

# Japan's utilities increasingly invest in LNG export projects

In their quest to lock up supplies of liquefied natural gas for years to come, key Japanese utilities have signed on as small sponsors of big LNG ventures.

Tokyo Gas, Chubu Electric and other companies that heat and power the world's third-largest economy are less content these days to simply contract with the latest LNG mega-project and wait for the first cargo to pull into port. Instead, they are buying small shares in ambitious gas developments and liquefaction facilities in Australia and North America.

LNG's long path to consuming countries starts with the exploration and development of gas fields, through production and liquefaction before tankers bring it to port. Japan's utilities, among the world's biggest buyers of LNG, believe that by increasing their involvement in the upstream and midstream links of the chain, they can do more to help bring home reliable supplies at prices they deem fair.

In exchange for spending what can amount to hundreds of millions of dollars to own slivers of LNG projects, the utilities may gain:

- Insider access to project plans, spending and technology.
- The chance to build relationships that smooth the way to long-term gas supply contracts.
- Protection against price upswings.
- A better understanding of project economics and market trends.

Depending on the nature of the project and partnership, the utility might even obtain a share of the gas reserves and some flexibility to decide where the LNG tanker delivers its cargo. (In Asia, the long-term purchase contracts commonly signed by utilities tend to prevent them from reselling or diverting the gas to other markets.)

"Becoming a producer ourselves leads to a stronger negotiating position on procurement and adds flexibility to our response to changes in demand," Hiroshi Ozaki, president of Osaka Gas, one of Japan's biggest LNG buyers, said in the company's 2013 annual report.



*Source: Woodside Petroleum*

**Water sprays heralded the first LNG tanker bound for Japan from the new Pluto LNG project in Australia in 2012. Two Japanese utilities own 10 percent of the project and take most of its output.**

Japan's utilities have been importing LNG for more than 40 years, but it's only in the past decade or so that multiple utilities have taken an investment interest in the sources of the gas they buy.

In Australia, at least seven Japanese utilities own small stakes in LNG projects. Two of those projects are already operating, while four are under construction.

In addition to owning a share of the project, the utilities also are buying much of the production. Total LNG purchases by the utilities from those Australia projects comes to about 17 million metric tons a year, or 2.25 billion cubic feet of gas a day on average — equal to about one-fifth of Japan's total LNG demand in 2013.

Of course, there are downsides.

Diving in upstream and midstream entails risks. Many LNG projects are among the most expensive and complex energy ventures in the world. They can easily go over budget, encounter delays or simply sit on the planning table for lack of economic viability. For Japan's utilities, the constant pressure to secure reasonably priced fuel for an energy-poor nation makes these risks increasingly worth taking.

