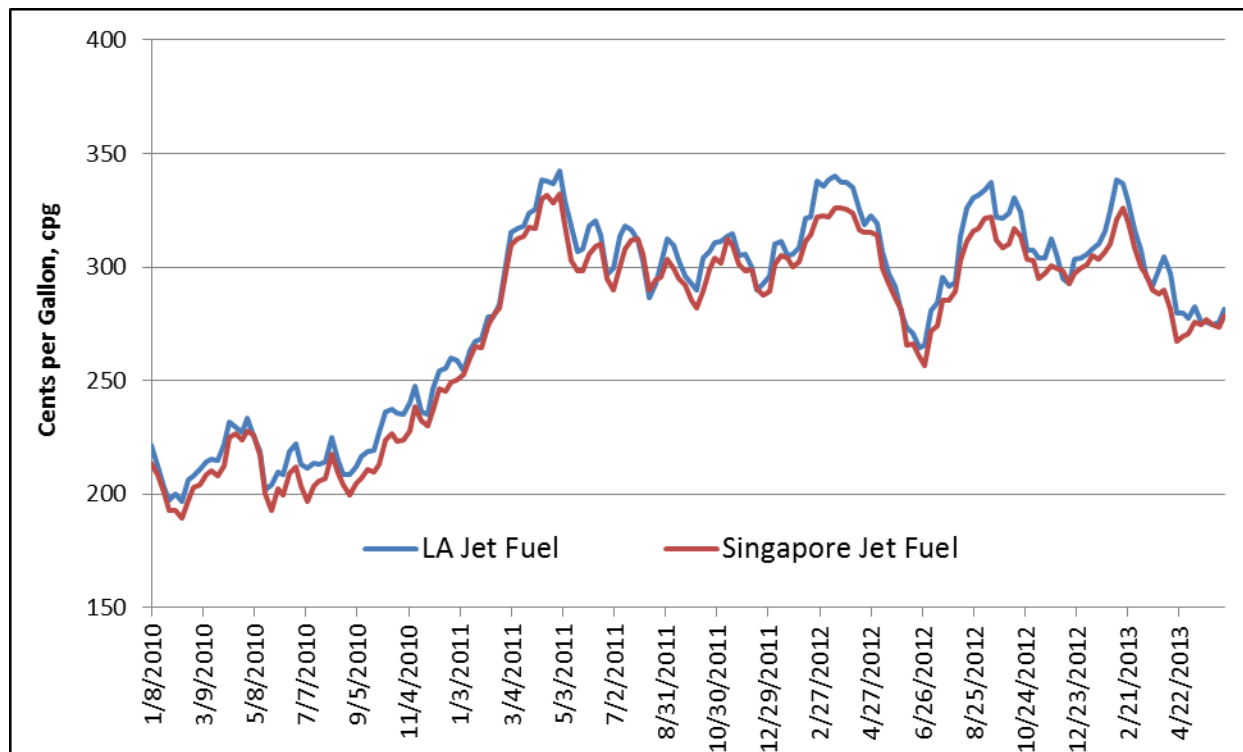
For the other key products (jet, diesel and residual fuel) there is no "one" visible price in Hawaii because contracts are negotiated between individual buyers and sellers and each contract could result in prices that may be significantly different than contracts between other parties in Hawaii. Consequently, we can track prices for the other fuels in the source markets and in general feel confidence that as those prices rise and fall for the specific commodity, prices to Hawaii consumers, airlines and utilities will rise and fall.

Jet Fuel

Exhibit 5 tracks jet fuel spot market prices in Los Angeles and Singapore over recent years. Both these prices have been used as the basis for contracts with the airlines for fuel deliveries in Hawaii. Parties have indicated that with the Tesoro refinery closure that contracts may tend to be more focused on using Singapore prices in the future as the Asia market has been the source of Hawaii jet fuel imports in the past, and more so in the future.²⁷

Exhibit 5 clearly shows a close relationship between the two price markers, with Los Angeles price generally higher (the LA price has averaged about 8 cents per gallon higher than Singapore since the beginning of 2012). Suppliers (Chevron and Tesoro, plus others such as World Fuels), and buyers (airlines) study these price trends and relationships, as well as freight costs to negotiate contract terms for each year's fuel procurement process.

Exhibit 5: Los Angeles and Singapore Jet Fuel Prices



Source: Bloomberg Los Angeles (LA) Prompt Jet Fuel Price pricing (ticker symbol: JETFLAPL Index); Bloomberg Singapore Jet Fuel pricing (ticker symbol: JETKSIFC Index).

Based on Exhibit 5, one can conclude that jet fuel prices in Hawaii have had a price basis of roughly \$3 per gallon over 2011 and 2012, and that recently prices have declined to the \$2.75 per gallon range.

