

# EnergySolutions' applications chosen by Freeport LNG in Texas

Robert Young, Product Manager, Energy Solutions International, Inc.

## Energy industry executives are focusing on technology to ensure more efficient operation of both their LNG facilities and their business processes.

Software solutions are being deployed to manage the complex commercial transactions associated with the purchase, sale, transportation and storage of LNG, as well as to monitor and manage physical operations.

The process of bringing LNG to its final destination can involve shippers, receiving terminals, regasification facilities, and pipeline systems for distribution to customers as part of their natural gas supply.

Importers of LNG in the US, Europe and Asia carry out a wide range of tasks after the LNG carrier delivers its cargo, from making sure the amount on board corresponds to the contract, to delivering the gas to the customer, to accounting and invoicing for the LNG transactions.

In the United States, LNG imports are set to surge over the next 10 years with dozens of LNG terminals being built or advancing in the Federal Energy Regulatory Commission's permitting process.

The first land-based facility in the US to open in almost 30 years, Freeport LNG in Texas, will start its commissioning process in the fourth quarter of this year, and begin importing in early 2008.

## Model terminal

Freeport LNG Development, L.P. is in the final stages of completing both the physical construction and integrated business system implementations at its Freeport LNG Terminal, located on Quintana Island outside Freeport, Texas. Once completed, their enterprise control system will be a model that can be followed throughout the industry.

Through this terminal, Freeport LNG will have a send-out capacity in its first phase of up to 1.75 billion cubic feet per day (Bcf/d) via LNG shipments from around the world.

It will supply natural gas to industrial and electric power generation markets from Freeport to the Houston Ship Channel, and beyond. Start-up of the first phase of the terminal is planned for early 2008, but applications necessary to start the

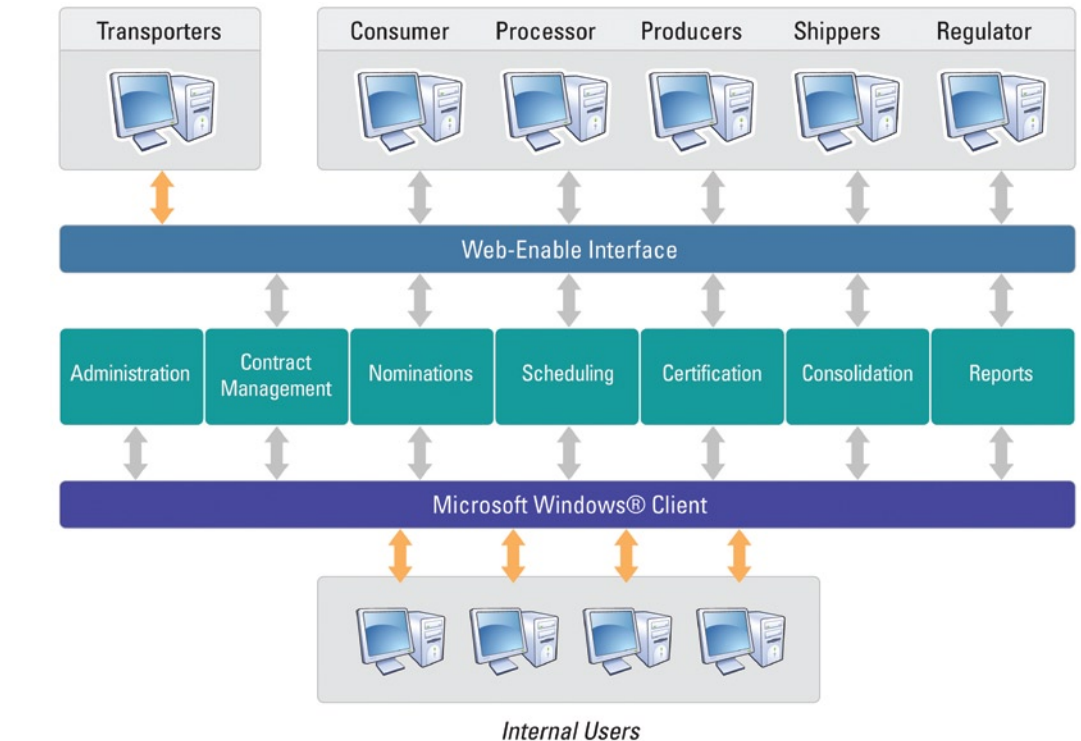


Figure 1: Systems architecture - PipelineTransporter

commissioning phase were in place as early as July 2007.

"We are utilizing industry best practices and the latest technology to ensure we deliver the highest quality LNG terminal services for our customers," said Eric Rojas, Information Technology Manager for Freeport LNG Development.

"To become the LNG terminal of choice on the US Gulf Coast, now and well into the future, we have to be innovative while making use of proven technologies," he added.