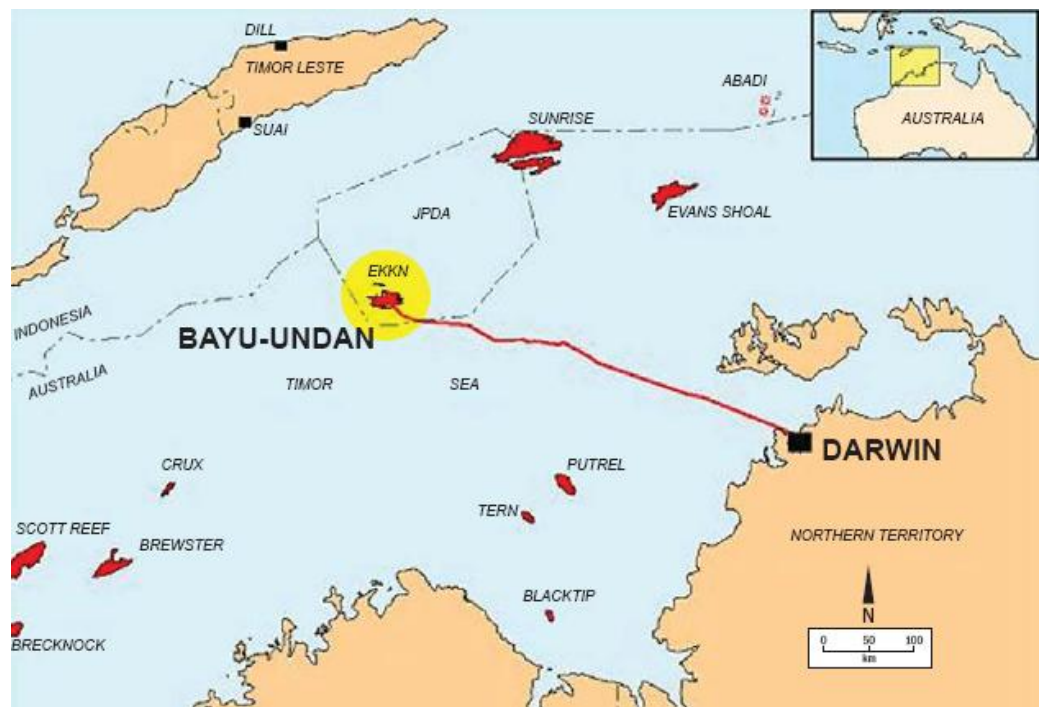
## TO AUSTRALIA VIA ALASKA

In 1995, while exploring in the resource-rich Timor Sea off the northwest coast of Australia, Phillips Petroleum hit on a world-class field. To bring gas to market the company wanted partners for the project, dubbed Darwin LNG after the capital of Australia's lightly populated Northern Territory.

As Darwin's majority owner, the company rounded up seasoned oil and gas players from an international field: Santos of Australia, INPEX of Japan and Italy's Eni. Phillips, which merged with Conoco in 2002, also brought in two other minority partners that had not traditionally participated on the ownership side of LNG ventures.

Tokyo Electric Power (TEPCO) and Tokyo Gas had been LNG customers of Phillips since receiving their first shipments of Cook Inlet gas from the liquefaction plant in Nikiski, Alaska, on the Kenai Peninsula in 1969.

The company identified the two Japanese utilities early on in the gas marketing process as obvious potential customers for Darwin and, after two years of discussions, the parties agreed that TEPCO would buy 2 million metric tons per annum (almost 100 billion cubic feet per year, or 12.5 percent of the utility's annual LNG purchases at the time) and Tokyo Gas would buy 1 mtpa (almost 50 bcf per year). Together, the two utilities would be purchasing nearly all the gas the Darwin plant could produce each year from start-up in 2006 to 2023.



**Australia's Darwin LNG went online in 2006, sending nearly all of its gas to Japanese utilities. The offshore fields send gas more than 300 miles through an undersea pipe to the onshore liquefaction terminal.**

But more was at work during the Darwin negotiations than the usual wrangling between buyers and sellers. The two Japanese utilities, whose main lines of business dealt with the gas after it landed ashore, were also looking to invest in gas exploration, production and liquefaction. Darwin was their chance.

Together, the utilities formed a joint venture, Tokyo Timor Sea Resources, to take what today is a 9.2 percent stake in the offshore gas and condensate field. In addition, Tokyo Electric ultimately settled on a 6.13 percent share of the midstream segment of the project — the single-train LNG plant — while Tokyo Gas took on 3.07 percent.

In explaining why they sponsored the project, the companies issued a joint statement in June 2003 saying that "involvement in the whole LNG business chain" would ensure "a stable and economic supply of the fuel and city gas feedstocks."

The gamble appeared to work. Buyer contracts are proprietary, but Tokyo Electric was pleased enough about one highly unusual feature of its Darwin agreement to discuss it publicly. In an interview with global energy market analysis firm ICIS Heren, Tokyo Electric revealed its success in convincing ConocoPhillips to agree in 2005 to a flexible-destination clause, a first for a Japanese utility.

## PARTNERSHIP PAYS OFF

Destination clauses prohibit buyers from reselling gas beyond certain geographic boundaries. The point is to protect sellers from having to compete against their own customers in other markets.

Buyers chafe against the clauses, which bar them from profiting from price differences between markets. Arbitrage isn't the only reason a buyer might want to sell off its gas: Maybe the cargo can be replaced by cheaper gas from the local gas market or by LNG from the spot market. Or the buyer might not need the cargo right away because of lower-than-expected demand, plant outages, or other unforeseen circumstances.

The European Union has been cracking down on destination clauses in LNG contracts among its member nations, yet they remain an irritating norm

from the point of view of buyers in the Asia-Pacific market.

