

# DPLNG brings a reliable new source of energy to a booming economy.

## Overview

### ■ Business Challenge

To satisfy its growing need for power, China is turning to natural gas, with DPLNG leading the pioneering project. With five power plants and millions of customers dependent on it as an energy source, DPLNG needed to put processes in place that would ensure the efficient, reliable and safe production of natural gas from liquefied natural gas (LNG).

### ■ Solution

DPLNG teamed with IBM to design and deploy a comprehensive business process framework from the ground up that lays the foundation for the reliable delivery of power to millions of residents in China's fastest growing region.

### ■ Key Benefits

- Maximization of efficiency through flexible, integrated processes
- Ability to dynamically optimize LNG production processes as demand grows
- Maximization of reliability and safety through the use of proactive asset management practices



The LNG project of Guangdong Dapeng LNG Company Limited ("DPLNG"), the first of its kind in China, addresses the whole process of LNG import, storage, re-gasification and transmission in China's Guangdong Province. Some of DPLNG's main clients and consumers are the fast growing cities of Shenzhen, Dongguang, Guangzhou, and Foshan City.

China—a country with the world's fastest-growing economy—is in the throes of change. Economic development and business formation is proceeding at a breakneck pace. Spurred by the desire to take part in this prosperity, Chinese citizens are flocking to the regions and cities where much of this growth has been concentrated. To accommodate these population shifts, and to smooth the way for continued economic growth, China continues to invest staggering amounts in its physical infrastructure, from roads and bridges to housing, schools and airports.

*“Establishing a solid operational foundation was imperative for the successful launch of DPLNG. IBM created the business process structure that allowed us to move seamlessly from the construction phase into the operational stage.”*

— Tom King, President, DPLNG

## ***Building an LNG process framework to support rapid economic growth in China***

### **Business Benefits**

- Maximization of efficiency through flexible, integrated processes
- Ability to dynamically optimize LNG production processes as demand grows
- Maximization of reliability and safety—and minimization of downtime risk—through the use of proactive asset management practices
- Maximization of terminal capacity through optimized scheduling and harbor management capabilities

### **Keeping up with growth**

As fundamentally important as these investments are, none have as much impact on China's continuing prosperity as the availability of energy resources to sustain it. Because of the speed and scale of its development, China faces an energy challenge that has no precedent. Among the more deeply rooted economies of the West, relatively steady growth made it possible for countries to develop their energy sources organically over decades, with growth in energy demand met by incremental additions to capacity and evolutionary change in technology. In contrast, the lightning speed of China's development has compelled the country to take a more proactive, aggressive stance in securing its energy needs. China's energy challenge also stands out because of its potential for adverse environmental impact. Realizing the importance of mitigating this risk, China's leaders have made cleaner, "greener" energy sources—most notably natural gas—a central element in the country's energy strategy. The interplay of these forces is on display in Guangdong Province, a fast-growing hotbed of manufacturing in a part of southeastern China known as the Greater Pearl River Delta. To establish a means to deliver natural gas and sustain the region's torrid growth, a number of cities in the province teamed up with China National Offshore Oil Corporation and BP to form a joint venture known as Guangdong Dapeng LNG (DPLNG).

DPLNG ([www.dplng.com](http://www.dplng.com)) faced significant challenges in meeting this goal. The most obvious was the need to put in place the physical infrastructure—including port facilities, pipelines and other processing equipment—to handle the natural gas. Just as important, however, were the many business processes and systems required to monitor and manage the storage, processing and distribution of natural gas. Citing its business process expertise and track record in the industry, DPLNG selected IBM Global Business Services to define, deploy and integrate these systems. To understand the challenges IBM faced in this engagement, one needs to understand the complexity of the processes governing natural gas processing and distribution. In the case of DPLNG's project, the gas is delivered from Australia in a liquefied state aboard liquefied natural gas (LNG) tankers. Once a tanker arrives in port, its cargo is offloaded into large tanks. From there, highly specialized equipment warms the LNG to "re-gas" it, or convert it back to a gaseous form. It is then sent into the network of pipelines that connect the LNG facility to power plants across the province that will use the gas to generate electricity, and to other end customers.

