

HAWAII GAS LNG PROGRAM  
Hawaii Shippers Council, September 5, 2012

Current Operations – Hawaii Gas – formerly the Gas Company

- Produces approximately 60,000 short tons (tons of 2000 lbs) of synthetic natural gas (SNG) annually at its plant from naphtha feed stock supplied by the two refineries – Tesoro and Chevron -- at Kalaeloa, Oahu, Hawaii
- Distributes SNG through local pipeline systems (gas mains) on Oahu, and certain areas on Kauai, Maui and Hawaii Islands.
- Ships bulk SNG from Oahu to three neighbor islands on its LNG Barge HUKI KAI.
- Also distributes Liquefied Petroleum Gas (LPG) – propane and butane – obtained from the two refineries as a byproduct – LPG is distributed and shipped in pressurized vessels.

Proposed Hawaii Gas LNG Container Program

- Planning to import liquefied natural gas (LNG) from California in highly specialized 40 foot intermodal ISO refrigerated tank containers to be shipped on existing containership services – Matson and Horizon Lines – to Honolulu and neighbor islands
- The purpose is to replace over time the SNG manufactured locally with the LNG supplied from California in tank containers.
- Plan to begin with 30 and build up to 140 containers that will eventually supply Oahu and the Neighbor Islands requirements
- Theoretically can close their SNG plant, mothball their LNG barge, close their interisland marine terminal in Honolulu, and close bulk storage facilities on the neighbor islands.
- HSC estimates HG will average 40 short tons per 40’ refrigerated tank container, and to ship 60,000 long tons/annum, HG will require the movement of approximately 1500 containers per annum or around 30 per week and a container fleet of about 150 units. The cost of these highly specialized containers will be something on the order of \$100,000 each, meaning a total investment of around \$15 million.

Carib Energy (USA) LLC Model

- Hawaii Gas container program based upon existing Carib Energy model.
- Carib Energy established several years ago to begin an innovative program to ship LNG in specialized tank containers on existing containership services from the U.S. Gulf Coast to Caribbean destinations that can’t justify or receive large tanker ships of LNG (LNG carriers).
- Carib Energy recognized that Caribbean countries rely on imported petroleum products with the majority of utilities generating electricity through diesel generators. This is an expensive method of producing energy. The result is that the cost of electricity can range from \$0.28 to \$0.50 kWh (kilowatt hour), compared to an average \$0.12 kWh in the U.S.
- Shale gas disrupted traditional pricing relationships between diesel and natural gas enough to make exporting LNG to Caribbean utilities economical. Carib Energy’s vision is to make electricity more affordable for its Caribbean customers.
- Carib Energy received on 08/02/2011 approval from U.S. Department of Energy (DOE) an export license to export 11.53 bcf / yr for 25 years and began shipping LNG in late 2011.

## Large Scale Bulk LNG Shipments

- Hawaii Gas is looking to the future when it may become the importer of large scale bulk shipments of LNG by specialized tanker ships known as LNG Carriers – this would require much planning, large infrastructure investments and far greater demand for natural gas in Hawaii than presently exists.
- According to Facts Inc. / Hawaii Energy Policy Forum at the University of Hawaii Manoa, if the Hawaiian Electric Company Inc. (HECO), its various subsidiaries and the Kauai Island Utility Cooperative (KIUC) were to convert their electrical power plants from oil to LNG-fired, the annual requirement would be approximately 1.0 million metric tonnes of LNG.
- Other uses may develop for natural gas in Hawaii including as a fuel for large fleets of road vehicles – such as the City & County’s bus and garbage truck fleets -- and for commercial interisland vessels.
- A single LNG Carrier should be able to make approximately 24 voyages between an LNG load port on West Coast of North America and Honolulu per year leading to the following transportation options:
  - One LNG carrier with the capacity of approximately 42,000 metric tonnes or 100,500 cubic meters could transport 1 million metric tonnes per year, but that size of ship may require far too much receiving terminal capacity to be practical.
  - Two LNG carriers with approximately half the capacity – i.e. 22,000 metric tonnes – could be employed to transport 1 million tonnes of LNG per year and reduce shore storage requirements and perhaps make additional calls at neighbor island ports.
  - One 22,000 metric tonne capacity LNG Carrier operating between the West Coast of North America would provide approximately 24 voyages per year and the capacity to carry roughly 500,000 metric tonnes of LNG annually – which is still far too much capacity at this time given current consumption in Hawaii is under 100,000 metric tonnes per year.
- It is unlikely that all the electric power plants in Hawaii will be converted to gas-fired, as maintaining a presence with coal and oil-fired plants may be considered an important hedge against changing energy prices, and a full conversion of all plants may just not be practical for various technical reasons.
- As such, the total future consumption of natural gas in Hawaii may never reach 1 million tonnes per day or even half that, and the capacity needed to transport the LNG to Hawaii may have to be smaller than even one 22,000 tonne capacity LNG Carrier.
- The large scale infrastructure development required would include:
  - A shore storage terminal and re-gasification plant would be at Kalaeloa Harbor, Oahu
  - Perhaps additional terminal facilities would be needed on those neighbor islands that might become slated to use LNG – this could include Nawiliwili, Kauai, Kahului, Maui, Hilo, Hawaii, and Kawaihae, Hawaii.
  - The oil fired electrical power plants would have to be converted to gas and pipelines installed to deliver the gas to the power plants.
- No LNG carriers have been built in the U.S. since the 1970’s and those who have looked into building an LNG carrier in the U.S. recently concluded that prices would be far too high and delivery schedules so uncertain that they decided domestic LNG projects with a Jones Act requirement would not be feasible.