Tokyo Electric's Darwin agreement allowed it to send LNG to destinations other than the companies' terminals under certain conditions, with "full flexibility to deliver cargoes in Japan." For deliveries outside Japan, TEPCO would first need to ink an agreement with ConocoPhillips to share any profits. The companies reportedly spent a long time hashing out the phrasing on the sharing provision.

Sponsorship of the project, combined with its position as a major buyer, allowed TEPCO to push hard for tweaking the destination clause in negotiating its LNG purchase contract. "The stakes of TEPCO and Tokyo Gas in Darwin LNG enabled us to obtain favorable terms," a source at Tokyo Electric told ICIS Heren. "So did our buying power."

Both sides credited their long, shared history in Alaska for helping them eventually shake hands on both the equity and purchasing sides of the Darwin deal. ConocoPhillips management said the relationship forged over the Kenai LNG export operation was "instrumental to the success of Darwin LNG" and "cannot be overestimated."

TEPCO and Tokyo Gas, similarly, singled out their "close and reliable relationship" with the company dating to 1969 in Alaska — when they became the first Asian importers of LNG from North America — as the foundation for discussions leading to the Darwin equity participation and LNG sales agreements.

"Oil is like dating, but gas is like marriage," Fereidun Feshraki of FACTS Global Energy said of the LNG buyer-seller relationship during a presentation in 2013 at the 17th Asia Oil and Gas Conference in Kuala Lumpur, Malaysia.

That much was evident in the Darwin deal, which pushed buyers and sellers even closer together.

## A SEAT AT THE TABLE

Participation by Japan's gas and electric utilities in backing LNG projects has grown increasingly common since Darwin came online, but the equity percentages remain small.

## Japanese utilities investment in Australia LNG projects

Project	Utility	Ownership stake	LNG under contract to utility	Length of sales contract
<b>DARWIN LNG (2006) 3.6 mtpa total capacity</b>				
Upstream	Tokyo Timor Sea Resources (a joint venture between Tokyo Electric and Tokyo Gas)	9.20%		
LNG project	Tokyo Electric	6.13%	2 mtpa	17 years
	Tokyo Gas	3.07%	1 mtpa	17 years
<b>PLUTO LNG (2012) 4.3 mtpa total capacity</b>				
Upstream	Kansai Electric	5%	1.75 mtpa	15 years
& LNG project	Tokyo Gas	5%	1.5-1.75 mtpa	15 years
<b>QUEENSLAND CURTIS LNG (2014*) 9 mtpa total capacity</b>				
Upstream	Tokyo Gas	1.250%		
LNG Project	Tokyo Gas	2.500%	1.2 mtpa	20 years
<b>GORGON (2015*) 15.6 mtpa total capacity</b>				
Upstream & LNG project	Osaka Gas	1.25%	1.375 mtpa	25 years
	Tokyo Gas	1%	1.1 mtpa	25 years
	Chubu Electric	0.417%	1.44 mtpa	25 years
<b>WHEATSTONE (2016*) 8.9 mtpa total capacity</b>				
Upstream	Kyushu Electric Power	1.830%		
	Tokyo Electric	0.820%		
LNG project	Kyushu Electric Power	1.460%	0.7 mtpa	20 years
	Tokyo Electric	0.656%	4.2 mtpa	20 years
<b>ICHTHYS (End of 2016*) 8.4 mtpa total capacity</b>				
Upstream & LNG project	Tokyo Gas	1.575%	1.05 mtpa	15 years
	Osaka Gas	1.200%	0.8 mtpa	15 years
	Chubu Electric	0.735%	0.49 mtpa	15 years
	Toho Gas	0.420%	0.28 mtpa	15 years
*Projected start-up date				
mtpa = million metric tons per annum (1 million metric tons equals 48.7 billion cubic feet of natural gas)				

Source: Office of the Federal Coordinator research

A typical case is the \$54 billion Gorgon project being built in Australia. Gorgon is operated by Chevron in a joint venture with ExxonMobil and Shell, with three Japanese utilities in bit parts: Osaka Gas, 1.25 percent; Tokyo Gas, 1 percent; and Chubu Electric Power; an even more minuscule 0.417 percent.

