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Worldwide Construction Surveys

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- Petrochemical
- Refining
- Pipeline
- Gas Processing
- LNG
- Sulfur

The Excel format enables efficient and rapid analysis of planned construction projects. The data collected includes Company, Location, Capacity, Expected Completion Date and Current Status, Contractor, Cost, Engineering and Process Design (when available). Some of these surveys are also available in historical version going back to 1996.

Production Projects Worldwide

Contains upstream projects in 47 countries, shows the development of individual fields, and the supporting infrastructure. The Survey in Excel spreadsheet identifies:

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- operator & company name
- project phase
- peak year
- development type details
- liquids and gas
- cost when available

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LNG Update

Latin American oil, gas policies remain in flux
Tullow finds Uganda oil, nears award of Congo blocks
Companies adopt efficient waste-management units

OIL&GAS JOURNAL®

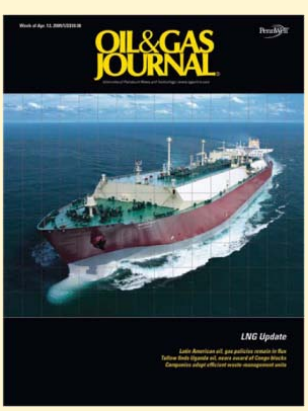
Apr. 13, 2009
Volume 107.14

LNG Update

Regular Features

Cover

Qatar Gas Transport Co. (Nakilat) took delivery on Sept. 30, 2008, of the 266,000-cu m Mozah, the world's largest LNG carrier. Samsung Heavy Industries built the vessel under a $290 million contract at its Geoje shipyard in South Korea. The first of 10 Q-Max vessels planned by 2010 from SHI, Mozah operates on long-term charter between the Qatargas 2 project and European terminals. Recent developments in LNG production and trade are the focus of this issue's special report, beginning on p. 38, with a look at prospects for the European market and then continuing on p. 49 with an analysis of the effects of the global economic crisis on Asia-Pacific markets. Photo from ExxonMobil Corp. and SHI.



General Interest

Exploration & Development

Drilling & Production

Processing

Transportation

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PennWell, Houston office

1455 West Loop South, Suite 400, Houston, TX 77027
Telephone 713.621.9720/Fax 713.963.6285/Web site www.ogjonline.com
Editor Bob Tippee, bobt@ogjonline.com
Chief Editor-Exploration Alan Petzet, alanp@ogjonline.com
Chief Technology Editor-LNG/Gas Processing Warren R. True, warrent@ogjonline.com
Production Editor Guntis Moritis, guntism@ogjonline.com
Pipeline Editor Christopher E. Smith, chriss@ogjonline.com
Senior Editor-Economics Marilyn Radler, marilynr@ogjonline.com
Senior Editor Steven Poruban, stevenp@ogjonline.com
Senior Associate Editor Judy R. Clark, judyrc@ogjonline.com
Senior Writer Sam Fletcher, samf@ogjonline.com
Senior Staff Writer Paula Dittrick, paulad@ogjonline.com
Survey Editor/News Writer Leena Koottungal, lkoottungal@ogjonline.com
Editorial Assistant Linda Barzar, lbarzar@pennwell.com

Vice-President/Group Publishing Director Paul Westervelt, pwestervelt@pennwell.com
Vice-President/Custom Publishing Roy Markum, roym@pennwell.com

PennWell, Tulsa office

1421 S. Sheridan Rd., Tulsa, OK 74112
PO Box 1260, Tulsa, OK 74101
Telephone 918.835.3161 / Fax 918.832.9290
Presentation/Equipment Editor Jim Stilwell, jims@pennwell.com
Associate Presentation Editor Michelle Gourd, michelleg@pennwell.com
Statistics Editor Laura Bell, laurab@ogjonline.com
Illustrators Mike Reeder, Kay Wayne
Editorial Assistant Donna Barnett, donnab@ogjonline.com
Production Director Charlie Cole

London

Tel +44 (0)20.8884.4246
International Editor Uchenna Izundu, uchennai@pennwell.com

Washington

Tel 703.533.1552
Washington Editor Nick Snow, nicks@pennwell.com

Los Angeles

Tel 310.595.5657
Oil Diplomacy Editor Eric Watkins, hippalus@yahoo.com

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Subscriber Service

P.O. Box 2002, Tulsa OK 74101
Tel 1.800.633.1656 / 918.831.9423 / Fax 918.831.9482
E-mail ogjsub@pennwell.com
Circulation Manager Tommie Grigg, tommieg@pennwell.com

PennWell Corporate Headquarters

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Apr. 13, 2009

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General Interest — Quick Takes

House members plan bill to expand NGV use

Legislation to greatly expand the use of natural gas as an alternative to conventional transportation fuel will be introduced in the US House, three members said on Apr. 1.

The measure's provisions will include an 18-year extension of three critical tax incentives that focus on natural gas as a transportation fuel, the purchase of natural gas vehicles (NGVs), and the installation of commercial and residential natural gas refueling pumps, according to Reps. Dan Boren (D-Okla.), John B. Larson (D-Conn.), and John Sullivan (R-Okla.).

Currently, the alternative fuel credit expires at the end of 2009, and the vehicle and refueling pump credits expire at the end of 2010, they noted.

Known as the New Alternative Transportation to Give Americans Solutions (NAT GAS) Act, the bill also would create a new tax credit for automakers producing natural gas and bi-fueled vehicles, the three federal lawmakers said. Currently, all major automakers manufacture NGVs for overseas markets, and this provision is critical to encourage them to begin offering NGVs in the US, they said.

The bill also would require that at least 50% of new vehicles placed into service by the federal government be capable of operating on compressed natural gas or LNG by the end of 2014, they added. The legislation also would provide grants for light and heavy-duty gas vehicle and engine development.

"We are at a crossroads, and the decisions we make today in Congress will determine the stability of our future energy industry, our domestic supply, and the daily cost of energy for millions of consumers and businesses across the nation. With natural gas vehicles, we have a real opportunity to establish a cleaner, cheaper fuel alternative that will provide an independent energy future for America," said Boren, who has introduced similar bills in the past.

Energy investor T. Boone Pickens applauded the measure. "America's national and economic security depends on moving off foreign oil as quickly as possible. Natural gas is the cleanest, most abundant, most economic fuel to replace imported diesel fuel. The US has enough natural gas to last more than 118 years; we should turn to it as an immediate replacement for foreign oil in fleets and heavy-duty vehicles," he said.

Western climate plan would cost jobs, study says

A new study finds that a carbon cap-and-trade plan in the western US could slow investment, cost the region hundreds of thousands of jobs, and cut personal income for millions of workers.

The analysis, conducted by economists at the Beacon Hill Institute (BHI) of Suffolk University in Boston, also found that the proposed Western Climate Initiative (WCI) would require Western states to dramatically increase their number of government employees.

The BHI study reconfirms many of the findings of a study released last month by the Western Business Roundtable (WBR). That study concluded that the WCI plan could seriously damage the West's economy if implemented in its present form.

The carbon cap-and-trade scheme is being pushed by a handful of western governors, the Western Governors' Association, and some environmental groups, according to WBR.

In its September 2008 report, WCI released its research on cap-and-trade policy, which is intended by 2020 to reduce the amount of greenhouse gas (GHG) emissions to 15% below 2005 emission levels.

But BHI finds that due to an inadequate cost and benefit review, the WCI's results show tens of billions of dollars of savings annually.

Using the WCI projections of increases in fuel costs, the BHI study authors concluded that the policies will decrease employment, investment, personal income, and disposable income.

None of the seven WCI states—California, Arizona, New Mexico, Oregon, Washington, Utah, and Montana—would escape economic harm should cap-and-trade be imposed, the new study found. Four Canadian provinces—British Columbia, Manitoba, Ontario, and Quebec—also signed the Western Regional Climate Action Initiative Agreement.

The BHI study found that under a scenario of a broad policy with no offsets, in which 100% of GHG emission permits would be auctioned off to emitters, the seven western states would lose as many as 251,674 private sector jobs, while the permit revenue would allow the states to hire as many as 142,241 state employees.

The plan also would put investment by firms at serious risk by slowing investment in the region by as much as $1.448 billion, and the plan would diminish total personal income by $6.35 billion to $18.31 billion/year.

Under a scenario where states auction the minimum of 25% of the permits issued, the West would suffer even greater losses, according to the study.

"If state governors and provincial premiers seek to truly meet the goals underscored in the WCI proposals, they should require a complete and thorough cost-benefit analysis," BHI said. "This consortium of state and provincial governments should understand that, whatever the benefits of the proposals, they will place the state and regional economies at a competitive disadvantage to other regions through higher prices for energy and transportation, and [will] exert measurable, negative effects on their economies." ✦

Industry Scoreboard

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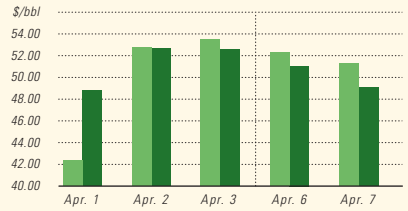
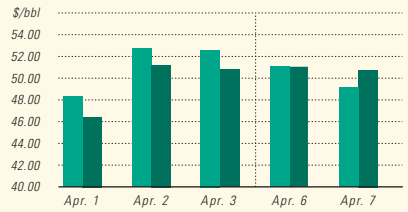
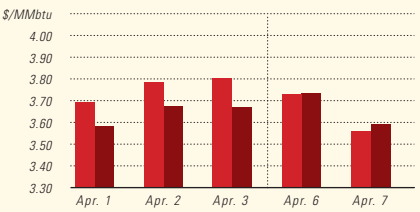


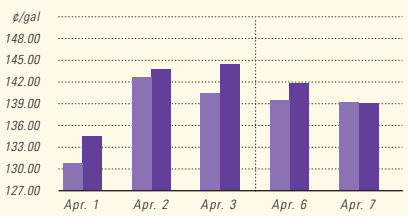
WTI CUSHING / BRENT SPOT



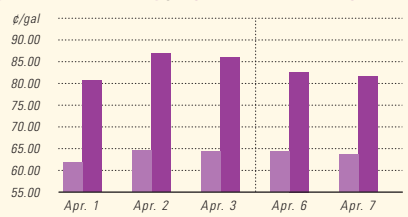
NYMEX NATURAL GAS / SPOT GAS - HENRY HUB



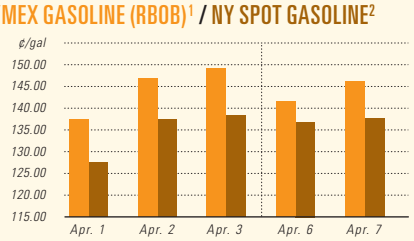
IPE GAS OIL / NYMEX HEATING OIL



PROPANE - MT. BELVIEU / BUTANE - MT. BELVIEU



NYMEX GASOLINE (RBOB)[1] / NY SPOT GASOLINE[2]



[1]Reformulated gasoline blendstock for oxygen blending.
[2]Nonoxygenated regular unleaded.