²⁷ This was mentioned by Tesoro at the April 10th Task Force meeting

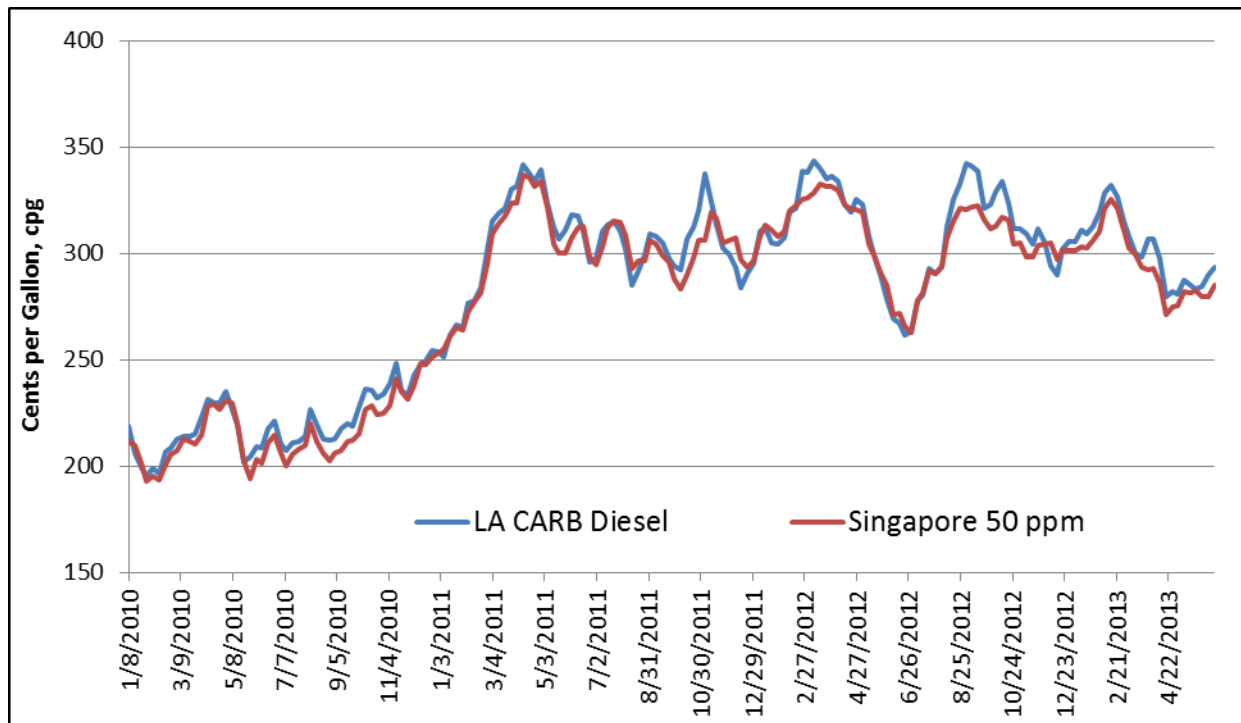
Based on comments from buyers and sellers, a number of contracts may have been altered to a Singapore basis rather than Los Angeles. If so, should prices in Singapore rise to approximate or exceed prices in Los Angeles, future annual contracts would reflect that and increase cost to airlines.

Diesel Fuel

Diesel fuel is sold for on the road transportation to consumers (at service stations) as well as to commercial entities for truck transport. These sales are typically Ultra Low Sulfur Diesel (ULSD). Higher sulfur level diesel fuels are sold to utilities where they are burned for power generation.

Overall, parties have indicated that commercial ULSD prices as well as higher sulfur diesel prices are linked to the Los Angeles and Singapore diesel prices. As with jet fuel, as the marker diesel prices rise and fall, prices to Hawaii consumers will also change. To date, the Task Force has had no input indicating diesel price contracts (for ULSD or higher sulfur diesel) have altered the pricing basis or the contract terms. See recent trends on Exhibit 6:

Exhibit 6: Los Angeles CARB and Singapore 50 ppm Diesel Prices



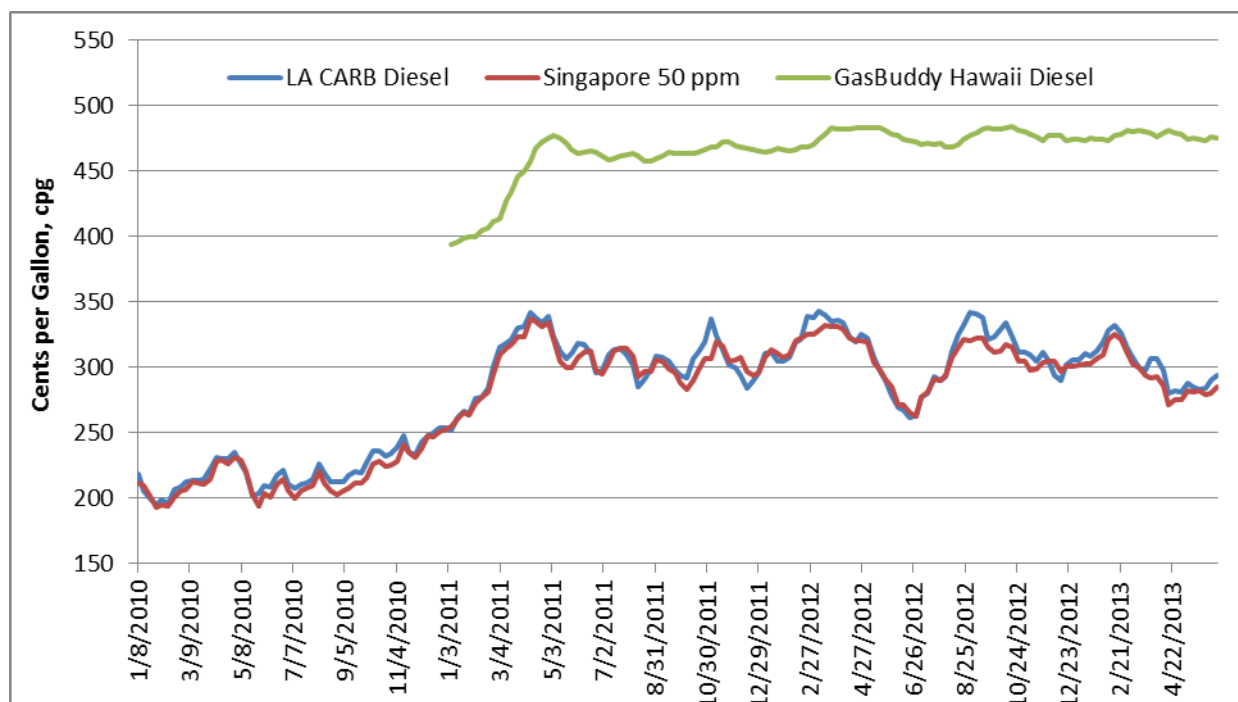
Source: Bloomberg Los Angeles (LA) CARB Diesel pricing (ticker symbol: DIEILCAM Index); Bloomberg Singapore 50 ppm Gasoil pricing (ticker symbol: GASL50PM Index).