As of March 2013, Osaka Gas had invested \$287 million in the subsidiary it set up to hold its stake in Gorgon.

The 15.6 mtpa project — an average capacity of 2.1 bcf a day of natural gas — is scheduled to start delivering LNG in 2015. It includes development of

gas fields off the Western Australia coast, an undersea pipeline to a liquefaction plant on Barrow Island and a carbon dioxide capture and underground storage operation.

Their small shares are no measure of the clout Japan's utilities wield in the LNG world. They are some of the world's biggest buyers and pay some of the highest prices. Taking ownership stakes gives them a varying degree of access to budgets, technology, engineering and other decisions made by the very companies selling them gas.

If a Japanese utility is sponsoring a project, chances are very good it's buying gas from that same development in proportions far greater than its equity share. In the case of the \$15.5 billion Pluto project in Australia, Kansai Electric and Tokyo Gas each hold a 5 percent ownership share, but are each taking about 40 percent of the gas from the 4.3 mtpa production facility over a 15-year span. The plant went online in 2012.

"They'd like to have a seat at the table to understand all the parameters of the project and make sure they're getting their fair share," Mikal Herberg, research director for the energy security program at the National Bureau of Asian Research, said in a November 2013 interview.

That seat at the table, for small project investors, doesn't include the power to take the lead on project decisions. What the utilities gain by taking equity stakes is the freedom to mingle with, and presumably influence to some degree, the companies that will be selling them the gas. (The utilities are small in comparison with the giant international energy companies that tend to spearhead LNG projects. Chevron, for example, was valued by investors at more than \$200 billion throughout 2013, while Tokyo Electric was valued at less than \$10 billion.)

"It can complicate issues for the majority owners if they (minority owners) want to have a say, but they are typically not going to have any say in spending, the capital program or technology," Herberg said. "You tend to make decisions based on ownership shares and if you have a small share, you have very little say. They're just going to pretty much be riding

the coattails of the big players."

Joining a project consortium also may help Japanese utilities follow more closely the efforts of their fellow LNG buyers.

"They are ideally positioned to learn about other buyers' expectations on hot-button issues such as pricing (traditionally the most secretive and sensitive topic!) as well as their expectations on other topics such as destination flexibility, price revision clauses, upward and downward quantity tolerance provisions, gas quality, transportation, and the like," Nelly Mikhael, a New-York based senior consultant at FACTS Global Energy, said in an email interview. "They can gauge what competing buyers want from a seller and determine how their own expectations as a buyer compare to others."

Acting as a seller gives the utilities a read on what other sellers are offering, as well. "In other words," Mikhael said, "They get an LNG market litmus test!"

## OVERSEAS INVESTMENT TO GROW

Unlike the United States, energy security for Japan doesn't start at home. With meager fossil fuel reserves of its own and no gas pipeline connections to other countries, Japan meets more than 95 percent of its gas demand with LNG imports.

The archipelagic nation was the world's largest LNG consumer even before an earthquake and ensuing tsunami in March 2011 caused a meltdown of the Fukushima Daiichi nuclear plant and prompted Tokyo to shut down the country's nuclear power plants. Since the accident, Japan has ramped up its imports of oil, coal and LNG to fill in the gaps left by shuttered nuclear facilities. As of 2012 about half of the country's electric power came from LNG, according to the U.S. Energy Information Administration.

Natural gas consumption in 2012 was about 4.4 trillion cubic feet, up 24 percent from 2010 mostly as a result of the nuclear disaster.

But as Darwin demonstrated, Fukushima wasn't the catalyst for Japanese utilities acquiring equity stakes in foreign LNG projects.

## Top LNG importers among Japanese utilities

	LNG purchase volume in fiscal 2013	Share of Japan's LNG imports in 2012
<b>City gas distribution</b>		
Tokyo Gas	12 million metric tons	14%
Osaka Gas	7.2 million metric tons	8%
Toho Gas	3 million metric tons	3%
<b>Electric generation</b>		
Tokyo Electric	20.6 million metric tons	24%
Chubu Electric	13.2 million metric tons	15%
Kansai Electric	7.4 million metric tons	8%
mtpa = million metric tons per annum (1 million metric tons equals 48.7 billion cubic feet of natural gas)		

Source: Office of the Federal Coordinator research

The push for ownership is one of several strategies designed to avoid gas shortages and high prices following the expiration of long-term LNG contracts inked in the 1970s and 1980s with exporters based primarily in Southeast Asia, according to the U.S. Energy Information Administration.

