



6. NATURAL GAS: Demand for LNG expected to surge in Japan, China

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Japan is expected to import more liquefied natural gas (LNG) as the nation rebuilds its economy after the devastating earthquake and tsunami flattened factories and coastal towns.

As it imports more LNG, Japan will reinforce the model for pricing natural gas shipped throughout the Asia-Pacific region, just as China gears up to become a major importer to meet its massive energy demand. LNG in Asia is linked to oil prices and that pricing mechanism reflects a premium Japan has long been willing to pay to fuel its industry.

Energy analysts examining the Asian LNG market in the aftermath of Japan's disaster say the region will be paying for gas at oil's prices for some time. Asia's economic powerhouses are desperate for energy and willing to pay three times the price of domestic gas sold in the U.S. market. Analysts tracking closely held deals involving China and foreign gas suppliers say new long-term contracts are binding Asian LNG to rising global crude oil prices for decades.

"We don't see Asia moving in a rapid way away from the oil index," said Nikos Tsafos, an analyst with PFC Energy. "It's only going to strengthen the price if Japan takes more LNG."

Gas consumption in Japan and China, and oil-linked LNG contracts demanded by producers like Exxon Mobil Corp. and Chevron Corp., are increasing the cost of energy in the region. It is also increasing the cost of cutting air pollution and carbon dioxide emissions in China. While China is going after nearly every source of energy to keep its factories churning, it is also looking to increase its use of gas as a cleaner substitute for coal burned at its galloping power stations.

Countries across Europe and Asia are recalibrating their plans to build more nuclear power plants and, in some cases, considering shutting down aging reactors in their existing fleets. Most nations are conducting safety inspections. If some capacity is taken off line and nuclear projects are shelved in Asia, analysts say it would boost natural gas demand considerably. Power companies can deploy gas-fired generation relatively quickly, and LNG infrastructure is in place to handle the demand.

Chevron sees 50% rise in natural gas use

For analysts and economists watching this play out, the billion-dollar question is what happens to the price of natural gas and related electricity prices outside of the United States as oil climbs north of \$100 a barrel. If a major Asian economy shelves nuclear power, said Tsafos, the expansion of zero-emissions baseload nuclear power as a serious substitute for coal and gas would be a thing of the past across Asia.

China is already reacting to the prospect of surging Japanese gas demand. The president of PetroChina on Friday, according to media reports, pledged to spend more on developing domestic gas fields and securing resources abroad. PetroChina, Exxon, Chevron, ConocoPhillips and BP PLC are pouring money into gas projects designed to meet Asian demand.

In a conference call with investors and analysts last week, Chevron executives said they expect gas consumption to grow 50 percent by 2035. Most of that will be in Asia, where demand is expected to grow at three times the rate of global demand.

Jim Blackwell, Chevron's executive vice president for technology, touted large investments in LNG export projects in Australia. "These investments are expected to deliver substantial cash flow for many decades," he said.

By 2017, he said, Chevron's LNG portfolio will deliver 500,000 barrels of oil equivalent a day. That is driven by the nearly \$40 billion Gorgon LNG project off western Australia and two other large gas projects along the country's northwest coast.

"Everything about this project is huge -- resources, production and infrastructure," Blackwell said of Gorgon. About \$25 billion in supply contracts are signed as Chevron expects to start deliveries from Gorgon in 2014. Almost all of that gas is tied to oil prices.

Exxon is building LNG export facilities in Papua New Guinea, the largest private investment ever undertaken there, doubling the nation's gross domestic product. Gas could flow from there as early as 2014.

"Long-term sales and purchase agreements have been secured under attractive terms, and Exxon Mobil is positioned to maximize the value of this natural gas resource in the attractive Asia-Pacific market," Mark Albers, a senior vice president at Exxon, told investors this month.

Gas markets in Europe and Asia are trending in opposite directions. Increasingly, gas buyers in Europe are using options in their long-term contracts to bargain hunt. Russia's Gazprom has cut prices for pipelined gas, while some buyers are turning to the spot market for LNG shipments. Meanwhile, prospects for drilling for shale gas in Central Europe could change the equation entirely in the coming years.

