

STUDY TITLE: An Examination of the Development of Liquefied Natural Gas Facilities

REPORT TITLE: Examination of the Development of Liquefied Natural Gas on the Gulf of Mexico

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BACKGROUND: Liquefied Natural Gas (LNG) is natural gas converted to liquid form. Natural gas is converted to LNG by cooling it to a temperature of -256°F, at which point it becomes a liquid. This simple process allows natural gas to be transported from an area of abundance to an area where it is needed. Once the LNG arrives at its destination, it is converted back to natural gas and delivered to end-users. LNG is not a new technology or new approach for delivering natural gas to commercial markets. It is simply a process by which the physical properties of natural gas, primarily methane, are altered in order to transport the commodity between markets of very long distance where pipeline transportation is economically and/or technically unfeasible.

OBJECTIVES: The purpose of this report is to examine the implications and potential impacts that LNG has for the GOM. This includes an examination of the impacts that LNG could have on existing production in the region, as well as the extensive infrastructure that has the potential to support, and be supported by, these new LNG regasification facilities.

DESCRIPTION: This research examines the historic development, role, and importance, LNG regasification facilities, generally, with particular emphasis on the existing and proposed facilities along the Gulf of Mexico (GOM).

The research provides historic context on LNG development in the U.S. and the factors that are making the current spate of LNG development different than what occurred during the late 1970s and early 1980s. Changes in natural gas markets have been examined and the role that new environmental pressures are placing on natural gas-fired power generation and industrial applications discussed. The LNG “value chain” is examined at length, as well as the respective costs, and estimated break-even prices needed to import natural gas into the U.S.

The interaction of these new LNG facilities with existing GOM energy infrastructure is examined in considerable depth. The research notes that GOM pipeline and storage infrastructure in the region is perhaps one of the most important sets of energy assets that will help facilitate the movement of imported gas across the region, and into other regions of the U.S. Gas processing and other supporting gas infrastructure is also examined.

Perhaps the biggest area of concern for many policy makers along the GOM is the ability of imported natural gas to help dampen both the increases and volatility of natural gas prices to all end users in the region, particularly those end users in the petrochemical sector. The research examines the challenges that high natural gas prices are having on these large energy using sectors, and the regional job losses that have occurred in the aftermath of the large natural gas price run up of 2000-2001.

SIGNIFICANT CONCLUSIONS: The conclusion of the research is that the development of LNG regasification facilities along the GOM will be supplemental, and even complimentary, to energy production and the existing set of energy infrastructure in the region. These facilities will provide new sources of revenue for pipelines, storage, and gas processing facilities, which in turn, can be used to service existing and ongoing domestic natural gas production.

STUDY RESULTS: This report has addressed concerns with supply and demand, infrastructure, safety, siting concerns, environmental and regulatory issues. Specifically, it is argued that LNG will not negatively compete with domestic gas production. And, in fact, will supplement domestic production, particularly when supply is low and demand is high. The timing of when these LNG facilities will impact prices is uncertain and based upon a wide range of factors that go beyond domestic considerations and includes the economic and geopolitical influences on global energy markets.

The dramatic development of gas-powered electric generation plants in the last decade, along with use of gas as a feedstock for the chemical, pulp and paper, and other industries supports strong natural gas demand even during a period when domestic supplies are falling. If these industries are to be maintained, then high and volatile

prices will need to be abated, and LNG appears to be the only short-to intermediate-run alternative to this resource challenge.

GOM overall production for both oil and gas has decreased over the past several years. This decrease is one of the most important factors impacting the development of LNG facilities in the GOM, and has had serious price implications, in both level and volatility, for natural gas.

The growing LNG infrastructure in the GOM will supplement the GOM gas production, since much of this imported natural gas will be processed, stored, shipped and even used in the GOM Region, particularly in the numerous chemical and other industrial facilities in East Texas and Louisiana. While some infrastructure additions will be required to fully integrate LNG into the existing natural gas system, most of the existing processing, storage and other facilities will support these new activities. LNG development will help extend the productive life of these assets as well assist in making the importation of natural gas lower.

The basic laws of supply and demand also dictate where, when and how much LNG is actually transported to each receiving facility around the world. Currently, LNG prices are set by activity in the Atlantic Basin, which has resulted, in part, in less LNG coming into the U.S. today. However, even under the most optimistic scenarios by the EIA and others, LNG imports to the U.S. are not expected to exceed 14 percent of total requirements for the next 20 years. Thus, the argument that an influx of LNG could put a damper on prices on U.S. gas production in the immediate foreseeable future is defeated, as it will take decades of LNG infrastructure facility production and supplemental improvements to be able to reach the 14 percent import level.

The same industries and infrastructure supporting current production will be the ones to support LNG development. It is this high concentration of infrastructure that makes the GOM so attractive for LNG developers, and many analysts agree that construction costs can be minimized in the area for this very reason. As the GOM natural gas production continues to mature, this energy infrastructure can carry natural gas imported from other regions.

The key remaining LNG development issues include environmental and safety concerns. With the exception of the Mobile, Alabama area, safety-related concerns in communities along the GOM has been relatively limited. The more important interest for these communities along the GOM has been the potential environmental impact for these types of facilities. The environmental permitting process for LNG facilities (onshore and offshore) are some of the most thorough and stringent of all industries. Of particular concern along the GOM has been the regasification technology used for vaporizing the liquid natural gas. Open loop systems, opponents complain, can negatively impact marine life, particularly ichthyoplankton. For this reason, closed loop systems, though they require more energy, is the preferred technology.

In conclusion, LNG regasification terminals represent a new and important addition to the Gulf Coast's energy infrastructure. Like the other assets along the Coast, LNG

regasification terminals will serve as an integral part of the nation's energy backbone. Roughly 60 percent of all U.S. crude oil imports are off-loaded at terminals along the GOM. By 2020, the same will more than likely be true for natural gas. The GOM accounts for some 80 percent of all approved and operating LNG regasification capacity. Continued LNG opposition along the Pacific and East Coast will more than likely reinforce the large share of development along the GOM.

Like crude imports, the presence of LNG in the region is unlikely to significantly reduce domestic natural gas production and in fact will serve as an important supplement for domestic needs. The development of LNG may in fact, actually prove to support the energy industry in ways typically not considered. Locating LNG terminals in the region will provide additional support and longevity to assets that are critical for domestic production.

STUDY PRODUCTS: Dismukes, D.E. 2008. Examination of the development of liquefied natural gas on the Gulf of Mexico. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2008-017. 114 pp.