With Japan's Prime Minister Shinzo Abe pushing for greater competition and lower electricity prices, the utilities are under pressure to keep costs down and push hard for better deals before passing higher fuel costs on to consumers. Given the high level and expense of Japan's energy needs now and into the future, some of largest electric and gas utilities appear poised to expand their presence at the owners' tables of LNG projects.

Australia, with its proximity to Japan and promise as a dependable, long-term source of LNG, has been a magnet for investment by utilities, but it's by no means the only country the utilities are targeting.

Tokyo Gas seeks to take majority stakes in medium-sized LNG projects in Southeast Asia or Africa, according to an article by Bloomberg News in October 2013. This would be a major new strategic move for one of Japan's top importers.

Shigeru Muraki, an executive vice president at the utility, told Bloomberg that Tokyo Gas is interested in plants that can produce as much as 3 mtpa of LNG —

about the same size as Darwin. The utility can have more operational control through ownership in mid-sized projects, rather than large ones, he said. Tokyo Gas already holds small shares in big Australia projects with capacity ranging from about 4 mtpa to 16 mtpa.

Osaka Gas likewise has plans to "aggressively enter this upstream stage of the natural gas value chain," the company said in its 2009 report on

corporate social responsibility.

In 2008, the company bought into its first overseas LNG plant with a 10 percent share of the \$10 billion Freeport LNG import terminal on Quintana Island, Texas. Like many underutilized U.S. import terminals, Freeport LNG now wants to get into the export business, moving some of the nation's shale gas riches to overseas markets. The U.S. Department of Energy has signed off on Freeport's export application, but the project sponsor is still waiting for approval from the Federal Energy Regulatory Commission for its construction and operation plans.

## UTILITIES NOT THE ONLY PLAYERS

LNG project ownership can help not only the utilities' bottom lines, but puts them in a position to potentially generate business for Japan's other industries. Muraki of Tokyo Gas has mentioned the possibility of teaming up with other Japanese companies such as engineering contractors JGC Corp. or Chiyoda Corp., and plans to expand its LNG shipping fleet.

Japan's financial institutions are also involved. The Japan Bank for International Cooperation states that one of its top priorities is "obtaining natural gas by supporting the acquisition of interests and development of LNG-related projects as well as imports."

JBIC's assistance includes hundreds of millions of dollars in loans to Osaka Gas to buy equity in Gorgon LNG and Ichthys LNG, both under construction in Australia. The Japan Oil, Gas and Metals National Corp., tasked under Japanese law with securing a stable supply of oil and natural gas, is another financing source for the utilities, as are private banks.

Japan's oil and gas companies and commodity traders have a longer history than the utilities of backing overseas LNG projects and tend to take larger stakes.

The Japanese energy company INPEX is operator and majority owner of the Ichthys LNG project under construction in Australia. Mitsubishi, a conglomerate known globally for its autos and electronics, is also a major import agent for Japan's utilities and is backing LNG projects in Russia, Malaysia, Brunei, Oman, Indonesia and Western Australia, according to its 2013 annual report.

Mitsubishi and fellow conglomerate Mitsui last year

each took an ownership stake in the Cameron LNG export plant in Lake Charles, La., proposed by a Semptra Energy subsidiary. That project is waiting on U.S. government approval and a final investment decision.