Most LNG prices tied to oil in Europe and Asia

The bulk of European gas remains tethered to crude oil benchmark prices, but gas markets in Belgium, the Netherlands, Germany and Spain are liberalizing because of uncertain oil prices. Russian and Norwegian gas suppliers have been accepting terms in negotiated contracts designed to soften the blow and provide options as oil goes up, said James Jensen, an independent energy economist that consults globally on the LNG trading market.

Europe has also watched as North American gas has diverged almost entirely from oil as a result of booming unconventional production out of domestic shale fields. U.S. gas has remained at or below \$4 per million British thermal units for two years. That also changed the equation for LNG suppliers in the Middle East, particularly Qatar, which had hoped healthy U.S. demand for imported gas would balance and stabilize the LNG trade. Today, there is a surplus of gas floating around the Atlantic Basin.

The opposite is playing out in Asia. There, natural gas' connection to oil prices is firming up. While producers are having trouble holding the line on high prices in Europe, Jensen said they will have an easier time in Asia.

"China is very unhappy with the price levels you're seeing," Jensen said. Still, "the costs are high, so nobody's really going to cut prices."

Most new LNG production capacity is in Australia. Oil giants are spending tens of billions of dollars to build up gas export infrastructure to serve Asia. And because the capital costs are outrageous and gas demand is on the rise in Asia, analysts say producers are still able to insist that the oil-indexed natural gas pricing model remain intact.

"The mechanism for cutting prices is simply not there," Jensen explained.

For now, Jensen said, even the Chinese have little bargaining power. China National Offshore Oil Corp. (CNOOC), PetroChina and Sinopec are building or planning LNG import terminals up and down the coast. In 2005, China had no gas imports, according to the U.S. Energy Information Administration, but China had three LNG import terminals up and running by the end of 2009. New pipelines are also bringing gas to China from Central Asia.

Yet with coal the dominant fuel for supplying power, China is still a small gas market. Producers are looking for ways to compete for rapidly rising future demand in China without dismantling the high-price model.

"The word is that everyone would like a piece of the Chinese market," Jensen said, "and everyone is looking for ways to do that that are not obvious."

Mikkal Herberg, research director at the Seattle-based National Bureau of Asian Research, said the only way Exxon, Chevron, ConocoPhillips and BP can finance huge LNG projects is to have 20-year supply contracts signed with a price primarily tied to oil, or "take or pay" terms that require customers to take gas.

Companies moving to fill power shortfall in Japan

The tension in Asia is clear, he said: South Korea and Japan, the largest LNG importer, built the original Asian LNG market on their willingness to pay a high price for gas so they could move away from coal and oil. While

China and India are succumbing to oil-linked contract terms today, Herberg said that won't last forever. Both are motivated by cost and reliability of supply.

"The industry wants to hold on to the oil-linked contract system," Herberg said. "But you have this enormous market potential in China and India that is looking for more flexibility."

According to Petroleum Economist, a London-based publication, Japan is expected to import another 10 million metric tons of LNG this year as gas-fired power plants make up for the shortfall in nuclear energy. The earthquake took out about 11 gigawatts worth of nuclear generating capacity.

In 2007, after another earthquake put the kibosh on about 8 gigawatts of nuclear power capacity, LNG prices on the Asian spot market shot up to \$20 per million British thermal units. At the time, global LNG supplies were still pretty weak. The global gas picture has changed substantially since then, as Egypt, Qatar and other North Africa and Middle East suppliers completed major LNG production projects.

"We have to recognize that 2007 was a very, very different market," said PFC's Tsafos. "Right now, you just have a lot of slack in the system. It's difficult to see prices shooting that high. There's enough supply to come in without raising prices that much."

Royal Dutch Shell has said it plans to divert some LNG cargoes to Japan. Consumers in the United Kingdom, which imports a lot of gas, are bracing for higher prices during the spring and summer. Slackened demand when gas is no longer needed for heating homes usually results in lower LNG prices in Europe at this time of year.

"You're going to see support for prices, maybe a boost," Tsafos said.

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