Exhibit 6 reflects global diesel prices in the Pac Rim, and looks remarkably similar to the jet fuel price chart. In this case, the Los Angeles prices have averaged about 7 cents per gallon higher than Singapore prices since mid-2012. Actual prices to Hawaii consumers may vary based on how specific supply contracts are established and what factors are used to adjust for fuel quality (ULSD would be a premium

to HSD) and location/transport to Hawaii, but the absolute price should rise and fall with the prices shown here.

Diesel prices at retail service stations can be monitored to validate this trend similar to the retail gasoline prices shown in Exhibit 7. These prices may be higher than diesel sales to commercial entities since they would reflect the margins required to operate and maintain a profitable retail service station business. However tracking these prices and the possible source spot market prices can provide perspective on the trend in Hawaii prices, Exhibit 7 shows diesel fuel prices at the Retail level in Hawaii and in the Los Angeles and Singapore spot markets²⁸:

Exhibit 7: Retail Diesel Prices in Hawaii, Los Angeles, and Singapore



Source: GasBuddy Honolulu, HI Diesel pricing; Bloomberg Los Angeles (LA) CARB Diesel pricing (ticker symbol: DIEILCAM Index); Bloomberg Singapore 50 ppm Gasoil pricing (ticker symbol: GASL50PM Index).

Exhibit 7 indicates that retail (service station) diesel prices are much “stickier” than retail gasoline prices in Hawaii. In several instances spot market diesel fuel prices decline substantially, including mid-2012 and in the current market, and retail diesel prices hold steady. It is unclear if this just applies to service station diesel sales or contracts with commercial entities buying diesel fuel for truck fleets, however based on the feedback during the initial transition period, the contracts between refiners and suppliers would have resulted in lower diesel fuel prices to suppliers. This would mean that either wholesale or

²⁸ Similar to gasoline price comparisons shown earlier, diesel retail prices include all taxes and wholesale business costs and margins, and therefore are much higher than spot market prices.

retail margins to service stations or consumers may have increased during those periods (this situation is not an impact related to the Tesoro closure).

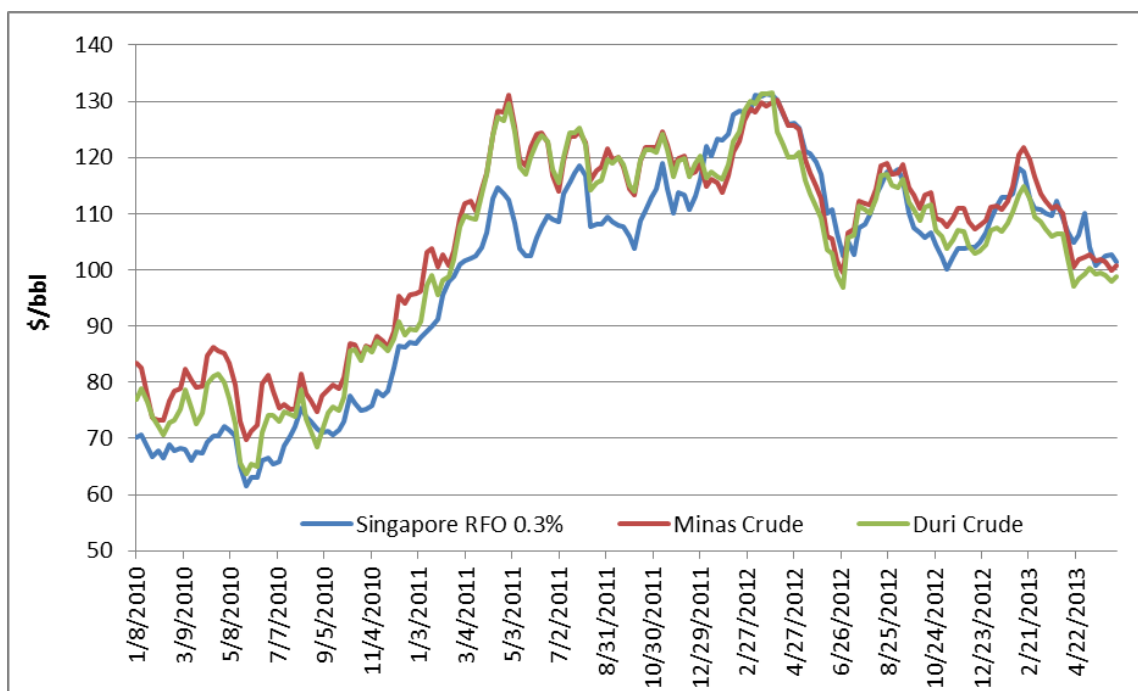
Residual Fuel Oil (for Power Generation and Ship Bunkering)

Both refineries in Hawaii produce RFO, or residual fuel oil. RFO is a blended product using the heaviest portion of the crude oil barrel blended with lighter stocks to provide a product with suitable qualities of flow, sulfur and heat content to be used in power generation applications. Tesoro's RFO is targeted to its customer needs. As detailed earlier, HECO and KPLP purchase LSFO from Tesoro, and MECO, HELCO and shipping companies purchase IFO, which is similar to LSFO although with a higher sulfur content.

The contractual arrangements for RFO sales to utilities are important to Hawaii consumers because cost increases or decrease will ultimately be passed through to consumers. Similar to other commodities like gasoline and jet fuel, contracts from Tesoro and, presumably Chevron are linked to global markets. For RFO products, these markets include Singapore and Los Angeles IFO or bunker fuel markets, as well as Pac Rim crude oil prices. Monitoring these markets can allow parties to assess the general direction of RFO prices, although the specific factors for freight or quality differences are confidential between buyers and sellers.