## KOREA, CHINA STAKING PROJECTS, TOO

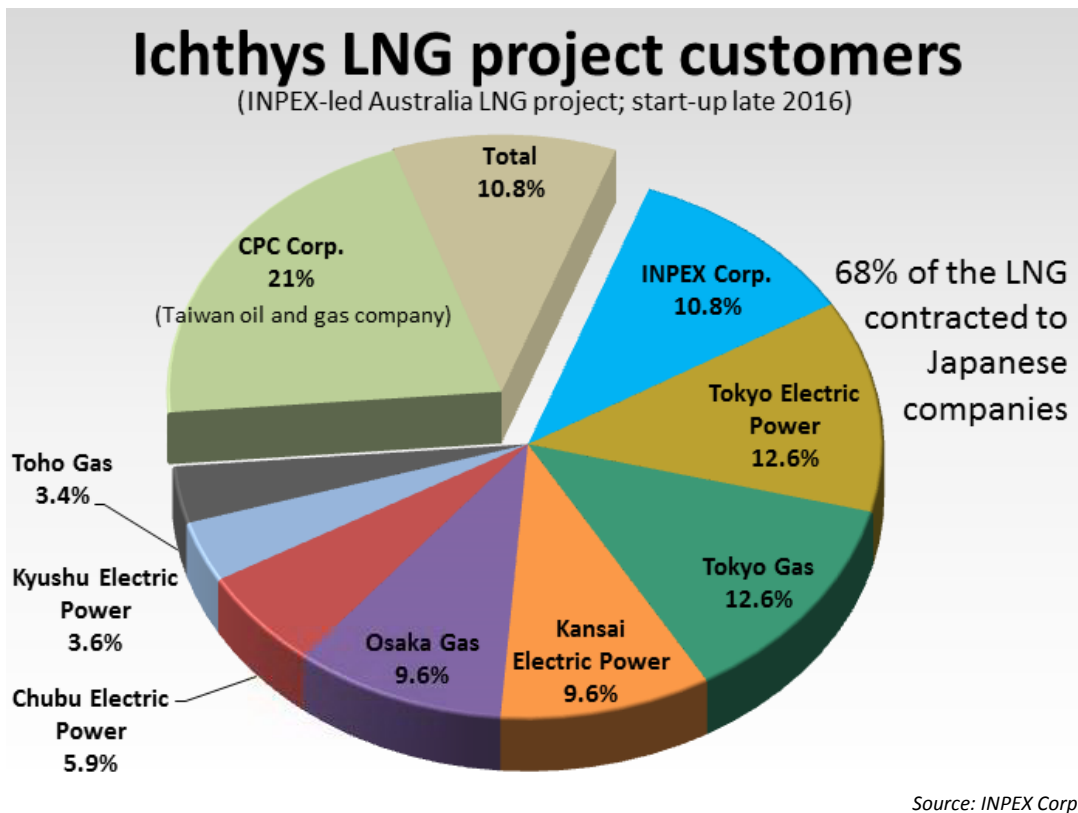
Korea Gas Corp., the world's largest single LNG importer, is also using project ownership to seek more control and oversight of its gas supply and to buy it at better prices. Like neighboring Japan, South Korea has little in the way of domestic fossil fuel resources and has had to reduce its nuclear capacity in recent years.

With its core business on the distribution side, South Korea's sole LNG importer brings in 35 mtpa of LNG annually. The government-owned company has an effective monopoly over the purchasing, import and wholesale distribution of natural gas, according to the U.S. Energy Information Administration.

In addition to holding minority equity stakes in about

half a dozen LNG projects under construction and proposed in Africa, the Middle East, Australia and North America, KOGAS has pounced on new fields in East Africa and the Mediterranean Sea, buying up blocks alongside more established producers like Italy's Eni.

In December 2013, a KOGAS executive told the Alaska Journal of Commerce that investing in a gas project in Alaska



The Ichthys LNG project under construction in Australia has 68 percent of its output under contract to Japanese buyers, most of that to seven utilities. INPEX Corp. is an oil and gas producer and the project operator.

as well as buying the fuel is a possibility someday. "At this moment, actually, the timing is a little bit far away," said Kwon Young, executive vice president and resources business division chief operating officer.

China's big national oil and gas companies, rather than its utilities, are investing in LNG projects and purchasing the gas. They tend to hold larger — albeit still minority — shares in LNG projects than either the Korean or Japanese buyers.

In June 2013, China National Petroleum Corp. agreed to purchase a 20 percent stake in the \$27 billion Yamal LNG project in the Russian Arctic. Yamal, which reached a final investment decision in December 2013 with production start-up targeted for 2017, is just one of several projects drawing China's interest.

The nation's largest refiner, Sinopec, is the foundational buyer and owns a 25 percent stake in Australia Pacific LNG, which is under construction and scheduled to start exporting gas in 2015. (ConocoPhillips holds a 37.5 interest in Australia Pacific LNG.)