To accomplish its goals, Freeport LNG embarked on a well-defined design process to ensure that it captured and attended to all the "details" associated with bringing online a new LNG facility in the US.

Freeport brought in a number of vendors to handle various LNG terminal functions. Selecting vendors is easy compared to the effort required to make sure they integrate to create a seamless process. That, according to Rojas, was a massive undertaking.

"We needed to capture the best business processes related to scheduling tankers, managing inventory once it arrives, and ensuring the LNG gets regasified and delivered to natural gas pipelines and markets in a most efficient manner," he said.

"On top of that, we require a system that makes sure everything is accounted for, and that our customers have a way to communicate and track their own business through the Freeport terminal," he added.

Such a process involves distinct functions and responsibilities. At a very high level, these can fall into the two categories: physical operations and commercial operations.

Underlying both of these processes, of course, is the accounting thread that runs through everything. For the purposes of this article, we will focus on the challenges faced in coordinating the business, or commercial, operations.

While there is a host of ways to construct an LNG regasification facility, when it gets down to it, your engineering is either right or wrong.

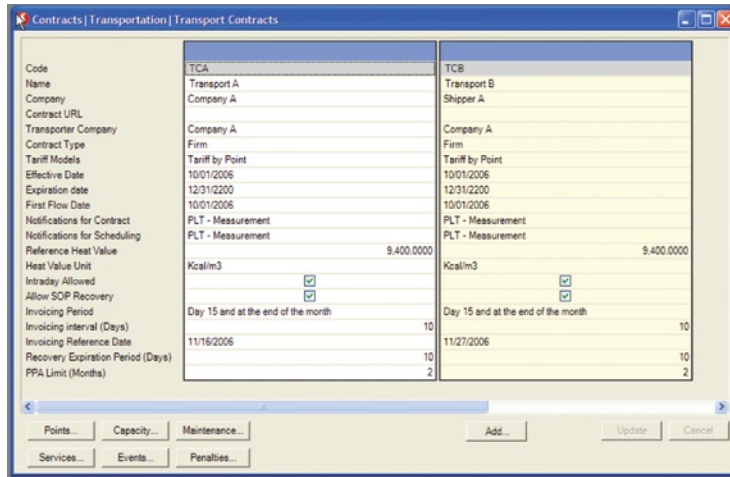
However, when it comes to developing your business operations process, there really is no right or wrong way.

Ultimately, LNG will come in, it will get regasified, and delivered to market. The question is: How will this happen? And how efficient will the process be when it comes to tracking, reporting, and profiting for all the parties involved?

You can enter it all on a spreadsheet and manage everything manually. However, keeping track of this over time - and increasing volumes - becomes less and less efficient.

That is why Freeport LNG endeavored to develop a method to employ software applications that would allow the computers to handle the "clerical" steps, while freeing its analysts to spend their time "thinking" instead of number crunching on spreadsheets.

One of the decisions that Freeport LNG made to enhance its Supply Chain Management was to deploy PipelineTransporter® for Gas, a software application developed by



**Figure 2: All Terminal Use Agreements (TUAs) and all the necessary data needed for daily business transactions were loaded here.**

Energy Solutions International Inc., to manage many of the technical and commercial aspects of delivering regasified LNG.

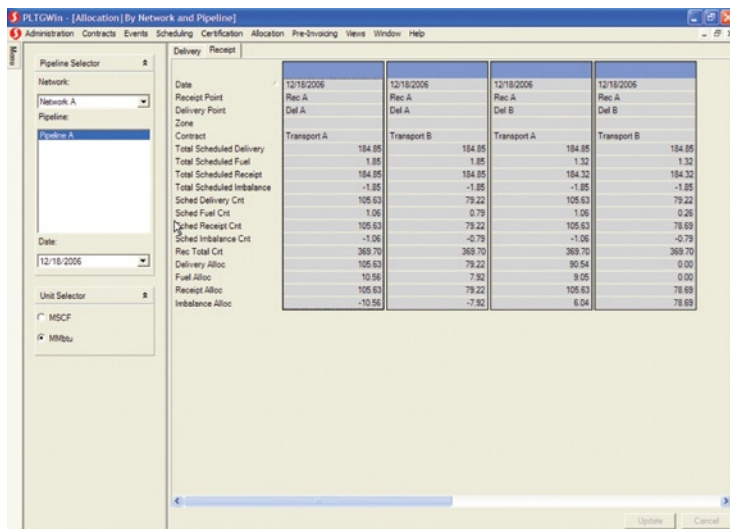
PipelineTransporter is a Windows® and Web-based application that enables Freeport LNG to communicate with its customers in terms of scheduling regasified LNG to downstream delivery pipelines and markets. This allows customers to nominate their inventory within minimum and maximum guidelines, and enables all parties to track balances and commercial deals via the Web.