Exhibit 8 and Exhibit 9 show several market prices which may be employed by buyers and sellers in contract transactions for RFO sales in Hawaii:

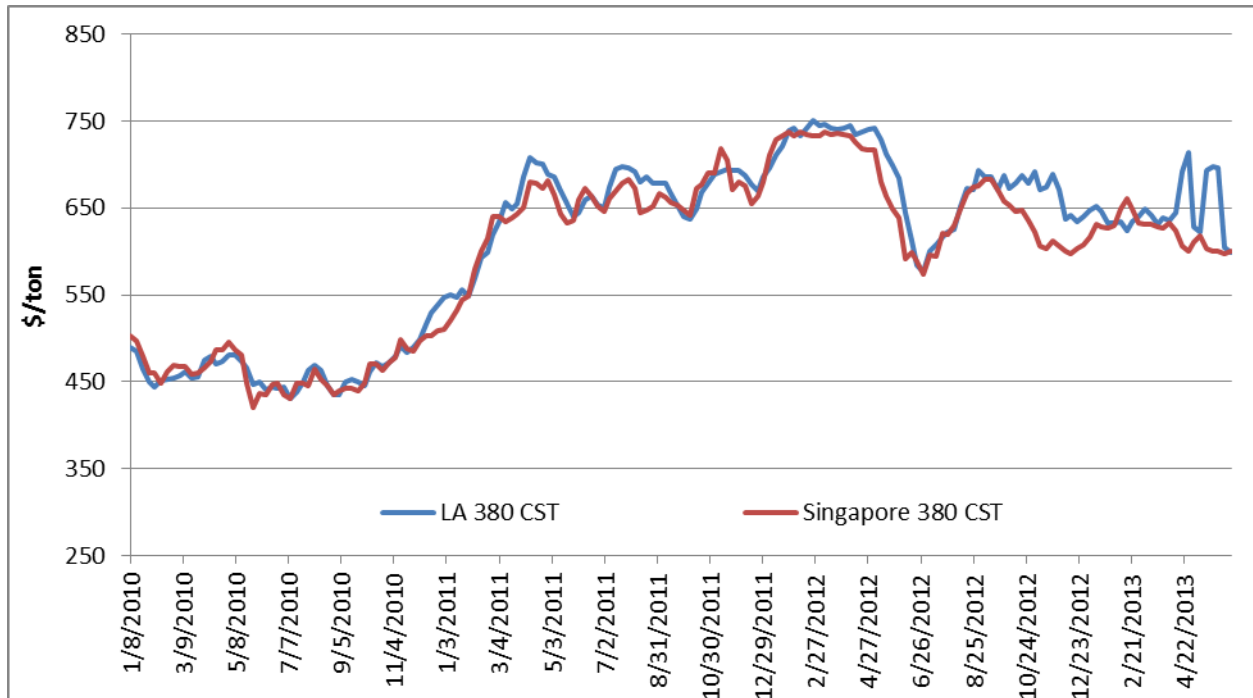
Exhibit 8: Singapore RFO (0.3% Sulfur) and Minas and Duri Crude Prices



Source: Bloomberg Singapore Residual Fuel Oil 0.3% pricing (ticker symbol: N6SHLSWR Index); Bloomberg Minas Crude pricing (ticker symbol: APCRMINA Index); Bloomberg Duri Crude pricing (ticker symbol: APCRDURI Index).

Exhibit 8 shows that residual fuel prices in Singapore track prices of key Pac Rim crude oils as well as Singapore RFO. If RFO contracts in Hawaii are linked to these markers, significant cost increases would have occurred from 2010 through 2011, although prices have moderated somewhat since then. It is noteworthy that the crude prices were well above the Singapore residual price through early 2012 but since that time the crude oil and residual fuel prices have been very close.

Exhibit 9: Los Angeles and Singapore 380 CST Bunker Fuel Prices



Source: Bloomberg Los Angeles High Sulfur 380 CST Bunker Fuel (ticker symbol: N6LA380 Index); Bloomberg Singapore High Sulfur 380 CST Bunker Fuel (ticker symbol: BUNKSI38 Index).

Similar to the prior chart, a tracking of the 380 CST²⁹ fuel oil price shows a large increase in early 2011 which mirrors increases in global crude oil prices. Both markets follow very similar patterns. Overall if higher sulfur residual fuel oil prices or bunker fuel prices are linked to either of these market prices, there should have been relative stability in these prices since early 2011. As with other commodity prices, these comments are observations assuming that the base fuel price is linked to these markets, and specific contract factors for freight and quality differences are unknown.

²⁹ 380 CST is 380 centistokes, a measure of viscosity which is important to assure flow of heavy fuels in marine equipment.

Naphtha

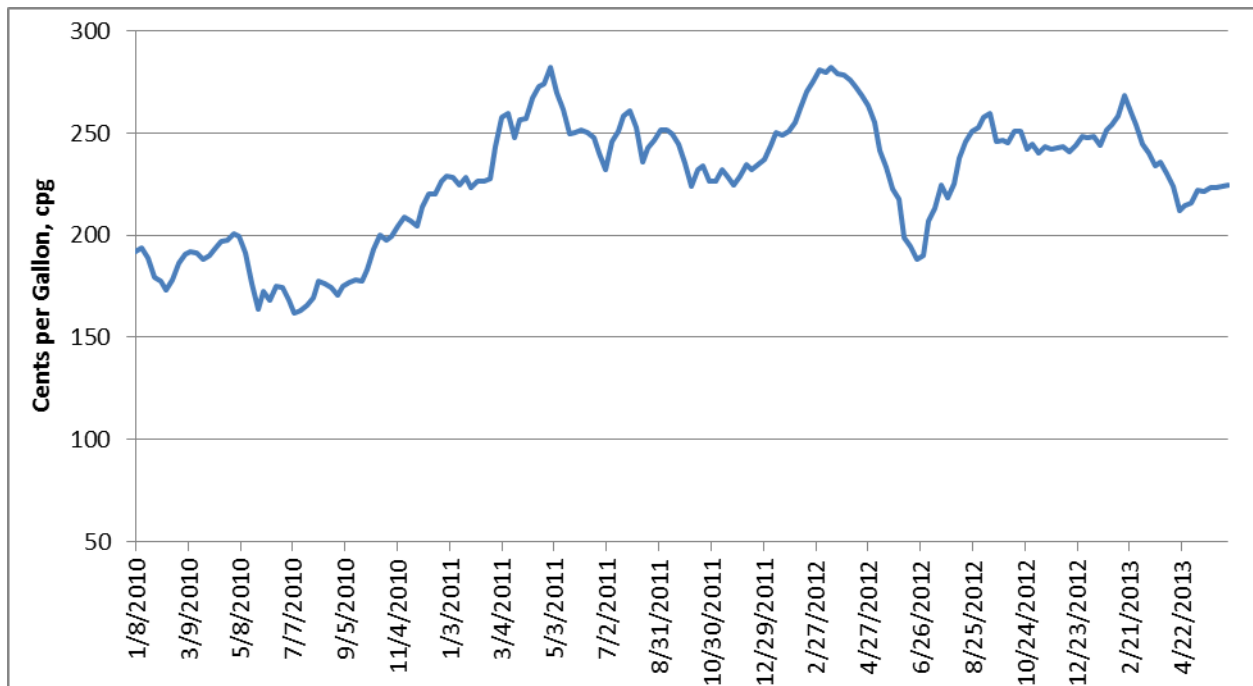
There is generally a robust global market for naphtha as a refinery feedstock, petrochemical feedstock, and in the case of Hawaii Gas, a feedstock for Synthetic Natural Gas production. Naphtha is also used in Hawaii as a fuel for power generation. This market is active in the Pac Rim region, and naphtha transactions are typically based on a MOPS (Mean of Platt's Singapore) Index, adjusted for source location, naphtha quality and current market strength or weakness.