Sinopec is also scoping out the investment potential of projects in British Columbia.

"The Chinese companies are new to this game and want to learn the biz," Herberg said. "CNPC and Sinopec want to gradually be able to lead these projects on their own."

Europe's utilities are not following their Asian counterparts into LNG project investments, in part because they depend less on LNG as a percentage of the overall fuel mix. FACTS Global Energy consultant Mikhael noted that Japan's extreme dependence on LNG makes anything that enhances security of supply an attractive prospect.

## PROFIT AND SUCCESS NOT GUARANTEED

Profitability is another attraction of investment in LNG projects. Project sponsor agreements often include ownership rights for a share of the gas, giving the utilities protection against upswings in price, which hurt them as buyers.

"If the markets soar, as they are now soaring, they will earn some of the high cost back in the way of profits," Zach Allen, an analyst at energy advisory firm PanEurAsian Enterprises, told The Wall Street Journal in April 2012.

Tokyo Gas, for one, forecasts a \$25.7 million increase in its operating income from investments abroad for the fiscal year ending March 2014. The projected earnings will come from the Pluto LNG project and a Barnett basin shale gas project in Texas.

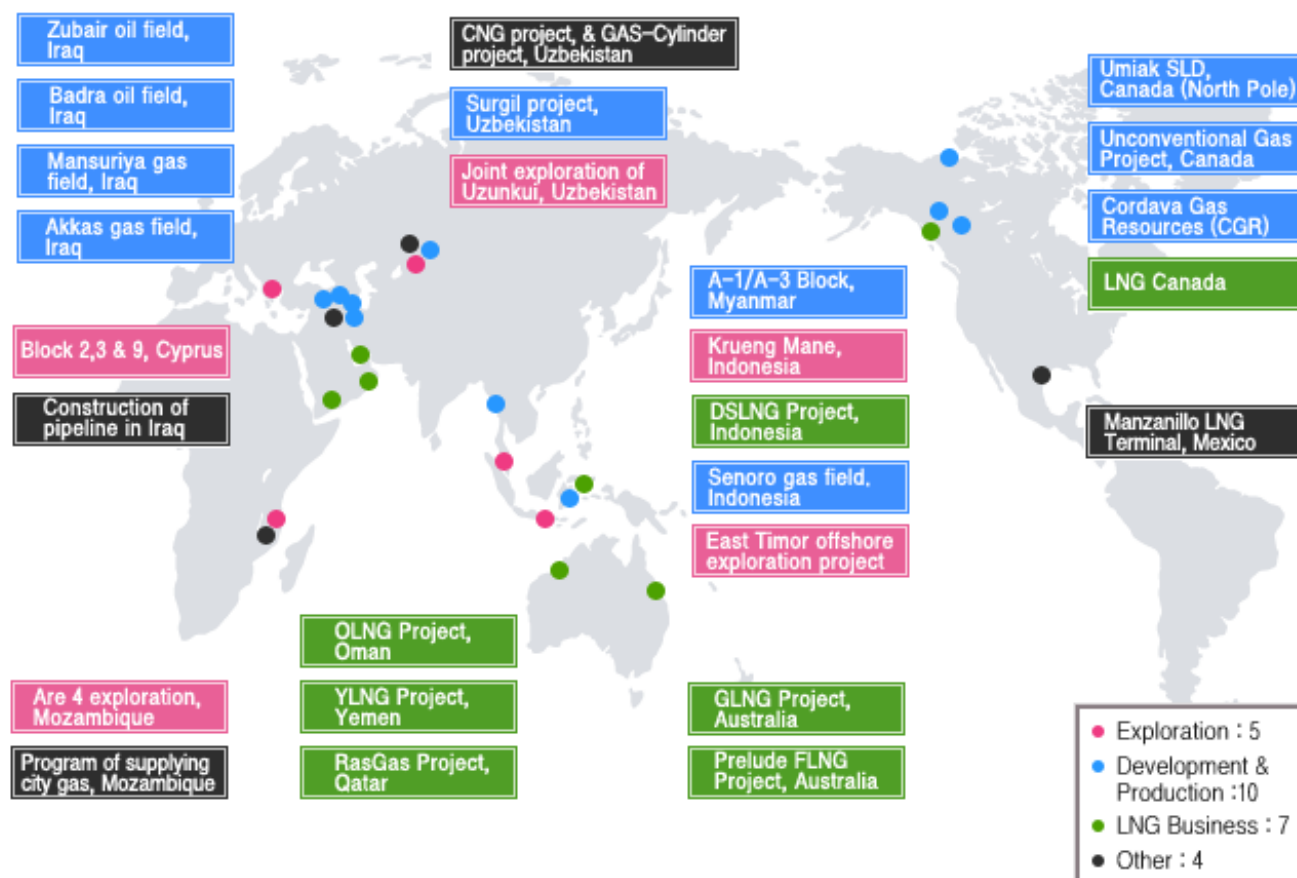
"The best part of the value chain is having a stake in the upstream production and liquefaction," Herberg said. "That's where a big chunk of the money is to be made."