PipelineTransporter – Gas is used to administer pipeline nominations, scheduling and allocations. As a data management system, it:

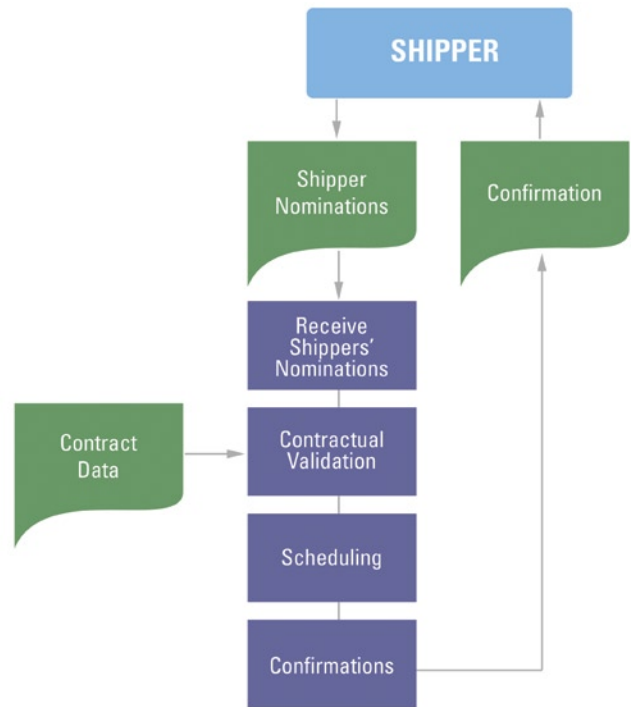
- » Contains a contract repository for all transporter and shipper agreements,
- » enables third-party customers to nominate

- gas via the website,
- » provides for balancing of pipeline schedules,
- » certifies actual measurement data versus scheduled transactions,
- » consolidates and allocates actual volume to a customer level, and
- » generates both industry standard and customized reports related to business transactions.

The process to nominate and schedule natural gas, whether it is regasified LNG or natural gas straight out of the ground, is unique. While the basic tenets call for moving gas from point A to point B, with a purchase and sale at each end, and a transportation cost component in the middle, the tricky part is keeping all the moving pieces straight – and doing so in a quick and efficient process that does not involve a number of manual steps.



**Figure 4: Gas allocation screen**



**Figure 3: Scheduling process using PipelineTransporter**

PipelineTransporter, as deployed by Freeport LNG, is designed to accomplish those goals. It meets legal, commercial, and operational objectives for gas transportation companies, shippers, producers and end users.

It is a stand-alone application that easily interfaces with third-party applications, such as SCADA systems, gas measurement systems, hydraulic modeling systems, billing systems, accounting systems and others. Working together, EnergySolutions and Freeport LNG configured PipelineTransporter to develop various industry best practices. Some of the resultant processes and key features incorporated allow Freeport LNG to:

- » Configure transportation contracts in full detail, including clauses, tasks, commitments, penalties and more.
- » Manage events or tasks using an operational engine to automatically follow all scheduled activities, identify delays in responses from different parties, and ensuring that the process is maintained according to design.
- » Simplify the daily tasks of schedulers by automatically consolidating requests for services (Nominations), organizing them by point and customer, and generating the final schedule - after validating contracts.
- » Allow external clients to check their own information and submit nominations via the web.

- » View and query on historical information, sort it by using different filters, and generate graphical reports. Applicable to both internal and external users.

- » Audit all activities performed in the application, or in conjunction with processes, using a detailed event log.

PipelineTransporter also includes a powerful formula editor that configures rates, tariffs and/or penalties that could be used in the billing process. Invoices that are configured to specific facility requirements can also be created.

Freeport LNG decided not to deploy this module since its rates and billings are tied more directly to the upstream process rather than the nomination and delivery process.

### PipelineTransporter as utilized in the FLNG process

FLNG utilized EnergySolutions' standard product and configured it in such a way to specifically address their business needs. This allows them the flexibility to stay current with the industry without worrying about maintaining customizations that may become outdated.

PipelineTransporter consists of a number of modules that can be grouped into three high level categories, each one with its own logical functions:

- » **Configuration** – This is the area for detailing a pipeline's business processes. Information is

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initially entered using the administrative menus during the setup phase and is updated as needed.

» **Operations** – This section includes all the tools to process operational information related to nominations, scheduling, consolidation, and invoicing.