The basis for the specific naphtha pricing between Hawaii Gas and Tesoro is confidential, although the PUC has approved the extension of that pricing basis for the balance of the Tesoro naphtha inventory sale. Future costs of naphtha into Hawaii Gas will depend on the outcome of short term supply options as well as longer term (post Tesoro) options.

Contracts could be short term ("spot"), bringing cargoes into Hawaii to cover periods in advance of a Tesoro asset sale or eventually Hawaii Gas may negotiate a longer term supply arrangement involving leasing access to the new owner's storage and developing a longer term naphtha purchase contract.

Exhibit 10 below shows the historical trend of Singapore naphtha pricing. The chart indicates similar trends to other fuels over the past few years, with hovering around the \$2.50/gallon level since early 2011.

Exhibit 10: Singapore Naphtha Prices



Source: Bloomberg Singapore Naphtha (ticker symbol: NAPHSINF Index).

For Hawaii Gas, evaluation of any short or long term contract to purchase naphtha would involve comparing the naphtha acquisition cost, including freight, against its historical naphtha cost and the impact on the cost of producing synthetic natural gas affecting its competitiveness in the market. Hawaii Gas would also look at the implications of use of additional long term propane supply as an alternative feedstock for the SNG plant.

Freight Cost Trends for the Hawaii and Pacific Rim Market

Freight Rate Overview

Tanker rates are generally broken into two categories: “dirty” and “clean.” Clean rates refer to those for tankers transporting refined products such as gasoline or jet fuel, while dirty rates refer to those carrying crude oil or residual products such as fuel oil or carbon black. Rates for both clean and dirty sectors are in the midst of a prolonged slump. Rates had spiked in the early part of the last decade, prompting a spurt of orders for new tankers across various sizes. Unfortunately for these investors, owners were overzealous in their ordering and a supply glut emerged just as a global financial crisis was becoming readily apparent. Ordering has subsequently slowed across all sectors, which has enabled rates to seemingly find a support level. Any subsequent recovery in rates will be threatened by those owners with access to capital that view the current environment as a good time to buy “at the bottom of the cycle.” For example, MR-sized vessel (30,000 DWT – deadweight tons) ordering by Scorpio Tankers Inc. has been particularly aggressive.

Impact of New Hawaii Import Demands on Freight Market

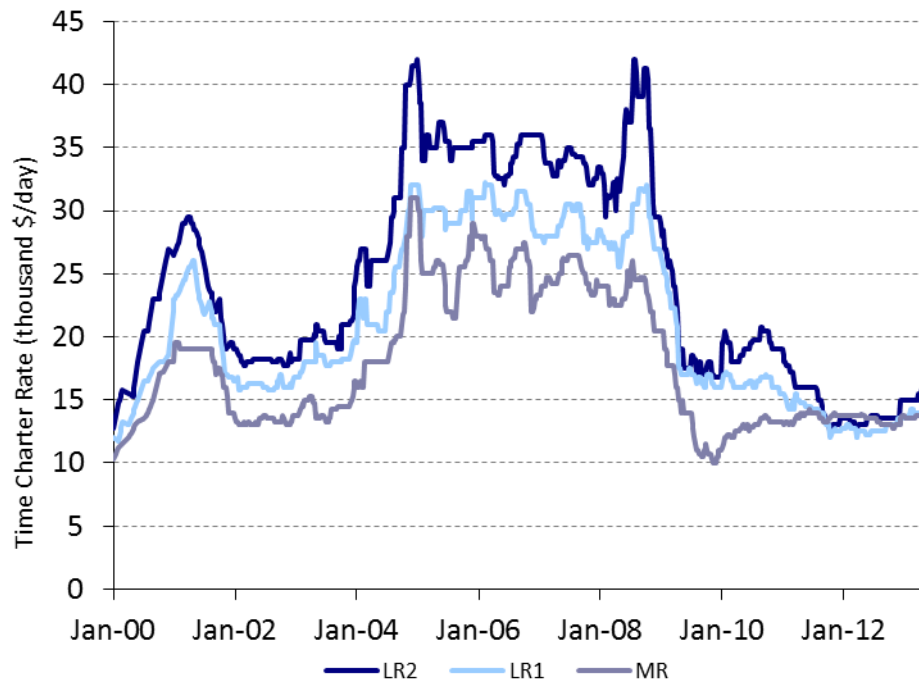
The replacement of the Tesoro refinery production with refined product imports should not have a meaningful impact on freight rates as the associated vessel requirements will be negligible in the context of the larger fleets. For instance, one LR2 – sized vessel (capable of carrying 500-600 MB) consistently doing a round trip voyage between Singapore and Hawaii could carry approximately 15 TBD of gasoline while an MR sized vessel could deliver roughly 7.5 TBD of supply. Consequently, assuming all deliveries into Hawaii originate in Singapore, approximately 8 MR sized vessels may be needed to replace the product previously supplied by the refinery. There are currently over 1,000 MR vessels in use carrying products, and about 220 vessels of that size under construction. The increase in demands of 8 vessels would have a miniscule effect on the freight market. Note that Singapore is simply a key market source for Hawaii. Other sources such as Korea are closer (shorter round trip) while others (India) may be a longer round trip. On balance, assuming Singapore as an average origin source for Hawaii is reasonable.