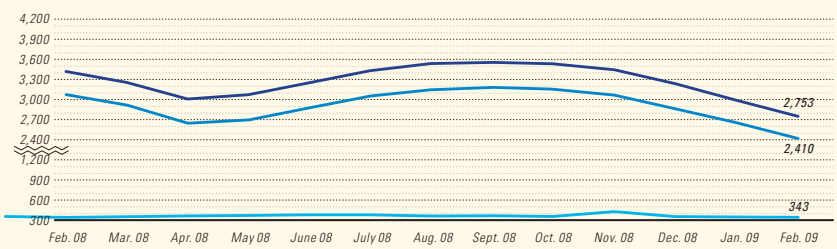
US INDUSTRY SCOREBOARD — 4/13

Latest week 3/27	4 wk. average	4 wk. avg. year ago[1]	Change, %	YTD average[1]	YTD avg. year ago[1]	Change, %
Demand, 1,000 b/d						
Motor gasoline	9,038	9,053	–0.2	8,949	8,908	0.5
Distillate	3,772	4,148	–9.1	3,988	4,209	–5.3
Jet fuel	1,505	1,533	–1.8	1,392	1,546	–9.9
Residual	577	570	1.2	596	672	–11.3
Other products	3,973	4,432	–10.4	4,433	4,631	–4.3
TOTAL DEMAND	18,865	19,736	–4.4	19,358	19,966	–3.0
Supply, 1,000 b/d						
Crude production	5,432	5,137	5.7	5,249	5,115	2.6
NGL production[2]	1,789	2,210	–19.0	2,135	2,180	–2.0
Crude imports	9,310	9,585	–2.9	9,485	9,744	–2.7
Product imports	3,156	2,937	7.5	3,186	3,144	1.3
Other supply[3]	1,581	1,407	12.4	1,482	984	50.7
TOTAL SUPPLY	21,268	21,276	0.0	21,538	21,167	1.8
Refining, 1,000 b/d						
Crude runs to stills	14,221	14,798	–3.9	14,221	14,594	–2.6
Input to crude stills	14,583	14,648	–0.4	14,583	14,891	–2.1
% utilization	82.8	83.3	—	82.8	84.7	—

Latest week 3/27	Latest week	Previous week[1]	Change	Same week year ago[1]	Change	Change, %
Stocks, 1,000 bbl						
Crude oil	359,427	356,583	2,844	319,164	40,263	12.6
Motor gasoline	216,793	214,568	2,225	224,710	–7,917	–3.5
Distillate	144,153	143,932	221	109,720	34,433	31.4
Jet fuel–kerosine	39,540	39,344	196	38,067	1,473	3.9
Residual	35,515	34,714	801	39,736	–4,221	–10.6
Stock cover (days)[4]			Change, %		Change, %	
Crude	25.4	25.1	1.2	22.2	14.4	
Motor gasoline	24.0	23.7	1.3	24.5	–2.0	
Distillate	38.2	37.9	0.8	26.1	46.4	
Propane	31.4	27.8	12.9	18.1	73.5	
Futures prices[5] **4/3**			Change		Change	%
Light sweet crude ($/bbl)	50.32	53.45	–3.13	104.24	–53.92	–51.7
Natural gas, $/MMbtu	3.76	4.11	–0.35	9.54	–5.78	–60.6

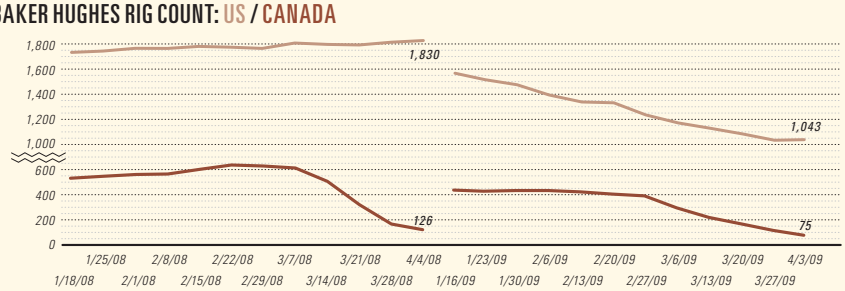
[1]Based on revised figures. [2]Includes adjustments for fuel ethanol and motor gasoline blending components. [3]Includes other hydrocarbons and alcohol, refinery processing gain, and unaccounted for crude oil. [4]Stocks divided by average daily product supplied for the prior 4 weeks. [5]Weekly average of daily closing futures prices.
Sources: Energy Information Administration, Wall Street Journal

BAKER HUGHES INTERNATIONAL RIG COUNT: TOTAL WORLD / TOTAL ONSHORE / TOTAL OFFSHORE



Note: Monthly average count

BAKER HUGHES RIG COUNT: US / CANADA



Note: End of week average count

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Exploration & Development — *Quick Takes*

Large Caguan basin find shapes up in Colombia

Emerald Energy PLC and Canacol Energy Ltd., Calgary, are delineating what appears to be a large heavy oil discovery in Colombia's Caguan basin 200 miles south of Bogota.

Five wells have been drilled, a sixth is drilling, and a seventh is planned in the southern part of Capella, an accumulation of 9-11° gravity oil in the Eocene Mirador formation that appears from 2D seismic to cover 22,000 acres on the Ombu E&P contract area.

Delineation drilling is planned on the northern half of the structure later in 2009 after environmental permitting.

Emerald Energy said gross proved and probable reserves are 14.8 million bbl from estimated initial oil in place of 245 million to 1.1 billion bbl. The six existing wells are on the southern 7,400 acres of the structure. The first five wells found oil in both intervals.

Emerald Energy and Canacol hold 90% and 10% interest, respectively, in the 74,130-acre Ombu contract area, and Emerald Energy holds 100% working interest in the 27,181-acre Durillo contract area adjacent to and southwest of Ombu. Emerald Energy said Durillo may have potential in the same exploration play as Capella.

The vertical Capella-1 went to a total depth of 3,802 ft in mid-2008 and found 189 ft of potential hydrocarbon-bearing interval in two Mirador sandstones. The two tested at a combined 240 b/d oil progressive cavity pumps.

Emerald Energy plans a cyclic steam injection pilot in one well this year. The field production rate is constrained by oil trucking and sales capacity. The individual intervals tested at initial rates of 26-240 b/d of oil and stabilized at as much as 400 b/d on extended tests, with water cut steadily declining to 6%.

Afghanistan launches first-ever bidding round

Afghanistan's Ministry of Mines said it "has initiated the process that will lead to the bidding round for the award of exploration and production-sharing contracts for hydrocarbon operations."

The ministry reported that the two gas blocks and one oil block to be auctioned lie in the northern part of the country where most oil and gas fields were discovered in the 1970s.

It said the Jangalikalan and Juma-Bashikurd gas blocks together hold recoverable reserves of 52 billion cu m, while the Kashkari oil block has recoverable reserves of 64.4 million bbl.

Two years ago, after completing a multiyear study, the US Geological Survey estimated Afghanistan's mean undiscovered resources at 15.7 tcf of gas, 1.6 billion bbl of oil, and 562 million bbl of natural gas liquids (OGJ Online, Mar. 27, 2006).

USGS said much of Afghanistan's petroleum resource potential and all the known oil and gas reserves are in the north. It said most of the undiscovered oil is in the Afghan-Tajik basin, while most of the undiscovered gas is in the Amu Darya basin.

A road show for the Afghan licensing round will be launched in Kabul on Apr. 26 before it travels on to Dubai, London, Calgary, Houston, and Singapore (OGJ Online, Mar. 19, 2009).

London-based consultant Exclusive Analysis recently predicted: "In the coming year, core al-Qaeda is...likely to focus on the military jihad in Afghanistan as the primary means of draining the US economy (OGJ Online, Apr. 3, 2009)."

Flemish Pass off Newfoundland gets discovery

StatoilHydro Canada Ltd. will apply for a Significant Discovery License for an indicated deepwater discovery in the frontier Flemish Pass basin in the Atlantic Ocean off eastern Canada.

The company didn't disclose the hydrocarbon type and said it will file for the SDL even though further analysis is needed to determine the well's potential.

The discovery came at Mizzen O-16 in 1,100 m of water on EL 1049 some 500 km east-northeast of St. John's and 180 km east of Whiterose oil and gas field in the Jeanne d'Arc basin.

The wellsite is 6 miles north of a well that PetroCanada drilled on the Mizzen prospect that found noncommercial oil. The Mizzen L-11 and Tuckamore B-27 wells were drilled in the Flemish Pass basin in the winter-spring of 2003 (OGJ, Aug. 15, 2005, p. 34).

StatoilHydro Canada praised the crew of the Henry Goodrich semisubmersible, which spud the well Dec. 21, 2008, and support contractors for carrying out the drilling in the heart of the North Atlantic winter storm season (OGJ, Oct. 27, 2008, p. 56).

Interests in the license are StatoilHydro 65% and Husky Energy Inc. 35%. ✦

Drilling & Production — *Quick Takes*

Petrobras, Repsol YPF find oil in Santos basin

Brazil's state-run Petroleo Brasileiro SA (Petrobras) and partner Repsol YFP SA made a declaration of commercial viability to the country's Agencia Nacional do Petroleo (ANP) for a light oil and gas discovery made on Block BM-S-7 in the Santos basin.

Piracuca field lies in 200 m of water off Sao Paulo state, 200 km from Santos. The partners, Petrobras 63% and Repsol YPF 37%, estimate in-place reserves at 88.5 million cu m or "about 550 million boe."

The declaration of commercial viability is the outcome of "intense exploratory activity" carried out on this block, the partners said, adding, "With the new field, it will be possible to increase the potential for light oil and gas production in shallow waters."

The announcement coincided with reports that Petrobras notified ANP on Apr. 6 that it found traces of oil in a test well drilled on the C-M-401 Block offshore in the Campos basin. Petrobras holds a 100% stake in the block.

Petrobras reported that data from early March showed that the Peregrine 1 rig was drilling at the site in 977 m of water and targeting a depth of 3,333 m.

