



# Providing innovative results to the worldwide LNG industry

## World Energy interviews Philip Asherman, executive vice president of CB&I.

*CB&I is one of the world's leading engineering, procurement and construction (EPC) companies, specializing in lump-sum turnkey projects for customers that produce, process, store and distribute the world's natural resources. CB&I is a fully-integrated EPC service provider, offering a complete package of conceptual design, engineering, procurement, fabrication, field construction, mechanical installation and commissioning.*

*CB&I serves customers in a number of key industries including oil and gas; petrochemical and chemical; power; water and wastewater; and metals and mining. Its projects include hydrocarbon processing plants, LNG terminals and peak shaving plants, bulk liquid terminals, water storage and treatment facilities, and other steel structures and their associated systems. CB&I has approximately 10,000 employees and operates from more than 60 locations worldwide.*

**World Energy:** What is CB&I's experience and capabilities with liquefied natural gas?

**Asherman:** Since the design and construction of the world's first double-wall LNG storage tank in 1958, we have provided innovative results to the worldwide LNG industry. As an example, we were responsible for the design and construction of the world's first LNG peak shaving plant in 1965, as well as the design and construction of the first marine LNG storage and distribution terminal in the United States in 1971. We are just nearing completion of the mechanical and civil erection for the liquefaction train in Bonny Island, Nigeria, as well as an LNG train for a baseload plant in Australia. Overall, CB&I has designed and constructed more than 45 LNG terminals and peak shaving plants and more than 200 LNG storage tanks on all six major continents.

Our ability to self-perform all aspects of LNG terminals – pipelines, cryogenic process area, send-out, storage tanks and site facilities – is unique in this industry. From start to finish, we have the capabilities to design, procure, fabricate, construct and commission any type of LNG facility anywhere in the world.

**World Energy:** That's impressive. Based on your company's knowledge of the market, what do you see for the future?

**Asherman:** The future of the LNG market is brighter than it has been for the last 30 to 40 years. With the worldwide demand for clean fuel increasing, more LNG import and export terminals will be built than ever. The U.S. market is realistically looking at a dozen or more import terminals, and internationally we are seeing another dozen import terminals. To support this demand, we can expect to see the expansion of supply in gas-rich places such as the Middle East, Africa and some parts of Asia. We anticipate a dozen or more liquefaction plants to be built in the next three to five years.

**World Energy:** Do you believe that offshore LNG is a viable concept?

**Asherman:** Although LNG is proven to be safe and environmentally friendly, community concerns have caused the industry

to consider offshore import terminals as a possible method for bringing natural gas to end users. Today there are several projects being considered in the waters off the United States, Mexico, Italy and China.

Economics and feasible technologies will drive the decision as to whether or not a particular offshore project will be built. Offshore projects will be more costly to both build and operate. However, due to permitting issues, there may be cases where the offshore projects are viable. To address this need, we recently introduced our GasPORT™ offshore LNG concept. GasPORT™ capitalizes on CB&I's extensive expertise in LNG terminals along with the offshore expertise that our John Brown Hydrocarbons acquisition brought to the CB&I family. Using this combination of expertise and proven technologies, we are prepared to respond to our customers' needs for offshore LNG opportunities whenever they arise.

**World Energy:** How will additional LNG import terminals in North America affect the current gas distribution infrastructure?

**Asherman:** A large portion of the United States pipeline capacity originates from major production areas – Louisiana, Texas and the Gulf of Mexico – and is distributed to markets in the West, Northeast and Midwest. Over the past decade, increasing levels of gas from Canada have helped to supplement the North American domestic supply.

The addition of new LNG import terminals might require some modifications to the current pipeline infrastructure to deliver this additional supply of natural gas. However, the overall effect that LNG import terminals will pose to the existing pipeline infrastructure depends upon where the new terminals are built. In evaluating the current pipeline infrastructure and distribution of gas to end markets, new terminals built along the Gulf Coast region and far Northeast will likely utilize existing pipeline capacity and feed into the current capacity flow. This is because the current pipeline infrastructure transports gas from the Gulf Coast and Canada, distributing it through the interstate pipelines to end-use markets.



