IMPLEMENTATION OF AN INTEGRATED LOCATION-INVENTORY MODEL FOR LNG REGASIFICATION FACILITIES IN THE DOMINICAN REPUBLIC

By

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ABSTRACT

Liquefied Natural Gas, or LNG, is the cryogenic variant of natural gas, a clean carbon fuel that is expected to last longer than the rest of the petroleum derivatives. The development of a LNG liquefaction plant in Trinidad and Tobago in the last decade has been accompanied by the planning and construction of regasification facilities throughout the Caribbean. The advent of this energy resource has had a great impact in the region, where consumption is expected to rise significantly within the next few years, as important consumers mainly of the electrical and industrial sectors, become more aware of the qualities and availability of natural gas. This thesis assesses the feasibility of constructing LNG regasification terminals in major ports around the Dominican Republic, expanding on the existing AES Corporation terminal in Punta Caucedo. The analysis makes use of an integrated location-inventory model developed by Daskin, Coullard, and Shen (2002), which takes into account shipping costs from supply sources to distribution centers, delivery costs from distribution centers to end consumers, and working and holding inventory costs. Key parameters in the model are estimated and varied systematically in order to understand changes in total system costs and optimal facility locations. The effects of changes in demands in the western part of the country are also assessed. Calculated system costs for the various potential facility combinations suggest that the location in Punta Caucedo is optimal with respect to transportation costs with current (2008) demand distributions and future (2015) demand projections. Solutions for projected market conditions in the year 2015 suggest that the combination of transportation and inventory costs do not support the construction of additional regasification terminals.