Meanwhile, ANP said ExxonMobil Brazilian subsidiary Esso Santos is drilling a second well on Brazil's Santos basin Block BM-S-22 to a depth of 5,404 m in 24 m of water.

ExxonMobil Chairman and Chief Executive Officer Rex Tillerson said the second well is designed in part to give ExxonMobil a "better understanding" of BM-S-22, but he declined to discuss

what the firm expects to discover.

While the block is close to major finds in Santos' presalt layer, Tillerson played down projections of discoveries at BM-S-22, saying, "We have one well" and "it's just too early" to predict what will be found on it.

ExxonMobil is operator of the block with a 40% stake. Hess Corp. also holds a 40% interest while Petrobras owns the remaining 20%.

CGES: Iraqi output target needs $28-43 billion

The Center for Global Energy Studies, London, in an Apr. 2 publication estimates that Iraq will need to invest $28-43 billion for raising its oil production capacity to 6 million b/d, a goal set during the regime of former President Saddam Hussein.

Besides the investment in fields, the estimate includes repair and refurbishment of pipelines, storage, and loading facilities to return capacity to 3.5-4 million b/d .

For the fields, CGES estimates that Iraq requires $9.6-13.6 billion for restoring production to the 3.8 million b/d produced before the 1980-88 Iran-Iraq war. Current production capacity is 2.7 million b/d.

To raise production to 6 million b/d would require an additional $18.6-26.9 billion, CGES says.

Burullus Gas extends rig contract

Burullus Gas Co. has extended its chartering of third-generation semisubmersible rig Scarabeo 6 from Saipem SPA under a $400 million contract.

The new contract will last until fourth-quarter 2014. The rig will remain in Egyptian waters.

Scarabeo 6's operating capacity is to be upgraded to 1,100 m from 780 m of water in 6 months in late 2011 or early 2012.

Burullus Gas is a joint venture of British Gas International Ltd. 25%, Petronas Carigali Sdn. Bhd. 25%, and Egyptian Natural Gas Holding Co. 50%.

No new floater orders placed last quarter

The market for floating production systems has frozen as a result of the abrupt downturn in the global economy with no orders for production floaters placed in the last quarter, according to International Maritime Associates Inc., Washington, DC.

IMA says this is the first time since 1996 when it began tracking floating production units (FPUs) that no companies have placed orders during a reporting quarter. As a result, order backlog for production floaters has dropped 30% from the same time last year, it says.

Its latest report notes that companies have delayed several orders for production floaters including three floating production, storage, and offloading vessels and a MinDoc, which is a deep-draft floating production unit for supporting dry-tree completions in deep water.

IMA said one FPSO operator has filed for bankruptcy and a second has sold its interest in an FPSO under construction. At least one other FPSO operator looks in tenuous condition, IMA added.

On the other hand, its long-term outlook for FPUs remains strong because of the number of development projects at various stages of planning that will need floating production or storage systems.

In its latest report, IMA identifies more than 155 projects that will require floating production systems. About one third of these are at an advanced stage of bidding or final design, IMA said.

Because of these projects and an anticipated recovery in the oil price, it forecasts that companies will order 93-141 production floaters in the next 5 years. ✦

Processing — *Quick Takes*

Axens lets contract for Kremenchug refinery

Ukrainian holding company Ukrtatnafta has awarded Axens SA of Paris a contract for upgrading the gasoline pool at the 360,000 b/d Kremenchug refinery. The Kremenchung facility has the largest throughput capacity in the Ukraine.

The upgrading project, the first of its kind in the Ukraine, will enable the production of Euro V gasoline grade in the 2011 timeframe. The project involves the addition of Prime-G+, naphtha hydrotreating, and DIH isomerization units.

The combined naphtha fractions from the two existing fluidized catalytic crackers will be fed to a 610,000 tonne/year Prime-G+ unit, where the product sulfur content will be lowered to 20 ppm. The C_5-C_6 straight-run and catalytic reforming fractions will be processed in a 380,000 tonne/year hydrotreater then isomerized in a deisohexanizer-type isomerization unit to produce an 88 RON (research octane number), light gasoline cut.

Ukrneftekhimproekt, Kiev, will perform the detailed engineering.

Aramco, Sumitomo to expand Petro Rabigh facility

Saudi Aramco reported it plans to sign an agreement with Sumitomo Chemical Co. to develop Phase 2 of its refinery and chemicals complex in the port city of Rabigh on the Red Sea.

Aramco Pres. and Chief Executive Khalid A. Al-Falih said his firm would "soon" sign a memorandum of understanding with Sumitomo to further develop the $10 billion Petro Rabigh complex.

Al-Falih's statement confirmed an earlier press report saying Sumitomo Chemical planned to build another large petrochemical complex in Saudi Arabia adjacent to one scheduled to come on line at the end of this month.

That first phase of the project involved upgrading the 400,000 b/d Rabigh refinery to produce higher-quality products, including petrochemical units to produce 900,000 tonnes/year of polyethylene, 700,000 tpy of polypropylene, 600,000 tpy of monoethylene glycol, and 200,000 tpy of propylene oxide.

To implement the project's first phase, Aramco and Sumitomo Chemical formed the joint venture Rabigh Refining & Petrochemical (Petro Rabigh).

The Saudi government recently approved investment plans for the second project, and the Nikkei Business Daily (NBD) on Mar. 12 reported that Petro Rabigh would soon conduct a feasibility study to identify investment amounts, output, and other details.

Construction could start as early as yearend, with the complex targeted to come online sometime in 2013-14.

Although yet to be determined, total investments are forecast at ¥300-500 billion. Both Sumitomo Chemical and Aramco will inject additional funds into the joint venture, and they plan to request financing from a banking consortium.

"The facility will be positioned as a second-phase project, but will be a huge…complex with cracking furnaces for naphtha and ethane gas," NBD said.

Despite the ongoing slump in the world economy, Sumitomo Chemical sees demand for petrochemical products rising over the long term in emerging markets and plans to market value-added products from the second complex to China and India as well as to Europe, NBD said.

The complex will mass-produce 20-30 high-function products such as autoparts-grade plastics and materials for LCD televisions.

A total investment of ¥500 billion was planned when Petro Rabigh was formed in 2004, but ballooning prices for resources and other factors swelled outlays for the first complex to ¥1 trillion.

"This time around," NBD said, "the downward trend in materials prices and construction costs due to the weak economy spurred the decision to make an additional investment."

Prior to this week's announcement, Sumitomo Chemical chose to have its petrochemicals business in Tokyo manage the Rabigh project, considered one of the world's largest integrated complexes for petroleum refining and petrochemical manufacture.

Petro Rabigh will independently operate the complex, while Sumitomo Chemical will be responsible for the sale of produced petrochemical derivatives.

Placid Refining completes hydrotreater

Placid Refining Co. LLC completed its 20,000 b/d fluidized catalytic cracker gasoline hydrotreater at its refinery in Port Allen, La.

The new unit, along with other improvements, will enable the refinery to meet all applicable clean fuel standards for its products.

The $63 million project, the largest single capital project in Placid's history, is part of the refinery's $300 million upgrade and expansion to increase capacity to 80,000 b/d from 55,000 b/d while reducing total air emissions by 50%.

Mustang, a subsidiary of international energy services company John Wood Group PLC, provided the engineering, design, procurement, and construction management for the project. ✦

Transportation — *Quick Takes*

Qatargas charters LNG ships

Qatargas Operating Co. Ltd. chartered the Q-Flex and Q-Max LNG carriers delivered to Nakilat, the Qatari-listed shipping company from shipyards in South Korea. Both ships will transport LNG produced by Qatargas 3 to the US.

The Al Sadd carrier Q-Flex carrier is one of the world's largest with a capacity of 210,000 cu m and is under a long-term contract. It was delivered from the Daewoo Shipbuilding & Marine Engineering Co. Ltd., Okpo shipyard on Geoje Island. The Mekaines Q-Max LNG Carrier has a capacity of 266,000 cu m, and it too is under a long-term charter. It was delivered to Nakilat at Samsung Heavy Industries Co. Ltd. shipyard on Geoje Island.

Nakilat said the Q-Flex carrier has 50% more capacity than conventional LNG carriers with about 40% lower energy requirements because it has maximized economies of scale and efficient engines. Q-Max has 80% more capacity. Both are unique and purpose-built for Nakilat to send efficiently Qatar's natural gas to markets throughout the world, the company added. Qatargas 3 shareholders are Qatar Petroleum, ConocoPhillips, and Mitsui & Co. Ltd.

Qatargas inaugurates delayed, two-train project

Qatargas has inaugurated its much-delayed 15.6 tonne/year Qatargas 2 in a ceremony in Ras Laffan City, the industrial complex north of Doha that has grown up around the country's LNG export industry.

The inauguration follows delivery last month of the project's first cargo, carried by the 210,000-cu m Q-Flex vessel Tembek, to the new South Hook terminal at Milford Haven, UK.

Qatargas 2 originally was to have produced its first cargo in late 2007, but mechanical problems and labor difficulties slowed its progress, according to press reports.

The project, according to Qatargas, is the world's "first fully integrated value chain LNG venture." It consists of three offshore unmanned platforms, two of the world's largest LNG trains, each capable of producing 7.8 million tonnes/year, 850,000 tpy of LPG, 140,000 b/d of condensate, five 145,000 cu m storage tanks, and a fleet of 14 Q-Flex and Q-Max ships. Vessels in the latter category can carry upwards of 266,000 cu m of LNG.

Qatargas 2 consists of Trains 4 and 5; each employs Air Product's proprietary APX process technology. It was LNG produced from Train 4 that arrived at the South Hook for use in commissioning the terminal. Ownership in Train 4 is split between Qatar Petroleum 70% and ExxonMobil Corp. 30%. Train 5 is owned by Qatar Petroleum 65%, ExxonMobil 18.3%, and Total SA 16.7%.

Total was a late comer to the project, buying into the project in late 2006. Total also holds 8.35% in the South Hook. QP holds 67.5% and ExxonMobil 24.15%.

Located in West Pembrokeshire in Wales, the terminal is the largest LNG receiving terminal in Europe, according to Qatargas, with capacity of 15.6 million tpy and employing the largest diameter storage tanks in the world. South Hook's sendout will be able to meet up to 20% of current UK natural gas demand, according to project sponsors.

NWS group marks LNG production milestone

The Woodside Petroleum Ltd.-operated North West Shelf joint venture's LNG plant on the Burrup Peninsula near Karratha in Western Australia marks its 20th anniversary this month of LNG production coming on stream. The first shipment of LNG left for Japan in late July 1989.