Hawaii Freight Rate Expectations

The cost to transport petroleum products can vary for a number of reasons. Simply put, the longer a cargo has to be hauled, the more costly a voyage may be to the party chartering the vessel. The cost per barrel or gallon hauled will increase as the vessel size becomes smaller, and will also increase as the cargo is more dense – i.e. since ships are designed to haul a certain tonnage, a ship can haul more barrels of gasoline for the same cost as fewer barrels of diesel fuel. Freight rates to chartering parties will also vary based on port and harbor charges, the cost of bunker fuels, and other factors.

In addition, as with most commodities, the supply and demand for ships varies over time, as noted in the first section on freight. Over the past 12 plus years, the cost for a party to “lease” or charter a vessel similar to those being used by Tesoro to supply gasoline, diesel and jet fuel to Hawaii has varied considerably, as seen in Exhibit 11 below:

Exhibit 11: Clean One Year Time Charter Weekly Rates



Source: Poten & Partners

These costs reflect what a company like Tesoro may pay to charter various clean tankers (an MR size vessel, for example, has a capacity of about 320 MB of gasoline or 300 MB of Jet fuel) for each day of use and a one year commitment. Rates for longer term commitments may likely be higher since ship owners would want to protect against the possibility of rates increasing over time.

Clearly, the prevailing market for clean freight is near the low mark over the past 12 years. This is an advantage to Hawaii as buyers (Tesoro or other importers) will seek to get low rates and their wholesalers (Aloha, Mid-Pac, etc.) are also aware of freight markets and will negotiate to get competitive rates.

However, there is exposure should the freight market become tight again. The current freight market rate translates into about a 10.7 cpg rate to move an MR size cargo of gasoline from Singapore to Hawaii, and about 7.8 cpg from Korea. These rates would increase by roughly 3-4 cpg at historical high rates for MR vessels.

Outlook Beyond the Initial Transition Period

Asset Disposition Alternatives

Stakeholders are most uncertain about what may happen after Tesoro exits the Hawaii market. The options can vary significantly, including the following:

- 1) Refinery and distribution assets are sold to an entity that will run the refinery and essentially take over Tesoro's role from refiner to marketer.
- 2) Refinery remains closed and is sold with distribution assets to an entity that will assume a permanent role similar to Tesoro's transition role as a supplier and distributor/marketer of petroleum products.
- 3) Refinery remains closed and is sold with distribution assets to an entity that intends to operate the system as a terminal owner, charging fees for use of storage facilities, SPM, pipelines, etc. but NOT owning the petroleum or marketing the petroleum.
- 4) Some fragmented dissolution of Tesoro assets –service stations sold to one entity; distribution assets to another; and so on

This initial analysis is focusing on alternative 2, which is in fact the current transitional operation with Tesoro in the role of Supplier/Distributor/Marketer. The Interim report will discuss other options in more detail, or discuss any announced resolution of Tesoro assets that may be decided by that time. Clearly, a sale to a buyer who plans to restart the refinery and operate Tesoro's assets in Hawaii will result in a return to prior fuel supply conditions and restoration of refinery jobs. The other options at this time are more speculative and it should be recognized that permutations of 2, 3 or 4 could be the ultimate end result of any sale.

Alternatives 3 and 4 are likely to result in the development of a different supply model for Hawaii than options 1 and 2. It may be possible that Hawaii companies like Aloha and Mid-Pac, HECO or even trading companies, could lease assets and purchase and import their own fuel requirements under some forms of option 3 and 4. There could be a number of pros and cons to this outcome which would need to be considered when the assets are ultimately sold.

Implications on Hawaii long-term strategy to shift from fossil fuel supply for transportation and power needs

Hawaii has made some significant commitments to cleaner fuels and reduced greenhouse gases. The urgency to implement these investments would be greater with the State reliant on one refinery rather than two. As Hawaii adapts to the Tesoro Refinery closure, stakeholders have a number of alternatives to traditional energy production, including the adoption of clean and renewable energy developed from Hawaii resources. Hawaii has already adopted an aggressive renewable energy standard of 40% by 2030

and an energy efficiency portfolio standard of 4,300 GWh by 2030. Hawaii also has other clean energy programs, such as a public benefits fund, solar water heating requirement for new residential construction, solar access requirements, feed-in tariff, and a variety of state and local financial incentives.³⁰

Likewise, to encourage the use of alternative transportation use, the state has adopted policies such as ethanol production incentives and blending requirements, electric vehicle high occupancy vehicle (HOV) access and EVSE requirements, and the development of a hydrogen energy plan and fund.³¹

Clean Energy Consumption

Despite the large number of existing clean energy policies, in 2010 Hawaii had about 8 percent of its power generated by renewable sources, with 0.817 GWh of net generation.³² The breakdown of electricity generation by source, including renewable energy, is included in Exhibit 12 below.

Exhibit 12: Hawaii Renewable Electric Power Industry Net Generation, by Energy Source, 2010, Thousand Megawatt-hours.³³

Energy Source	Thousand MWh	% of Total
Renewable Energy	817	8%
Geothermal	201	2%
Hydro Conventional	70	1%
Solar	2	0%
Wind	261	2%
MSW Biogenic/Landfill Gas	174	2%
Other Biomass	109	1%
Fossil	9,655	89%
Coal	1,546	14%
Petroleum	8,087	75%
Natural Gas	0	0%
Other Gases	22	0%
Other	364	3%

³⁰ Database of State Incentives for Renewables & Efficiency, "Hawaii: Incentives/Policies for Renewables & Efficiency," accessed May 31, 2013, <http://www.dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&state=HI>.