*Source: Korea Gas*

**The KOGAS LNG receiving and storage terminal at Incheon, on South Korea's northwest coast, is the world's largest, with 20 storage tanks.**

# KOGAS overseas projects



Source: Korea Gas.

**KOGAS has invested in natural gas production in Indonesia, Myanmar, Iraq, Uzbekistan and Canada, and in exploration projects in Indonesia, East Timor, Uzbekistan, Mozambique and Cyprus.**

But as with any investment, nothing is guaranteed. Following the 2011 earthquake, Tokyo Electric, which owns and operates the Fukushima Daiichi nuclear plant, lacked the finances to maintain its 15 percent equity share in the licenses for the Wheatstone gas field and 11.25 percent interest in the proposed Wheatstone liquefaction terminal in Australia. (Wheatstone is under construction and scheduled to go online in 2016.)

In June 2012, Mitsubishi along with one of the world's largest shipping companies, Nippon Yusen Kabushiki Kaisha, came to TEPCO's rescue by joining the project, effectively knocking Tokyo Electric's

share down to less than 1 percent of both the gas reserves and LNG plant.

Under pressure from the South Korean government, KOGAS is trying to scale back its ownership stakes in Australian and Canadian projects. A Wall Street Journal article in 2013 reported that Seoul wants its national energy companies to improve their financial standing by selling unprofitable, non-core overseas assets. The country's energy giants have amassed large debt loads in the past five years in acquiring energy resources abroad.

Aside from adverse events at home, there is risk that the projects themselves won't go well for any number of reasons: The cost of materials might skyrocket, labor costs might increase, poor weather could put construction on hold, demand might fizzle, fellow suppliers might push down prices by flooding the market, or there might not be as much gas as originally expected.

"The risk is that you get into a poor project in terms of profitability and you don't make money after investing a lot of capital," Herberg said.

## **RELATIONSHIPS BUILD PROJECTS**

The international oil and gas companies heading LNG projects are willing to welcome their customers as fellow project sponsors for good reason: Without buyers, there is no project.

"Rarely can the projects get under way without long-lasting commitments from these customers to buy cargoes annually for 15-25 years," Herberg said. "For majority owners, when they bring in a really small partner who's also a buyer, what that generally does is make the investor a reliable buyer."

The upstream partnership "in a sense cements a partnership for the supply contract," Herberg said, "and it all fits together better."

Mikhael thinks the increasing involvement of LNG customers as project sponsors ultimately makes overcoming the differences between buyers and sellers "quicker and more trouble-free."

Asian LNG buyers, in particular, have been pushing hard for changes in the traditional formula that yokes the cost of natural gas in their region to the global price of oil. Producers, however, are resisting the change, arguing they need the high, oil-linked prices to finance the mega-billions of upfront capital costs and provide their desired rate of return.

"The LNG industry is built on cooperation," Mikhael said. "If you have got the buyer with a seat at the table of a sellers consortium, and all parties are cognizant of what's driving each other, this can only facilitate understanding since the views of the other party will always be expressed in a timely fashion."



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This video was linked in the original article. It will open in an Internet browser.

Internet address: <https://www.youtube.com/watch?v=zcXNW2II6v0>



*Source: Chevron*

**Several Japanese companies hold small stakes in the Chevron-led Wheatstone LNG project under construction in Australia, including two electric utilities. This Chevron video describes the project.**