» **Interface** to third party systems – Pipeline Transporter includes the ability to interact with third party applications such as:

- SCADA or field data
- Gas measurement systems
- ERP tools
- Financial applications

**Administration module:** During the setup phase, all business data necessary to run the FLNG business plan was entered using administrative menus. There are several administrative areas that are populated for use within the system, including:

- Company Information – All third-party company contractual information.
- Point Information – Listing of both active and inactive receipts and deliveries on the pipeline system downstream of the Stratten Ridge regasification plant.
- Event Manager – Defines activities, conditions and actions to be validated and executed by the application automatically. Tasks such as send emails, request for confirmations, and close nomination period were defined in this module. This allows FLNG to notify internal and external parties of tasks or events that relate to the daily and monthly business process.
- Security – Roles and groups were defined through this option. Access levels to the information, including reading/writing, are configured for each role. This allowed for FLNG to manage “who saw what” (both internally and externally) through the entire business process.

**Contract management module:**

Contracts were configured, edited and maintained through a powerful and intuitive Contract Editor, as shown in the following figure. (Figure 2 on page 10) All Terminal Use Agreements (TUAs) and all the necessary data needed for daily business transactions were loaded here.

**Nomination module:**

This module allows FLNG to gather nominations from its third-party customers through an Internet browser interface without the need for faxing and phone calls.

Access is secured through a login user id and password for each customer and will require validation through FLNG’s company firewall. The customer can be directed to PipelineTransporter by a hyperlink from the FLNG home page.

Nominations are validated against contract parameters set up in the configuration process.

**Scheduling module:** Gas scheduling is the process of matching requests and availabilities to define how much gas is expected to be received and delivered at each point along the FLNG network. This is considered the process used to “balance” the pipeline.

When the entire balance of the system for the following day is established by comparing total gas received into the system with total gas to be delivered out of the system, plus system gas, the application consolidates all nominations by point.

The following figure shows the flow chart for nominations and schedules within PipelineTransporter and utilized for FLNGs business. (Figure 3 on page 2)

FLNG’s upstream measurement system feeds “clean” data into the application. Measurement and quality data on received or delivered gas is managed via meters installed at the physical locations on the pipelines.

**Volume allocation**

As gas moves from the FLNG facilities to its downstream delivery pipelines, the measured volume needs to be distributed to the various LNG PLANT SYSTEMS KBR TUA owners. FLNG does this on a pro rata basis based on scheduled nominations.

The process of identifying such differences and distributing them between the customers connected to the same delivery point is known as allocation.

The application performs the distribution of this volume based on the data received from the measuring system and the information and rules described in the TUAs. The allocation process is usually agreed upon in advance by the operators of the points. Allocations occur at all custody transfer



**Figure 5: Graphical report**

points. The allocation process is performed when measured volumes become available. Allocations can be performed on a daily or monthly basis as measured volumes become available from the measuring systems to PipelineTransporter.

The following figure shows a typical allocation screen. (Figure 4 on page 2)

**Reporting**

This module gives FLNG and its customers access to all information gathered and generated by the application in a secure and efficient manner. Information related to contracts, nominations, scheduling, consolidation, and invoicing can be easily handled through this module. FLNG determined that, in addition to customized reports, it wanted to give their customers the ability to create their own reports using data captured within the system. The ability to export data to CSV files and generate graphical reports where information can be displayed in trend or bar-chart formats was also a requirement from FLNG.

The following figure shows a typical screen in the Reporting module. (Figure 5).

**Interfaces**

The heart of the unique business process developed by FLNG was the ability to have each of its vendor applications “talk” to each other.

The process designed allowed each application to either provide or accept data from a sister application. FLNG developed a process whereby information is only entered once, and the technology of the applications interface to the necessary functions.

This allows for complete efficiency, no double entry of data, and the ability of personnel to worry about the business, rather

than simply crunching numbers.

Examples of interfaces include, 1) Measurement to Nominations for customer allocations, 2) Allocations back to Energy Balancing for reporting of client specific balances, and 3) Nominations to Operations to determine flow rates and set points for gas deliveries.

**Conclusion**

Constructing an LNG terminal and its associated infrastructure (both physical and commercial) is a huge investment.

Owners must not only look for efficiencies, but be forward-thinking in their applications in order to keep pace with changing industry trends.

Technology, especially software, is being used more and more in an industry that needs efficient physical and business operations. Complex commercial transactions are easily managed with software, freeing analysts to focus on performance.

The ability to more easily integrate applications is also paramount. Leaders like Freeport LNG are deploying these solutions because they realize it makes them competitive, efficient and better serves their customers.

*Energy Solutions International, Inc. is global supplier of pipeline management software for the oil and gas industry. Founded in 1976 and headquartered in Houston, Texas, EnergySolutions serves more than 250 clients in 45 countries through its offices in the United States, United Kingdom, Dubai, India, China and Canada. For more information, visit [www.energy-solutions.com](http://www.energy-solutions.com).*