North West Shelf Australia LNG Pres. Peter Cleary said the original 20-year contracts signed in 1985 with the Japanese had underpinned the development of the LNG production and export facilities. ✦

Letters

Missed an argument

The editorial "Oppose cap-and-trade" missed a vital part of the argument to stop cap-and-trade (OGJ, Mar. 9, 2009, p. 16).

A tax is a simple matter to stop. Putting a cap-and-trade system into place is creating another bureaucracy. As all should know, a bureaucracy never gets undone. It only grows.

Neither system would do anything for climate change. Either of them would be an expensive waste.

Toby Elster
Consulting geologist
Wichita

Platform flyways

The industry cannot thank you too much for publishing "Oil and aviation safety" (OGJ, Mar. 16, 2009, p. 20). Hopefully, responsible parties will buy reprints and circulate them to vital news media worldwide. This would update and support such previous documentaries as the API's "Steel Reefs" film that showed huge fish swarms around marine offshore petroleum drilling and production platforms.

Particular interest should exist, too, in long-distance bird migration across the Gulf of Mexico. Surely there are instances of exhausted birds resting on such platforms, drinking rainwater collected thereon, and doing their own replenishment fishing before proceeding to their destinations. Perhaps intelligent estimates are published of the number of birds with prolonged lives because these platforms exist.

Since air traffic is now monitored on these installations, they might also monitor migratory bird traffic if so instrumented. Such data should be of interest to a big variety of entities—e.g., the Audubon and National Geographic societies—and might be further documented from various other discrete sources.

Harrison T. Brundage
Retired geologist and technical writer
Houston

Calendar

✦ Denotes new listing or a change in previously published information.

OIL&GAS JOURNAL online

Additional information on upcoming seminars and conferences is available through OGJ Online, Oil & Gas Journal's Internet-based electronic information source at http://www.ogjonline.com.

2009

APRIL

GPA Mid-continent Annual Meeting, Oklahoma City, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 16.

Middle East Petroleum & Gas Conference, Dubai, 65 6338 0064, 65 6338 4090 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 19-21.

ERTC Coking & Gasification Conference, Budapest, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 20-22.

Hannover Messe Pipeline Technology Conference, Hannover, +49 511 89 31240, +49 511 89 32626 (fax), website: www.hannovermesse.de. 20-24.

IADC Drilling HSE Middle East Conference & Exhibition, Abu Dhabi, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 21-22.

API Pipeline Conference, Fort Worth, Tex., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 21-22.

Pipeline Transport Conference & Exhibition, Moscow, +43 1 230 85 35 33, website: www.expopipeline.com. 21-23.

Base Oils and Lubricants in Russia & CIS Conference, Moscow, +44 (0) 1242 529 090, +44 (0) 1242 529 060 (fax), e-mail: wra@theenergyexchange.co.uk, website: www.wraconferences.com. 22-23.

Instrumentation Systems Automation Show & Conference, (ISA), Calgary, Alta., (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 22-23.

CPS/SEG International Geophysical Conference & Exposition, Beijing, (918) 497-5500, (918) 497-5557 (fax), e-mail: semery@seg.org, website: www.seg.org. 24-27.

AIChE Spring National Meeting, Tampa, (203) 702-7660, (203) 775-5177 (fax), website: www.aiche.org. 26-30.

API Spring Refining and Equipment Standards Meeting, Denver, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 27-29.

EAGE European Symposium on Improved Oil Recovery, Paris, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 27-29.

ENTELEC Conference & Expo, Houston, (972) 929-3169, (972) 915-6040 (fax), e-mail: blaine@entelec.org, website: www.entelec.org. Apr. 29-May 1.

MAY

EAGE International Petroleum Conference & Exhibition, Shiraz, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 4-6.

Offshore Technology Conference (OTC), Houston, (972) 952-9494, (972) 952-9435 (fax), e-mail: service@otcnet.org, website: www.otcnet.org. 4-7.

GPA Permian Basin Annual Meeting, Austin, (918) 493-3872, (918) 493-3875 (fax), website: www.gasprocessors.com. 5.

Interstate Oil and Gas Compact Commission Midyear Meeting (IOGCC), Anchorage, (405) 525-3556, (405) 525-3592 (fax), e-mail: iogcc@iogcc.state.ok.us, website: www.iogcc.state.ok.us. 10-12.

ERTC Asset Maximisation Conference, Prague, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 11-13.

ACHEMA International Exhibition Congress, Frankfurt, +1 5 168690220, +1 5 168690325 (fax), e-mail: amorris77@optonline.net, website: http://achemaworldwide.dechema.de. 11-15.

IADC Environmental Conference & Exhibition, Stavanger, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 12-13.

North American Unconventional Oil & Gas Conference & Exposition, Denver, (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 12-13.

NPRA National Safety Conference, Grapevine, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 12-13.

International School of Hydrocarbon Measurement, Norman, Okla., (405) 325-1217, (405) 325-1388 (fax), e-mail: lcrowley@ou.edu.Website: www.ishm.info. 12-14.

Uzbekistan International Oil & Gas Exhibition & Conference, Tashkent, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 12-14.

Pipeline Simulation Interest Group (PSIG) Meeting, Galveston, Tex., + 966 3 873 0139, + 966 3 873 7886 (fax), e-mail: info@psig.org, website: www.psig.org. 12-15.

Iraq Oil + Gas Summit, Houston, (202) 536-5000, (202) 280-1239 (fax), e-mail: lwilson@nfemail.com, website: www.New-Fields.com. 13-14.

Louisiana Oil and Gas Symposium, Baton Rouge, (225) 578-8657, (225) 578-9257 (fax), e-mail: hammer@lsu.edu, website: www.brgs.la.org. 19-20.

NPRA Reliability & Maintenance Conference, Grapevine, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 19-22.

IADC Drilling Onshore Conference & Exhibition, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 21.

Gastech International Conference & Exhibition, Abu Dhabi, +44 (0) 1737 855000, +44 (0) 1737 855482 (fax), website: www.gastech.co.uk. 25-28.

APPEA Conference & Exhibition, Darwin, +61 7 3802 2208, e-mail: jhood@appea.com.au. website: www.appea2009.com.au. May 31-Jun. 3.

SPE Latin American and Caribbean Petroleum Engineering Conference, Cartagena, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. May 31-Jun. 3.

JUNE

Caspian International Oil & Gas/Refining & Petrochemicals Exhibition & Conference, Baku, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 2-5.

Asia Oil & Gas Conference, Kuala Lumpur, 65 62220230, 65 62220121 (fax), e-mail: info@cconnection.org, website: www.cconnection.org. 7-9.

AAPG Annual Meeting, Denver, (918) 560-2679, (918) 560-2684 (fax), e-mail: convene@aapg.org, website: www.aapg.org. 7-10.

PIRA Scenario Planning Conference, Houston, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 8.

ILTA Annual International Operating Conference & Trade Show, Houston, (202) 842-9200, (202) 326-8660 (fax), e-mail: info@ilta.org, website: www.ilta.org. 8-10.

International Oil Shale Symposium, Tallinn, Estonia, +372 71 52859, e-mail: Rikki.Hrenko@energia.ee, website: www.oilshalesymposium.com. 8-11.

SPE EUROPEC/EAGE Conference and Exhibition, Amsterdam, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 8-11.

PIRA Understanding Global Oil Markets Seminar, Houston, (212) 686-6808, (212) 686-6628 (fax), website: www.pira.com. 9-10.

GO-EXPO Gas and Oil Exposition, Calgary, Alta., (403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 9-11.

Petro.t.ex Africa Exhibition & Conference, Johannesburg, +27 21 713 3360, +27 21 713 3366 (fax), website: www.fairconsultants.com. 9-11.

Oil and Gas Asia Exhibition (OGA), Kuala Lumpur, +60 (0) 3 4041 0311, +60 (0) 3 4043 7241 (fax), e-mail: oga@oesallworld.com, website: www.allworldexhibitions.com/oil. 10-12.

ASME Turbo Expo, Orlando, (973) 882-1170, (973) 882-1717 (fax), e-mail: infocentral@asme.org, website: www.asme.org. 13-17.

Society of Petroleum Evaluation Engineers (SPEE) Annual Meeting, Santa Fe, NM, (713) 286-5930, (713) 265-8812 (fax), website: www.spee.org. 14-16.

PIRA London Energy Conference, London, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 15.

IPAA Midyear Meeting, Dana Point, Calif., (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org. 15-17.

Calendar

PIRA Scenario Planning Conference, London, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 16.

Atlantic Canada Petroleum Show, St. John's, Newfoundland & Labrador, 403) 209-3555, (403) 245-8649 (fax), website: www.petroleumshow.com. 16-17.

IADC World Drilling Conference & Exhibition, Dublin, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 17-18.

PIRA Understanding Global Oil Markets Seminar, London, 44 1493 751 316, e-mail: miles@pira.com, website: www.pira.com. 17-18.

AAPL Annual Meeting, Clearwater Beach, Fla., (817) 847-7700, (817) 847-7704 (fax). e-mail: aapl@landman.org, website: www.landman.org. 17-20.

IAEE International Conference, San Francisco, (216) 464-2785, (216) 464-2768 (fax), website: www.usaee.org. 21-24.

Society of Professional Well Log Analysts Annual Symposium (SPWLA), The Woodlands, Tex., (713) 947-8727, (713) 947-7181 (fax), website: www.spwla.org. 21-24.

SPWLA Annual Symposium, The Woodlands, Tex., (713) 947-8727, (713) 947-7181 (fax), e-mail: webmaster@spwla.org, website: www.spwla.org. 21-24.

International Offshore and Polar Engineering Conference (ISOPE), Osaka, (650) 254-1871, (650) 254-2038 (fax), e-mail: meetings@isope.org, website: www.isope.org. 21-26.

Asia LPG Seminar, Singapore, (713) 331-4000. (713) 236-8490 (fax), website: www.purvingertz.com. 22-25.

API Exploration & Production Standards Oilfield Equipment and Materials Conference, Westminister, Colo., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 22-26.

Moscow International Oil & Gas Exhibition (MIOGE) & Russian Petroleum & Gas Congress, Moscow, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 23-26.

JULY

Rocky Mountain Energy Epicenter Conference, Denver, (303) 228-8000, e-mail: conference@epicenter2008.org, website: www.denverconvention.com. 7-9.

API Offshore Crane Operations and Safety Conference, Houston, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 14-15.

Oil Sands and Heavy Oil Technologies Conference & Exhibition, Calgary, Alta., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.oilsandstechnologies.com. 14-16.

