North American LNG 2006

Market and technology analysis

"Our ability to expand our use of liquefied natural gas is limited because today we have just five receiving terminals…around the United States."

- George W. Bush – US President

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Utilis Energy is a new kind of research firm.

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North America, and in particular the US, requires additional sources of energy to meet expected increases in demand over the decades to come. While it is commonly known that the US has imported the majority of its crude oil for some time, it is a lesser known fact that US natural gas production has been unable to keep pace with domestic demand and that incremental increases in natural gas imports from Canada are not expected to offset future demand growth.

Such market fundamentals, in addition to recent price increases, create a favorable environment for increased imports of LNG – which, during 2004, amounted to 652 Bcf, roughly half the expected future demand. However, greater reliance on LNG is stymied by the lack of sufficient capacity at US regasification terminals. Only five such terminals are currently operation in the US and regulatory hurdles and opposition from both public and private bodies has hindered the construction of additional regasification infrastructure.

The US LNG market underwent a fundamental change when in August 2005, President George W. Bush signed the Energy Policy Act. This Act clarified the Federal government's role in the siting and operation of onshore and near shore LNG import terminals and gives the FERC the ultimate authority over states on LNG issues.

By the end of 2005, the FERC had approved twelve LNG terminals and the US Coast Guard had approved two. Most of these proposed LNG terminals will be sited in the Gulf of Mexico, causing relatively little opposition from a region already accustomed to abundant petroleum industry infrastructure. Twenty more facilities are currently proposed, twelve under the authority of the FERC and the eight offshore under the authority of the Coast Guard.

To facilitate the importation and regasification of LNG there has been a rapid expansion in the range of alternative offshore LNG importation methods. These new methods are expected to compete with conventional onshore regasification terminals.

The catalyst for alternative, offshore LNG regasification centers on several issues and concerns shared by individuals, communities and governments. These can be broadly defined as:

- Environmental;
- Security and safety; and
- Regulatory.

EXECUTIVE SUMMARY

One of the most appealing features of offshore LNG import terminals is their lack of environmental impact on shorelines and population centers. An offshore LNG import terminal is a relatively small and isolated installation and in the unlikely event of an accident, few would be affected.

The enhanced security and safety of offshore LNG infrastructure is the result of their remoteness. Access to offshore LNG facilities can be monitored and restricted to a much greater extent than onshore installations.

US offshore LNG facilities are under the jurisdiction of the US Coast Guard not the FERC. The US Coast Guard is less bureaucratic and more efficient than the FERC generally, approving LNG project applications in one year, while it usually takes the FERC 18 months or more to approve an onshore facility.

Offshore receiving technologies can be defined by the following categories:

- Offshore gravity based structures (GBS) - A GBS LNG import terminal consists of concrete or steel caissons located on the seabed. This type of installation is totally self-supporting with respect to its operation, utilities and power generation;
- Platform based import terminals – The utilization of existing oil and gas platform structures, converting them to accommodate LNG deliveries;
- Floating storage regas units (FSRU) – An LNG import terminal concept consists of a purpose built, permanently moored steel structure with LNG carriers shuttling between an export facility and the import site; and
- Regasification vessels - A standard LNG carrier modified in order to enable the vessel to discharge regasified LNG to a subsea pipeline, through an internal turret arrangement connected to an offshore mooring buoy.

Each of these offshore regasification technologies have their own specific merits and disadvantages and their use will be highly dependent on various environmental factors, such as water depth and other logistics.

Table 1:	Summary of offshore regas characteristics			
	GBS	**Platform**	**FSRU**	**Regas Vessel**
Advantage	Concrete construction	Existing asset	Operates at greater depth	No visible fixed facility
Disadvantage	Shallow Depth operation	No storage	Loading systems/sloshing	Requires specialized technology
Cost	$650m	$400-800m	$400-800m	$200m
Time to operation	2-3 years	1.5 years	3 years	2 - 2.5 years

Source: Utilis Energy UTILIS ENERGY

Evolving LNG market fundamentals, regulatory changes within the US government and innovative offshore regasification technologies are setting the stage for a promising future for LNG imports into the United States. These imports will play a significant role in helping the US greater diversify its sources of global energy supply.

This study explores the development of the US LNG market and its increasingly important role for America's energy security. The study also considers other issues and provides a detailed evaluation of new offshore regas technologies.

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