³¹ National Renewable Energy Laboratory, Alternative Fuels Data Center, "Hawaii Laws and Incentives," accessed May 31, 2013, <http://www.afdc.energy.gov/laws/law/HI/6079>.

³² U.S. Energy Information Administration, "State Renewable Electricity Profiles (Data for 2010)," March 8, 2012, <http://www.eia.gov/renewable/state/>.

³³ U.S. DOE Energy Information Administration, "Hawaii: State Renewable Electricity Profiles 2010," March 2012, <http://www.eia.gov/renewable/state/hawaii/>.

Total	10,836	100%
-------	--------	------

Notes: Hydro Conventional does not include pumped storage. Other Biomass includes agricultural byproducts/crops, sludge waste and other biomass solids, liquids and gases. Solar includes solar thermal and photovoltaic. MSW = Municipal Solid Waste. MSW Biogenic includes paper and paper board, wood, food, leather, textiles and yard trimmings. Petroleum includes petroleum liquids, petroleum coke, and waste oil. Natural Gas includes single-fired and dual-fired plants operating on natural gas. Other Gases includes blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels. Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, tires, non-biogenic MSW and miscellaneous technologies. For co-fired plants, generation is prorated on the basis of energy source shares. Totals may not equal sum of components due to independent rounding.

Source: Capacity: U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report." Generation: U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report."

Stakeholders anticipate that Hawaii will be able to reach the 15% renewable portfolio standard by 2015, but it is unclear if it would be feasible to reach the 25% standard by 2020 without significant utility-scale projects.³⁴

In 2011, a total of 7,341 alternative fuel vehicles were operating in the state, including E85, LPG, LNG, CNG, hydrogen, and electric vehicles, which consumed 886,000 gasoline gallon equivalent (GGE).³⁵ This compares to roughly 460 million gallons of motor fuel used in 2011, with alternative fuels only representing about 0.2% of the total.

Barriers to Clean Energy Adoption

Though Hawaii has made some significant clean energy progress in the past few years, there is still much to be done to expand this nascent industry. According to stakeholders, policy and decision makers have been less proactive about clean energy policies due to a false sense of progress from highly visible wind developments and residential rooftop solar initiatives.³⁶ Unfortunately, these measures have not yielded the large utility-scale projects necessary to meet state regulations and clean vehicle technology penetration. In part, these efforts have been impacted by a wide variety of technical and social barriers. For example, two proposed wind farms in Lanai and Molokai, which could provide 400 MW of offshore

³⁴ Phone interview with Robin Campaniano, May 30, 2013.

³⁵ U.S. DOE Energy Information Administration, "Alternative Fuel Vehicle Data," Last Updated May 4, 2012, <http://www.eia.gov/renewable/state/hawaii/>. <http://www.eia.gov/renewable/afv/users.cfm>.

³⁶ Phone interview with Robin Campaniano, May 30, 2013.

wind energy, have been opposed due to potential impacts on wildlife and the use of sacred cultural areas.³⁷

Additionally, the lack of interconnectivity between the islands has limited the ability to shift renewable energy resources to load centers. For example, geothermal energy from the Big Island could provide 50-75% of the electricity for the islands, but without deep sea cables, it would be impossible to fully utilize the resource.³⁸

Finally, Hawaii clean energy projects have been significantly impacted by federal sequestration and program cutbacks.³⁹ These funds are needed to advance research and development in new technologies, such as ocean energy and feedstock development for biofuels. It is unclear if there will be a resolution to this barrier in the near-term, although federal funding could be restored in the future.

Potential Policies and Initiatives for Consideration

Feedback and observations to date indicate that If Hawaii is to make significant progress in renewable energy and alternative transportation fuels, policymakers will need to engage in a thorough assessment of existing policies and regulations. These initiatives merit consideration regardless of whether or not the Tesoro refinery is operational, however, with the refinery's closure, these initiatives become more compelling to develop reliance on self-generation of fuels and power infrastructure. These will create both renewable energy sources as well as jobs to replace those lost with the Tesoro closure. Some of the recommendations suggested by stakeholders include:

- **Encourage the Hawaii Public Utilities Commission (PUC) to streamline the approval process for utility-scale renewable energy projects.** To reduce the amount of distillates used for electricity production the PUC may consider strategies to more quickly approve large renewable energy projects. This could include streamlining the review and approval process for projects under a certain size. For example, the approval of the HECO off-take arrangement for two large biofuel production facilities, which have been held-up in the review process.
- **Dedicate resources to study and initiate an inter-island grid corridor.** To expand interconnectivity between the islands and encourage the development of renewable energy resources, the State should dedicate resources to study and commission the installation of deep sea cables.
- **Consider expansion of the E10 blending requirement and encourage the use of in-state biofuel production.** The State should evaluate options to promote and expand in-state production of biofuels. This could be achieved by expanding the E10 blending requirement to include biodiesel

³⁷ Star Advisor, "Wind Energy Faces Gales," February 27, 2011, http://www.staradvertiser.com/editorials/20110227_Wind_energy_faces_gales.html#.

³⁸ Phone interview with Robin Campaniano, May 30, 2013.

³⁹ Phone interview with Robin Campaniano, May 30, 2013.

(e.g. B5 or less). Additionally, the State could expand the ethanol production tax credit to include biodiesel and require that a certain percentage of the biofuel procured by the state come from in-state sources.