AUGUST

SPE Asia Pacific Health, Safety, Security and Environment Conference and Exhibition, Jakarta, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-6.

SPE Asia Pacific Oil and Gas Conference and Exhibition, Jakarta, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-6.

EnerCom's The Oil & Gas Conference, Denver, (303) 296-8834, email: kgrover@enercominc.com, website: www.theoilandgasconference.com. 9-13.

*Oil Sands and Heavy Oil Technologies Conference & Exhibition, Calgary, Alta., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.oilsandstechnologies.com. 14-16.

ACS Fall National Meeting & Exposition, Washington, (202) 872-4600, e-mail: service@acs.org, website: www.acs.org. 16-20.

IADC Well Control Conference of the Americas & Exhibition, Denver, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 25-26.

Summer NAPE, Houston, (817) 847-7700, (817) 847-7704 (fax), e-mail: info@napeexpo.com, website: www.napeonline.com. 27-28.

SEPTEMBER

Oil & Gas Maintenance Technology North America Conference, New Orleans, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.ogmtna.com. 1-3.

EAGE Near Surface European Meeting, Dublin, +31 88 995 5055, +31 30 6343524 (fax), e-mail: eage@eage.org, website: www.eage.org. 7-9.

IAEE European Conference, Vienna, (216) 464-5365, e-mail: iaee@iaee.org, website: www.iaee.org. 7-10.

Offshore Europe Conference, Aberdeen, +44 (0) 20 7299 3300, e-mail: nbradbury@spe.org, website: www.offshore-europe.co.uk. 8-11.

✦ GPA Rocky Mountain Annual Meeting, Denver, (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gpaglobal.org, website: www.gpaglobal.org. 9.

GITA's GIS Annual Oil & Gas Conference, Houston, (303) 337-0513, (303) 337-1001 (fax), e-mail: info@gita.org, website: www.gita.org/ogca. 14-16.

Polar Petroleum Potential 3P Conference, Moscow, (918) 584-2555, (918) 560-2665 (fax), website: www.aapg.org. 16-18.

ADC Drilling HSE Europe Conference & Exhibition, Amsterdam, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 23-24.

SPE Eastern Regional Meeting, Charleston, W.Va., (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 23-25.

ERTC Sustainable Refining Conference, Brussels, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. 28-30.

DGMK Production and Use of Light Olefins Conference, Dresden, 040 639004 0, 040 639004 50, website: www.dgmk.de. 28-30.

IADC Advanced Rig Technology Conference, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 29.

Unconventional Gas International Conference & Exhibition, Fort Worth, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.unconventional-gas.net. Sept. 29-Oct. 1.

ERTC Biofuels+ Conference, Brussels, 44 1737 365100, +44 1737 365101 (fax), e-mail: events@gtforum.com, website: www.gtforum.com. Sept. 30-Oct. 2.

OCTOBER

Interstate Oil and Gas Compact Commission Annual Meeting (IOGCC), Biloxi, Miss., (405) 525-3556, (405) 525-3592 (fax), e-mail: iogcc@iogcc.state.ok.us, website: www.iogcc.state.ok.us. 4-6.

SPE Annual Technical Conference and Exhibition, New Orleans, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 4-7.

World Gas Conference, Buenos Aires, +54 11 5252 9801, e-mail: registration@wgc2009.com, website: www.wgc2009.com. 5-9.

ISA EXPO, Houston, (919) 549-8411, (919) 549-8288 (fax), e-mail: info@isa.org, website: www.isa.org. 6-8.

Kazakhstan International Oil & Gas Exhibition & Conference (KIOGE), Almaty, +44 (0) 207 596 5233, +44 (0) 207 596 5106 (fax), e-mail: oilgas@ite-exhibitions.com, website: www.oilgas-events.com. 6-9.

NPRA Q&A and Technology Forum, Ft. Worth, Tex., (202) 457-0480, (202) 457-0486 (fax), e-mail: info@npra.org, website: www.npra.org. 11-14.

API Fall Petroleum Measurement Standards Meeting, Calgary, Alta., (202) 682-8000, (202) 682-8222 (fax), website: www.api.org. 12-15.

✦GPA Houston Annual Meeting, Houston, (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gpaglobal.org, website: www.gpaglobal.org. 13.

International Oil & Gas Exploration, Production & Refining Exhibition, Jakarta, +44 (0)20 7840 2100, +44 (0)20 7840 2111 (fax), e-mail: ogti@oesallworld.com, website: www.allworldexhibitions.com. 14-17.

SPE/EAGE Reservoir Characterization and Simulation Conference and Exhibition, Abu Dhabi, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 18-21.

GSA Annual Meeting, Portland, (303) 357-1000, (303) 357-1070 (fax), e-mail: meetings@geosociety.org, website: www.geosociety.org. 18-21.

SEG International Exposition and Annual Meeting, Houston, (918) 497-5500, (918) 497-5557 (fax), e-mail: register@seg.org, website: www.seg.org. 25-30.

SPE/IADC Middle East Drilling Conference & Exhibition, Manama, +971 4 390 3540, +971 4 366 4648 (fax), e-mail: spedal@spe.org, website: www.spe.org. 26-28.

Louisiana Gulf Coast Oil Exposition (LAGCOE), Lafayette, (337) 235-4055, (337) 237-1030 (fax), e-mail: lynette@lagcoe.com, website: www.lagcoe.com. 27-29.

Offshore Middle East Conference & Exhibition, Manama, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.offshoremiddleeast.com. 27-29.

NOVEMBER

Deep Offshore Technology International Conference & Exhibition, Monte Carlo, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepoffshoretechnology.com. 3-5.

IPAA Annual Meeting, New Orleans, (202) 857-4722, (202) 857-4799 (fax), website: www.ipaa.org. 4-6.

✦GPA North Texas Annual Meeting, Dallas, (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gpaglobal.org, website: www.gpaglobal.org. 5.

Capture and Geological Storage of CO_2 Symposium, Paris, +33 1 47 52 67 21, +33 1 47 52 70 96 (fax), e-mail: patricia.fulgoni@ifp.fr, website: www.CO2symposium.com. 5-6.

IADC Annual Meeting, Miami, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 9-10.

API Fall Refining and Equipment Standards Meeting, Dallas, (202) 682-8000, (202) 682-8222 (fax), website: www.api.org/events. 9-11.

Deepwater Operations Conference & Exhibition, Galveston, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.deepwateroperations.com. 10-12.

SPE International Oil and Gas China Conference & Exhibition, Beijing, (972) 952-9393, (972) 952-9435 (fax), e-mail: spedal@spe.org, website: www.spe.org. 10-12.

ASME International Mechanical Engineering Congress and Exposition (IMECE), Lake Buena Vista, Fla., (973) 882-1170, (973) 882-1717 (fax), e-mail: infocentral@asme.org, website: www.asme.org. 13-19.

IADC Completions Conference, Houston, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 17.

Houston Energy Financial Forum, Houston, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.accessanalyst.net. 17-19.

IADC Well Control Asia Pacific Conference & Exhibition, Bangkok, (713) 292-1945, (713) 292-1946 (fax), e-mail: conferences@iadc.org, website: www.iadc.org. 18-19.

DECEMBER

World LNG Summit, Barcelona, +44 (0)20 7978 0000, +44 (0)20 7978 0099 (fax), e-mail: info@thecwcgroup.com, website: www.thecwcgroup.com. 1-4.

Emerging Unconventional Resources Conference & Exhibition, Shreveport, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.emergingresourcesconference.com. 8-10.

PIRA Natural Gas Markets Conference, New York, (212) 686-6808, (212) 686-6628 (fax), e-mail: sales@pira.com, website: www.pira.com. 14-15.

PIRA Understanding Natural Gas and LNG Markets Seminar, New York, (212) 686-6808, (212) 686-6628 (fax), website: www.pira.com. 14-15.

PIRA Understanding Global Oil Markets Seminar, New York, (212) 686-6808, (212) 686-6628 (fax), website: www.pira.com. 16-17.

2010

JANUARY

Oil & Gas Maintenance Technology Conference & Exhibition Co-located with Pipeline Rehabilitation and Maintenance, Cairo, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.oilandgasmaintenance.com. 19-21.

Pipeline Rehabilitation & Maintenance Co-located with Oil & Gas Maintenance Technology, Cairo, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.pipeline-rehab.com. 19-21.

API Exploration and Production Winter Standards Meeting, New Orleans, (202) 682-8000, (202) 682-8222, website: www.api.org. 25-29.

FRBRUARY

Deep Offshore Technology International Conference & Exhibition, Houston, (713) 963-6271, (713) 963 6296 (fax), e-mail: registration@pennwell.com, website: www.dotinternational.net. 2-4.

✦Laurance Reid Conditioning Conference, Norman, Okla., (512) 970-5019, (512) 233-2877 (fax), e-mail: bettyk@ou.edu, website: www.lrgcc.org. 21-24.

MARCH

Subsea Tieback Forum & Exhibition, Galveston, Tex., (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.subseatiebackforum.com. 2-4.

GPA Annual Convention, Austin, Tex., (918) 493-3872, (918) 493-3875 (fax), e-mail: pmirkin@gpaglobal.org, website: www.GPAglobal.org. 21-24.

Offshore West Africa Conference & Exhibition, Luanda, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.offshorewestafrica.com. 23-25.

APRIL

Rocky Mountain Unconventional Resources Conference & Exhibition, Denver, (918) 831-9160, (918) 831-9161 (fax), e-mail: registration@pennwell.com, website: www.RMURconference.com. 6-8.

Oil & Gas West Asia Conference, Muscat, +968 24660124, +968 24660125 (fax), e-mail: omanexpo@omantel.net.om, website: www.ogwaexpo.com. 19-21

SEPTEMBER

World Energy Congress, Montreal, (514) 397-1474, (514) 397-9114 (fax), e-mail: info@wecmontreal2010.ca, website: www.wecmontreal2010exhibit.com. 12-16..

The voles of Hoo Pen

Warren R. True
Chief Technology Editor-LNG/Gas Processing

As industrial facilities go, LNG terminals are generally among the cleanest and quietest to be found. But every terminal has to start somewhere. And that starting place comes with a history.

It may be the pristine coastal forests of Oregon or Maine. Or, as in the case of the UK's Isle of Grain LNG terminal, it may be a site where earlier industrial activity—and nature—have left footprints.

Beneath the gleaming, visually impressive terminal on the Thames estuary in north Kent lie some legacy effects of the previous tenant, the BP Kent oil refinery. And before even that, some furrier tenants called the site home.

Building the terminal there had to contend with both realities.