## Starting from scratch

What posed the most fundamental challenge for IBM was the fact that DPLNG—the very first LNG project in China—was starting from a blank slate. As such, the hundreds of business processes that were essential to the facility’s operation needed to be designed from the ground up. In many ways, the LNG processing flow is a balancing act between LNG coming in on tankers, LNG that is undergoing “re-gasification” and the pipeline network. In the middle are the facility’s storage tanks, which provide a buffer between inflows and outflows. The negative ramifications for upsetting this balance are significant. If, for instance, the storage tank is too full to receive a new shipment, tankers will be unable to unload their cargo, potentially depriving the port of gas supply and processing revenues. Conversely, if the tank is not sufficiently replenished and allowed to go too low, the facility would be unable to deliver gas into the pipeline network, thus endangering its ability to deliver reliably. A key part of IBM’s role was to design and deploy the scheduling and management processes that maintained this balance and ensure the facility’s reliability in the natural gas supply chain.

Another factor affecting reliability is the ongoing maintenance and upkeep of the complex equipment used to unload and re-gas the LNG. This equipment, which is central to the process flow, represents a potential single point of failure. Because of the enormous costs and disruptions such a breakdown would entail, it was critical that IBM put in place systems and processes that could detect these breakdowns before they happened. The importance of reliability for the DPLNG solution cannot be overstated. Put simply, the region’s ambitious long-term economic development plans are literally built on the reliability of DPLNG’s capabilities. With vigorous population growth and accelerating economic activity on the horizon, the cities connected to the DPLNG network have staked their future on natural gas—and on DPLNG’s ability to deliver it reliably. The fact that DPLNG chose IBM to design and implement the processes and systems needed to ensure this reliability signifies how seriously DPLNG takes the challenge.

In addition to designing DPLNG’s core processes, such as scheduling and vessel management, IBM also addressed processes in the area of administration (such as HR and finance) and commerce (related to the processing of gas contracts). In total, IBM designed 341 business processes as part of the DPLNG project. On the systems side, IBM’s key role was to implement SAP R/3 FI/CO, which addresses both Financial (e.g., general ledger) and Controlling (e.g., cost center accounting) processes, as well as a gas management solution (Telvent’s Gas Suite) to handle specialized technical and commercial functions.

## Key Components

### Software

- Strategic Asset and Service Management (IBM/MRO Software)
- SAP R/3
- Telvent Gas Suite

### Servers

- IBM System p5™ servers
- IBM TotalStorage® DS4300

### Services

- IBM Global Business Services

### Time frame

- Process design: 1 year
- Implementation and Integration: 9 months

## Why it matters

*The first-of-a-kind system and process infrastructure developed by IBM to run China’s first LNG plant enables DPLNG to keep pace with the growth of China’s fastest growing region. Built from the ground up, DPLNG’s new infrastructure orchestrates the plant’s complex process flow while maintaining maximum reliability and safety.*

IBM also deployed and configured the asset management platform used to proactively manage the maintenance of the terminal's processing equipment. DPLNG specified the platform—the Strategic Asset and Service Management by MRO Software (an IBM company)—because of its strength as an oil and gas industry solution. After deploying these platforms, the IBM team then integrated them with the business processes they had defined at the outset of the project. The solution runs on three IBM System p5 servers and employs an IBM TotalStorage DS4300 disk system for storage.

### **Ready to grow**

In designing the process and system framework to run the DPLNG facility, IBM had to custom configure it to take into account aspects of DPLNG's business model, which substantially increased the complexity and had a direct impact on its long-term success. The first consideration was the need to construct a solution that would suit the needs of all 11 shareholders in the joint venture. Because of the enormous costs of building LNG terminal facilities—and the risks inherent in the world market for natural gas—joint ventures are the predominant business model for developing these facilities. To optimize the solution for this model, IBM employed industry-standard technology and designed the systems to maximize the visibility of critical business and financial information to all of DPLNG shareholders, thus improving the speed, efficiency and quality of decision-making. The fact that the scope of DPLNG's operations would be ramping up over time, and thus represented a “moving target,” also posed a major design and implementation challenge. To address this, IBM designed a flexible, standardized solution—employing reusable components—that could easily be expanded and optimized as the terminal's volume increased along with the number of power plants and cities it served.

Soon after deployment, the DPLNG terminal received and processed its first shipment of 66,000 tons of LNG from Australia, inaugurating a 25-year contract for an annual gas supply of 3.63 million tons with The North West Shelf ALNG Company. “Establishing a solid operational foundation was imperative for the successful launch of DPLNG,” says Tom King, President, DPLNG. “IBM created the business process structure that allowed us to move seamlessly from the construction phase into the operational stage. This foundation allowed us to receive and process our first shipment of LNG and will enable us to scale our operations to match the anticipated growth of our business.”

### **For more information**

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