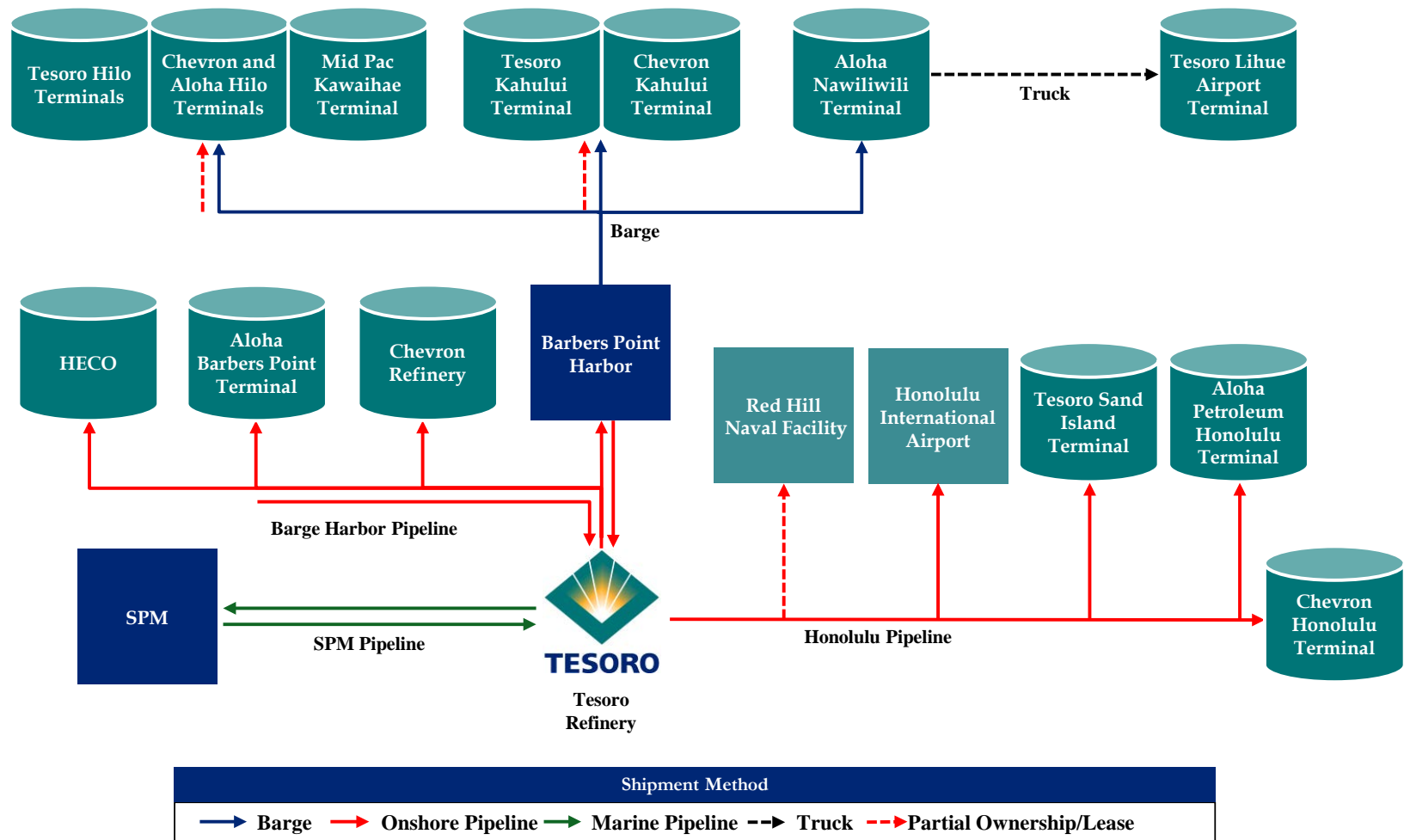
- **Reduce vehicle miles traveled.** To date, very few policies have been designed to mitigate fuel consumption among light-, medium-, and heavy-duty vehicles. Transportation fuel consumption represents an opportunity to reduce impacts of the Tesoro refinery closure and future import needs. Among options for reducing vehicle miles traveled (VMT) include expanding multi-modal transportation, mass transit, and promoting ridesharing and teleworking.
- **Expand the network of alternative transportation fuel infrastructure.** The State could use less conventional fuels in favor of alternative fuels, particularly those that could be generated in Hawaii. One of the most significant barriers to alternative fuel consumption is the availability of refueling infrastructure to support vehicles. The state only has three publicly-accessible LPG stations, seven biodiesel refueling stations, and 126 electric vehicle recharging stations.⁴⁰ Though the state does have a requirement that all public parking facilities with at least 100 parking spaces should designate at least one parking space for electric vehicles,⁴¹ the state does not have any other incentives available for infrastructure, such as tax credits for infrastructure installation.
- **Encourage the use of alternative fuel and efficient vehicles.** The state could promote alternative fuel and efficient vehicles by adopting policies and regulations that would impact vehicle suppliers and end users. For example, by adopting a regulation similar to the Zero Emission Vehicle program in California, vehicle manufacturers would be required to send low emission and highly efficient vehicles to Hawaii. Additionally, a regulation such as a vehicle feebate could alter vehicle choices of end users by charging an added 'fee' for inefficient vehicles and a 'rebate' for efficient vehicles.
- **Expand the Public Benefits Fund to apply to efficient transportation strategies.** The PUC has led the efforts to increase efficiency on the island through the creation of a public benefits fund through the strategic use of rate payer funds to increase energy efficiency. A public benefits model like this could be successful for transportation and provide the necessary resources to evaluate a wide range of efficient transportation options.

⁴⁰ National Renewable Energy Laboratory, Alternative Fuels Data Center, "Alternative Fuels Station Locator," Accessed on May 31, 2013,

http://www.afdc.energy.gov/locator/stations/#results?utf8=%E2%9C%93&location=hawaii&filtered=true&fuel=all&owner=all&payment=all&ev_level1=true&ev_level2=true&ev_dc_fast=true&radius_miles=5.

⁴¹ National Renewable Energy Laboratory, Alternative Fuels Data Center, "Plug-In Electric Vehicle Parking Requirement," accessed May 31, 2013, <http://www.afdc.energy.gov/laws/law/HI/6566>.

Appendix 1: Tesoro Logistics Overview



Appendix 2: Hawaii Petroleum Supply Schematic