What's there

The site of the current terminal began modern (i.e., post-World War II) industrial life as BP's Kent refinery, built in the early 1950s and closed as a refinery in 1983.

Also, the site was home to one of the UK's five LNG peak-shaving plants operated since 1981 by Transco Ltd., part of what then was British Gas, which purchased the refinery land to build an LNG terminal. But increased North Sea gas production torpedoed those earlier terminal plans.

Transco became part of Lattice Group PLC, which in 2002 merged with National Grid Group PLC to form National Grid Transco, parent of Grain LNG. But in late 2000, plans were already forming to build the Grain LNG terminal to address declining natural gas supplies to the UK. That project started up in late 2005.

Grain LNG declined to specify to OGJ what its own environmental surveys found other than to call them "legacy contamination issues" and frequently to note its efforts to "protect ecology" during site development. The company did admit that site access "to protect ecology…was often limited by the presence of asbestos."

Anyone familiar with refinery sites even in environmentally conscious Britain can imagine what else lay on and beneath the surface.

But Grain also cited its efforts in another environmental issue that came with the site.

The Isle of Grain (from Old English greon meaning "gravel") is not an island at all but the north end of the Hoo (OE for "spur of land") Peninsula. A line of sand and clay hills dominates its landscape surrounded by extensive marshland consisting of alluvial silt.

In addition to the anticipated contamination problems Grain LNG faced, it turns out that Hoo Peninsula is, according to the company, one of the "few remaining strongholds in Britain" for water voles.

A water vole, according to the BBC website, is a small mammal that grows to a body length of 5-8 in. and has dark fur, a round body, a short, fat face, and a long, fur-covered tail. Anyone fortunate enough to grow up in the UK since 1908 probably knows something about water voles: A main character in Kenneth Grahame's famous children's book Wind in the Willows is a water vole named Ratty.

Protecting 'Ratty'

But water voles are not rats. More to the point, these mammals' numbers in the UK have been in near freefall for decades. Intrusions of agricultural, industrial, and residential development into their marshy habitats have combined with predation by the American mink (Of course, the culprit has to be American.) to shrink the water vole population to a few 100,000 recently, from an estimated 2 million in 1990, according to several websites that track Ratty's descendants.

The Grain LNG terminal cannot be blamed for being the first industrial intruder on the water vole's habitat, but it has nonetheless taken on responsibility not to aggravate the decline. The company says it has embarked on a coordinated "mink strategy" that involves landowners and statutory authorities working together. "The aim is to maintain the current distribution and numbers of water vole on the Isle of Grain by controlling mink" before they reach the site.

This requires close communication with landowners and other organizations, interested in conserving the creature, about any occurrences of mink within Hoo Peninsula. Efforts also include monthly checks of rafts on site for evidence of mink and prompt trapping if such is reported.

Other environmental sensibilities probably prevent Grain from turning this trapping effort into another profitable sideline. A modern dilemma if there ever was one.

But LNG is a modern commodity—and a clean one. And natural gas can warm almost as well as a mink coat. ✦

Editorial

Recruiting problems ahead

The oil and gas industry fretted about recruitment of engineers and scientists while it was scrambling to hire them in the boom years that now are history. Now it's fretting about the future supply of engineers and scientists as it lays them off by the thousands.

At the RMI Oilfield Breakfast Forum in Houston Apr. 8, RMI Pres. Steve Jacobs asked speakers to identify their greatest immediate worry. Three of the four—chief or high-ranking executives of an oil company, a service firm, and a drilling contractor—responded with, as one of them worded the answer, "keeping talented people." The fourth speaker, an investment analyst, said his main concern was the economy. When business conditions were opposite those of the present, speakers at industry functions routinely said the same thing.

Talent pool

This is no surprise. In good times and bad, the oil and gas industry depends on its talent pool. That it can't keep the pool full when commodity prices crash is a painful business imperative. Managers making layoff decisions don't need to be reminded how much the industry's oscillating employment record hurts.

But a reputation for cyclicality isn't the only obstacle companies will face when they resume hiring, especially for entry-level positions, when the business recovers. The industry's chronic unpopularity is another. And related to that problem is the supposition that oil and gas are yesterday's fuels. Why would anyone contemplating a career or job change stake his or her future on substances thought to be in their dying years?

In the premise of that question, people knowledgeable about oil and gas markets see fatal flaws. But most people in the US, especially young people who haven't studied the subject, do not. They read that the world is running out of oil. They hear government officials talk about switching to renewable fuels to cure a national "addiction" to petroleum. The younger ones have been told since grade school that the use of fossil energy warms the planet dangerously, so any alternative must be superior.

The problem has intensified with a recent onslaught of legislative, regulatory, and budget proposals that seem designed to drive oil and gas out of the energy mix and the industry that supplies fluid hydrocarbons out of the country. Denials by the Obama administration that this is the intention don't align with what's happening. The plan seems to be to shrink access by producers to hydrocarbon resources on federal land and to sap cash from oil and gas companies to fund initiatives in other areas, including heavy subsidization of noncommercial energy.

As has been argued here frequently, the industry has good reason to resist policy errors like these as the threats to national prosperity that they are. But it has a further reason, related to staffing, to fight the notion underlying these moves that the US can afford to treat oil and gas as fuels approaching extinction: No one wants to feel like a dinosaur at work.

Expectations about the death of oil and gas, deliberate or otherwise, are unreasonable. In its Annual Energy Outlook published last month, the Energy Information Administration projects big changes in the US oil market, most related to conservation and renewable fuel. One major change is the cessation of growth in consumption of oil as use of liquid fuels increases by only 1 million b/d between 2007 and 2030 and as ethanol and other biofuels make up the difference.

Course correction

That's a noteworthy course correction. It's also inevitable: Oil consumption can't climb forever. In EIA's reference-case forecast, however, the industry still supplies 14.32 million b/d of crude oil to the US in 2030, including 7.37 million b/d from domestic fields.

These numbers do not indicate an industry likely to disappear any time soon. And future policies can't change them much except at untenable cost. Finding, producing, transporting, and processing the oil and gas that the US will continue to need, no matter what its government does, will require much work for many years. That work, lest anyone forget, must be done by people. ✦

Latin American oil, gas policies remain in flux

Paula Dittrick
Senior Staff Writer

Oil and gas producing countries in Latin America have adopted diverse approaches to energy policy and the extent to which international companies are allowed to invest or operate in conjunction with the various national oil companies.

Rice University's James Baker Institute hosted a Feb. 26 conference in which speakers discussed Latin America's changing energy landscape, which continues to be heavily influenced by economics, geopolitics, and sometimes very localized politics.

Privatization and deregulation were common in the early 1990s as Latin America governments tended to allow increased participation by international oil and gas companies.

Bolivia and Argentina sold their state-owned oil companies while Brazil broke its monopoly. Venezuela shifted toward privatization and deregulation before reverting to resource nationalism—meaning the government sets exploration and production terms.

Mexico is the only country that remains closed to outside oil companies, although it established service contracts in recent years. Recent legal reforms might set the stage to eventually enable international operators to explore and produce in Mexico.

This article provides a brief country-by-county review and examines possible scenarios for energy policy in Mexico, Brazil, Venezuela, and Argentina.

Mexico production dips

Mexico needs to offset declining production in Cantarell field and elsewhere.

Recent energy reform legislation reportedly broadens the flexibility with which state-run Petroleos Mexicanos can arrange contracts.

Contractors and international oil companies are waiting to see what future relationships with Pemex might emerge. Pemex was created after President Lazaro Cardenas nationalized the oil industry in 1938. It remains a monopoly today.

Increases from Chicontepec oil and gas field and Mexico's eventual first forays in the deepwater Gulf of Mexico are expected to help build production. Pemex officials cite Chicontepec as a stop-gap measure pending future deepwater production. The field is in Veracruz and Puebla states.

Total Mexican oil production fell to an average 2.8 million b/d in 2008—the lowest level in 13 years. Pemex expects that 2009 production will average 2.85 million b/d and will return to 3 million b/d in 2015. Mexico's production peaked at 3.4 million b/d in 2004.

Pemex expects to see deepwater production around 2015. It anticipates 92,000 b/d from deep water in 2017, Pemex Chief Executive Jesus Reyes Heroles told reporters in Houston during the Cambridge Energy Research Associates conference.

Reyes Heroles said Pemex plans to drill 27 wells in more than 1,640 ft of water in 2008-12 compared with having drilled six deepwater wells during 2004-07.

In February, Pemex announced a 170-well tender for Chicontepec. The tender's winning bid is expected to be announced in April with work scheduled to start in May.

Chicontepec is a complicated basin where production has been slower than expected, Reyes Heroles and Veracruz Gov. Fidel Herrera Beltran both told reporters in separate visits to Houston. Beltran spoke at Rice University's Latin American energy conference.

Chicontepec pay is an Eocene turbidite with three zones. Wells in the widespread sand are less prolific than wells elsewhere in Mexico, although researchers hope that technology can improve production rates.

Pemex said this month that Chicontepec averaged 707 operating wells in 2008 and 35 drilling rigs as of January 2009. The field's fourth-quarter 2008 production was 30,000 b/d.

Mexico is counting on Chicontepec oil and gas field to help curb the country's declining production. Weatherford International Ltd. was awarded three contracts in 9 months to provide drilling rigs and workover rigs in Chicontepec. Photo from Weatherford.

The goal is to produce some 700,000 b/d by 2017. Pemex said that as of Dec. 31, 2008, Chicontepec had estimated proved reserves of 668 million boe, probable reserves of 8.8 billion boe, and possible reserves of 7.9 billion boe.

Brazil's consistent policy

Two consecutive Brazilian presidents maintained flexible oil and gas regulations and partial privatization of Petroleos Brasileiro SA (Petrobras), said David R. Mares, Baker Institute scholar and a political science professor at the University of California, San Diego.

Former President Fernando Henrique Cardoso established an energy policy that current President Luiz Inacio Lula da Silva supports, Mares said.

Both Cardoso and Lula sought to attract energy investors and to pass along some energy revenues to Brazil's social programs. Lula took office Jan. 1, 2003, and was reelected in 2006, extending his term until Jan. 1, 2011.

"We don't know what is going to happen in Brazil…what combination of privatization and regulatory reforms will provide the best answer," Mares said. "Total privatization for Brazil is not in the cards."

He described Brazil as "very high" on resource nationalism after the mid-1970s. Constitutional reforms in 1995-97 moved Brazil away from resource nationalism. Energy security was a difficult issue in 2002, said Mares, who believes Brazil moved "a little more toward energy nationalism" during 2008. Currently, the Brazilian government is examining how to regulate exploration and drilling in a presalt region off Brazil. Lula commissioned a task force to make recommendations.