New LNG terminals built along the East Coast might affect the use of the existing pipeline infrastructure. The delivery of gas to this region will displace the existing gas that is fed through interstate pipelines from the Gulf Coast and/or Canada and delivered to East Coast markets. This will lead to lower utilization of existing interstate pipeline capacities and could result in a loss of revenue and lower tolling fees for pipeline owners.

**World Energy:** What are some of the other challenges facing the LNG market, and how is CB&I planning to address them?

**Asherman:** Adequate supply of steel and other materials is a global concern for many owners. CB&I has established relationships with mills and suppliers worldwide to assure our clients that materials will be available when and where they are needed for projects.

Also, because of the demand to get the gas to market, schedules have become critical to the owner. We have worked with a number of clients to improve their scheduling and to help them establish world-class standards. We now use innovative weld-inspection techniques and other sophisticated construction methods, particularly for full-containment designs, to ensure that projects are completed on time.

We need to continue addressing issues and concerns regarding the safety and security of LNG facilities. In the United States, CB&I works closely with the Federal Energy Regulatory Commission to address such siting and safety issues. In addition, our technical group considers all safety and security issues when working on the design of these facilities.

**World Energy:** Beyond LNG, are there other methods available to monetize stranded gas?

**Asherman:** When it comes to recovering stranded natural gas, another method is gas-to-liquids technology, or GTL, which converts natural gas into a synthetic crude oil that is further refined to produce environmentally friendly, high-value fuels. Because the fuels it produces contain virtually no sulfur or aromatics, GTL technology has the potential to become an economically viable solution for developing the 3,000 trillion cubic feet of stranded natural gas in the world.

**World Energy:** What is your experience with GTL?

**Asherman:** Capitalizing on our capabilities, experience and expertise in both syngas and modular design, we launched a GTL initiative in early 1997. This initiative complemented a major integrated oil company's program and, in turn, we were selected to construct a GTL semi-works facility. The project was completed in 2003; however, our involvement with the program continues, as we are supporting the company's front-end development effort toward full-scale commercial operations.

The GTL projects of the future will be huge and complex. They will require a substantial amount of logistics and planning, as well as the materials and labor necessary for project execution. CB&I is well positioned to meet the needs of these projects through our unique, true EPC approach. Because we use our integrated resources to self-perform all aspects of a project - from concept to commissioning - we can deliver these large-scale GTL facilities safely, on time and within budget.

**World Energy:** We understand that CB&I has gas-processing capabilities. How does the increased demand for natural gas impact this part of your business?

**Asherman:** While there is an increased demand for natural gas, the high price of gas creates uncertainty regarding the future of gas-processing projects. Many companies are wary about making capital investments in this market, especially in North America where many projects have been delayed or cancelled. Outside of North America, however, the number of international projects is growing. Declining oil reserves plus large, underutilized gas reserves in developing countries have increased the value of natural gas as an alternative fuel source.

CB&I has designed and built more than 30 processing plants around the world. As we look to the future, we see a major part of our gas-processing work coming from remote locations. Although this increases the complexity of the projects, we've been doing work in these locations for decades, and we're confident that our clients will continue to turn to CB&I for their gas-processing needs.

**World Energy:** Do you have any final comments?

**Asherman:** Yes. Over the past few years, CB&I has taken the steps necessary to be able to meet nearly all of the capital project needs of the oil and gas industry, from wellhead to product storage and distribution. We've accomplished this by acquiring and integrating several premier EPC companies, such as Howe-Baker Engineers and John Brown Hydrocarbons, whose expertise in oil and gas is unparalleled. Combining the capabilities of these companies with CB&I's traditional strengths and global construction infrastructure has led to a new CB&I. However, we're not done yet. CB&I will continue to grow so that wherever our oil and gas customers are and whatever they need, we'll be there to supply them with competitively priced lump-sum turnkey projects that are second to none.

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