Separate from the Rice conference, Brazilian attorney Luiz Antonio Maia Espinola de Lemos foresees two possible scenarios:

- The government could create a state-run company that would manage development of the oil reserves in the presalt through partnerships with any firm, including Petrobras, in exploring the presalt areas yet to be auctioned.
- A second possible plan would focus on raising mining taxes and oil royalties to provide more income from the province. Either change is likely to need ratification by Brazil's Senate, Lemos said.

Brazil plans to invest anticipated additional oil revenues in education and social development. The government also wants additional development of the local oil and gas industry and for Brazil to become self-sufficient with technology, Lemos said.

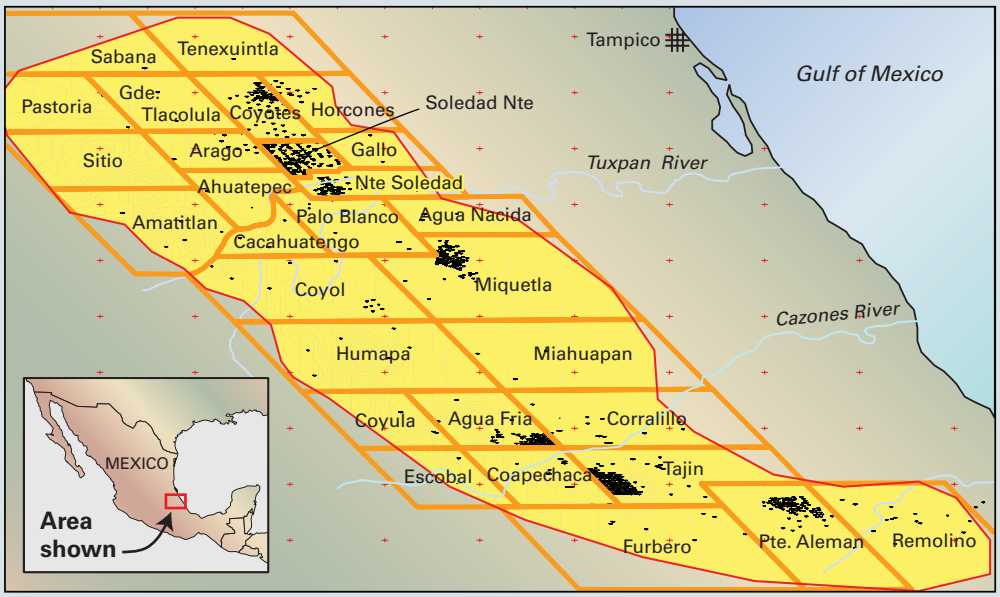
Mares said subsalt development is expensive and technologically risky. Brazil could find it increasingly difficult to raise capital given development expenses combined with tightening credit markets and lower oil prices.

"In these conditions Petrobras's credibility becomes an increasingly important asset because the company's investment will be influenced by Brazil's needs more than would be the case for international oil companies," Mares said.

Chavez changes PDVSA

Venezuela's national politics led to a restructuring of Petroleos de Venezuela SA (PDVSA). Laurence Whitehead, Oxford University's Official Fellow in Politics, said, "The total upheaval that took place in Venezuela is the result of one particular president."

MEXICO CHICONTEPEC FIELD DIVISIONS AND WELLS*



*Wells drilled through 2001.
Source: After Cheatwood & Guzman, 2002

Contractors to accelerate Chicontepec drilling

Pemex is in the process of awarding a series of contracts to service providers and drilling companies to accelerate production in Chicontepec, which was discovered during the 1920s.

The contracts are known as Aceite Terciario del Golfo (ATG). Weatherford International Ltd. was awarded three contracts in 9 months, said Andrew Becnel, Weatherford's senior vice-president and chief financial officer.

A $646 million contract announced Mar. 31 is ATG4. Weatherford will provide 6 drilling rigs and 2 workover rigs. The 3-year contract, scheduled to start June 1, is for 500 wells. The contract calls for Weatherford to provide many services, including directional drilling, fracturing, completions, and artificial lift.

Previously, Weatherford was awarded the ATG1 and ATG2 contracts, each for 300 wells. For these contracts, Weatherford had drilled 119 wells through the end of 2008. Weatherford is using an average of 70% owned rigs with the rest provided by third parties.

ATG1 and ATG2 each involve 10 drilling rigs and 2 workover rigs. Schlumberger was awarded the ATG3 contract.

Becnel said Weatherford can drill a well in Chicontepec field in 8-18 days, down from 60 days when Pemex began developing the field. Pemex's recovery factor is 7% so far, but Weatherford expects to improve that.

Evolving drilling technology has improved the economics of Chicontepec pay, which is an Eocene turbidite with three zones. Wells in the widespread sand have been less prolific than wells elsewhere in Mexico.

Pemex aims to produce 700,000 b/d from Chicontepec by 2013-15. Government officials cite production at 30,000 b/d as of Dec. 31, 2008. Pemex wants to drill 1,200-1,500 wells/year for 10 years

Venezuelan President Hugo Chavez initiated administrative changes in the oil company following a December 2002 oil workers strike in which PDVSA senior executives participated.

Putting the government's national development policy ahead of PDVSA's commercial strategy, Chavez appointed Rafael Ramirez as both petroleum minister and PDVSA director. Two thirds of PDVSA's budget was dedicated to social welfare.

Chavez raised taxes and royalties and altered the contract regime. Private oil companies had to convert contracts into PDVSA joint ventures in which PDVSA takes more than 50% interest and acquires all production.

Ramon Espinasa, a consultant for the Inter-American Development Bank, told the Baker Institute's Latin America conference that Venezuela's production has fallen steadily since 2005.

"That is a consequence of the massive loss of knowledge stemming from the strike," Espinasa said, noting that he spoke only on behalf of himself rather than as a bank representative.

"PDVSA as it was cannot be recreated," Espinasa said. He suggested PDVSA needs a different regulatory model, perhaps one patterned after Norway's.

Argentina's energy reforms

Energy policy reforms were part of a broader overall reform that Argentina launched in 1990 when most state companies in all industries were privatized (OGJ, Dec. 2, 2007, p. 20).

Argentina will have a new president in 2011, said Mark Jones, a Rice Uni-

until reaching a total of 15,000-17,000 wells.

For comparison, Pemex drilled an average 675 wells/year during the last 5 years across all its basins.

Becnel compares the geology of Chicontepec with the Denver basin in the US. He noted that the 17,000 wells Pemex plans to drill in Chicontepec represent the largest integrated project worldwide today of which he is aware.

Weatherford and other contractors are helping accelerate the pace of drilling and production. Weatherford moved 20 rigs into Mexico within 6 months and had to build a new, 50,000 sq ft base to service the project. Roads and drilling sites must be built in many circumstances to get the rigs into place.

"By the end of this year, Weatherford should have more than 30 rigs running in the field," Becnel said. Each Weatherford rig is expected to drill on average 2.5 wells/month for a total peak run rate of about 70 wells/month.

A typical pad has 10-18 wells. A few wells will be vertical or horizontal, but most will be directional in an S pattern with vertical upper and lower sections to achieve 4- to 8-acre spacing in the reservoir. Bottomhole locations are 200-800 m apart, said Peter Fontana, Weatherford vice-president for Latin America.

The field is divided into eight blocks of which Weatherford is drilling in six. True vertical depth of the reservoir is 2,500-3,000 ft in the northwest and 7,500 ft in the southeast.

Footage per well at 7,500 ft TVD depends on the displacement and can be as much as 9,000 ft. Maximum wellbore angle is 45° except in the horizontal wells.

Fontana said standard hydraulic fracturing has been used so far in the field, which is an old seabed canyon that nears 60 km by 150-200 km. Multiple layers of sand are embedded with shale.

He said the pay is 1,200 ft thick at the thickest portion and requires several frac stages to yield 14-24° gravity oil.

Weatherford's fracs will use nitrogen or carbon dioxide to recover the frac fluids. The Switzerland-based company is scheduled to introduce the use of coiled tubing drilling into the field this month. This will be the first time coiled tubing drilling has been used in Chicontepec. Weatherford has its own frac equipment and its own coiled tubing units.

Flush production rates vary widely. A well can start producing at 300-400 b/d but then it settles down to about 150 b/d on artificial lift.

Pemex is putting out tenders for artificial lift systems. The main type has been sucker-rod beam pumps, but Pemex is moving toward using more progressing cavity pumps.

versity political science professor.

"From a business perspective, any contract signed now might not be honored by the next president," Jones said. Currently, the provinces grant oil and gas licenses to foreign companies, but the national government retains jurisdiction over national energy policy.

Price controls on oil and gas have discouraged some outside investors since late 2001 when Argentina experienced an economic downturn and a currency crisis.

During the 1990s, Argentine companies could market freely within the country or could export production at unregulated prices. This attracted billions of dollars invested in exploration, development, and infrastructure. After 2001, Argentina reregulated domestic prices while curtailing some exports and taxing others.

"It looks like Argentina is going to become a net petroleum importer," Jones said, adding that the country already is a net natural gas importer.

Apache Corp. of Houston recently said Neuquen Province extended the company's eight oil and gas concessions for 10 more years. Those concessions, covering 590,000 acres, would have expired in 2015-17.

In exchange, Apache agreed to pay a $23 million bonus, increase the provincial royalty to 15% from 12%, and spend up to $320 million in a future work program. Apache plans to pursue similar extensions for concessions on Tierra del Fuego. ✦

Low oil prices pinching Venezuela, minister says

Eric Watkins
Oil Diplomacy Editor

Venezuelan Finance Minister Ali Rodriguez Araque said the drop in world oil prices will cause budget revenues of his country to be reformulated as well as changes in economic growth estimates, which are now 1-2%.

In an interview with Caracas's El Universal newspaper, Rodriguez—a former minister of oil for Venezuela—said the country's projected revenues have been adjusted to 156.38 billion bolivares ($72.8 billion) due to the drop in oil prices to $40/bbl from $60/bbl.

Rodriguez said the main variable in planning now "is the scenario of global crisis and the effects it might have on the oil market." But he offered reassurances, saying that "Venezuela, thanks to its much-maligned exchange controls, has a sort of wall that the strong waves of this global tsunami have crashed against."

With the exception of the Stanford fraud case, he said, "depositors here have not suffered the slightest anxiety over losing their savings." He said, "The Venezuelan financial sector is very solid."

For the most part, Rodriguez sup-

ports efforts by the Organization of Petroleum Exporting Countries to shore up oil prices by reducing production. "So far the measures that OPEC has taken have managed to stop the drop in oil prices, but there is still no indication of a recovery, and it is still too soon to know how much the oil sector might be affected by a drop in demand," he said.

"There might be further drops in oil prices if the global recession gets even worse and that would be the variant that could lead us to think of any other [governmental] measure" to take, he told the paper.

As for the oil price necessary for the government to meet expenses, Rodriguez said, "We have already implemented a cut to $40/bbl, and we need to maintain a minimum of $40 for the Venezuelan basket. For the moment we would like to reach an average of $60 for the year, but it all depends on how things go."

The price of Venezuela's gasoline, which is scheduled to rise, was a sore point with the minister. "Over here we are paying for people to consume gasoline, which is a brutal waste," he said. "Those prices do not cover the cost of extraction, transportation, refining, and the distribution of the gasoline in gas stations."

Continuing about gasoline, Rodriguez said that Venezuela's "domestic market is already 650,000 bbl, which is brutal, and it goes without saying that an adjustment will have to be made, but it will have to be made at the right time." ✦

Japan, Venezuela agree on oil, gas developments

Eric Watkins
Oil Diplomacy Editor

Japan and Venezuela, following meetings in Tokyo between Venezuelan President Hugo Chavez and Japanese Prime Minister Taro Aso, have agreed to investments of $33.5 billion to develop oil and gas projects in Venezuela for Japanese markets.

"Japan needs oil. Venezuela wants to diversify its market. Japan is ideal for us," Chavez said, adding that the two countries plan to cooperate in 12 projects altogether over the next 5 years, including one of $8 billion on a block in the Orinoco belt.

Chavez said he wants to supply Japan "in the future" with 1 million b/d of oil—about one third of the South American nation's current oil production, according to official figures.

Among the agreements, Venezuela's state-owned Petroleos de Venezuela SA (PDVSA) and Japan's Inpex Corp.; Mitsubishi Corp.; and Japan Oil, Gas & Metals National Corp. agreed to a 2-year study to determine the precise reserves of the Junin 11 Block and the cost of extracting its oil.

Venezuela says Junin 11 Block is confirmed to hold 35 billion bbl of oil, with reserves of 6 billion bbl and a long-term expected production level of 200,000 b/d.

PDVSA also signed a memorandum of understanding (MOU) with Japanese trading houses Mitsubishi, Mitsui, Itochu, and Marubeni for the development of natural gas fields in the offshore Proyecto Mariscal Sucre region, which is dedicated to Venezuela's first LNG train.

"With this group as a Japanese consortium, we aim to spend the next month analyzing data provided by Venezuela, with a view to making a development proposal," said Seiji Kato, executive vice-president and chief executive officer of Mitsubishi's energy business group.

"As the region seems to have confirmed massive gas reserves, it may take us more than one month to analyze the data," Kato told journalists in Tokyo.

PDVSA holds a 60% stake in the gas fields, and the remaining 40% will be shared by other stakeholders, possibly Qatar Petroleum (QP) and a selection of Japanese companies, according to Venezuelan Energy Minister Rafael Ramirez.

A variety of partners have signed up for the $12 billion LNG project, which would be comprised of two 4.7-million tonnes/year gas liquefaction plants.

Train 1 partners include PDVSA 60%, Portugal's Galp Energia (GALP) 15%, Chevron 10%, QP 10%, and a Mitsui-Mitsubishi joint venture 5%. Train 2 partners include PDVSA 60%, GALP 15%, Enarsa of Argentina 10%, a joint venture of Mitsubishi and Mitsui 5%, and Itochu 10%.

State-owned Japan Bank for International Cooperation (formerly the Export-Import Bank of Japan) signed an MOU to consider lending PDVSA $1.5 billion to fund expansion of its 140,000 b/d El Palito and 200,000 b/d Puerto La Cruz refineries. Japanese trading houses Mitsubishi Corp. and Itochu also pledged $750 million for each refinery.

PDVSA signed an MOU with Marubeni to jointly study different financing possibilities for industrial facilities, which could be installed near the extra-heavy oil upgraders in Carabobo and Junin blocks in Venezuela's Orinoco belt.

Japan and Venezuela also have created a $4 billion investment fund, which would be part of a larger package of investment in oil, petrochemicals, and LNG production.

On a visit to Tokyo in March, Ramirez met with Japan's Economy, Trade, and Industry Minister Toshihiro Nikai and signed a memorandum aimed at deepening their cooperation in the area of energy development (OGJ Online, Mar. 20, 2009). ✦

Putin: OAO Transneft to complete ESPO's first phase 'within weeks'

Eric Watkins
Oil Diplomacy Editor

Russia's Prime Minister Vladimir Putin on Apr. 7 said state-owned pipeline operator OAO Transneft will complete construction of the first phase of the East Siberia-Pacific Ocean (ESPO) oil pipeline "within weeks."

"In just a few weeks, the phase during which the pipeline will reach the Chinese border will be over and we will go further to the Pacific Ocean," Putin told Russia's parliament.

The news will be welcomed in China, which recently completed negotiations with Russia for a 67-km pipeline spur to run from the line's Phase 1 endpoint at Skovorodino to the Chinese border (OGJ Online, Mar. 9, 2009). From the border, the Chinese also plan to construct a 960-km pipeline link to Daqing.

Putin's remarks echoed statements last week that construction of an oil railway terminal in Skovorodino will be completed by this August.

Officials said the first test trains will begin running in October to Primorye from the Skovorodino station, which initially is designed to pump 15 million tonnes/year of oil, eventually increasing to 30 million tonnes.

The officials said that 11 sets of railway tracks will be laid at the station for pumping oil into tank cars, maneuvering in dispatching loaded trains, and other technical purposes.

Under construction also are an automated oil delivery and receiving point along with related transport facilities. As many as 10 trains/day will depart from Skovorodino to deliver oil to the export terminal at Kozmino on Russia's Pacific Coast. Meanwhile, OAO Rosneft last week said it will finish building a pipeline from its giant, newly developed

WATCHING THE WORLD

Eric Watkins, Oil Diplomacy Editor

Blog at www.ogjonline.com

Showdown in Uganda?

Is a showdown looming in Uganda? The oil and gas industry has heard much recently of developments in the country, not least the desire on the part of Ugandan officials to develop a refinery instead of an export pipeline.

Well, it seems things are coming to a head as the country considers ways of taking more control over its budding oil and gas industry with the establishment of an oil and gas policy, to say nothing of a national oil company.

According to consultant IHS Global Insight, Uganda's Energy and Mineral Development permanent secretary Fred Kabagambe-Kaliisa last week announced the government's intentions with an overhaul of the oil and gas policy to be implemented before the end of the year. The pending Resource Management Law and Revenue Management Law would see the establishment of a new institutional framework separating policy from regulation and commercial activities. It would also see the creation of a state-owned Uganda Oil Co.

Refinery needed

"Uganda's government officials all talk of the country's need to be able to refine its own crude, and it seems intent now on constructing a commercial refinery which would require a multibillion dollar investment," said the consultant.

In fact, IHS Global Insight now strongly believes that "the Ugandan government is unshakeable in its belief that a refinery will be constructed; it is now only a question of how large the facility will be and what product slate it will have."

Apparently the Ugandans are emboldened by the results of a 2007 study conducted by the East African Community that identified regional demand of about 150,000 b/d of petroleum products, a figure that is growing at 5%/year. While IHS Global Insight sees some merit in the idea of a Ugandan refinery, it nonetheless points out that any commercial-scale refinery would cost billions of dollars and would take many years to pay back the investment.

Key concern

As a result, it says, "this strategy would not benefit Uganda in the short term as the country's key concern is to monetize its assets in order for the country to make progress as quickly as possible."

Another vital issue is the actual size of Uganda's crude reserves, an answer that will not be known until considerable further exploration has taken place over the next few years. Enter the international oil company.

"We can't just go with a 'big bang' solution," said Ian Cloke, exploration manager of Tullow Oil's operations in Uganda. "We've got to understand the reservoirs and how they'll perform," he told a recent conference in East Africa.

Uganda clearly does have a number of key decisions to make over the coming months and years on how best to develop its crude reserves. Before making such decisions, though, the government would do well to know just what its reserves actually amount to.

What's the old saying? The one about not counting your chickens until…? ✦

Vankor field in the Krasnoyarsk territory to the Transneft pipeline network by mid-April.

"We'll complete the last weld by Apr. 15," said Rosneft Chief Executive Sergei Bogdanchikov. "We've literally 6 km left," he told Russia's Vesti TV. "This will be a key event because it means the project is going well," he said.

Vankor field, which will be the main source of oil for the ESPO line, has estimated reserves of 200.4 million tonnes and probable reserves of 233.7 million tonnes.

"This is the biggest field in Russian history, and its launch will be a massive event," said Bogdanchikov, who noted that production from the field will begin in the third quarter.

He also said Rosneft and Transneft will sign an oil-trading contract by Apr. 10, under which Rosneft plans to sell the crude to Transneft, which will then repay China's loan.

In February, Russia and China initialed an agreement on building the ESPO pipeline spur, with China granting loans of $10 billion and $15 billion to Transneft and Rosneft respectively for 15 million tonnes/year of oil for 20 years (OGJ Online, Feb. 17, 2009).

Half of the planned 30 million tonnes of oil shipped to Skovorodino will be diverted to China along the 67-km pipeline spur and the other half will be moved by rail on to Kozmino until Phase 2 of the line is completed.

ESPO's first phase—2,700 km from Taishet to Skovorodino—is scheduled to start operating late this year, while ESPO's second phase, extending another 2,000 km from Skovorodino to Kozmino, is due to be completed by 2015. ✦

Hearing provides preview of US energy commodity reform

Nick Snow
Washington Editor

A US Senate Energy and Natural Resources subcommittee hearing on Mar. 25 showed the steps one congressional energy commodity reform advocate would like the federal government to take.

"We are here today to examine two pieces of proposed legislation that will help prevent future energy price bubbles and market manipulation," said Sen. Maria Cantwell (D-Wash.), who chairs the Energy Subcommittee.

The first, S. 672, which she introduced on Mar. 24, would give the Federal Energy Regulatory Commission authority to issue cease-and-desist orders against manipulative schemes in progress. The US Securities and Exchange Commission and Commodity Futures Trading Commission already have this authority, she noted.

She said the bill also would enable FERC to freeze the assets of any entity suspected of market manipulation. It would give the commission authority to temporarily change or suspend power rates for up to 30 days during an energy emergency caused by market manipulation. And it would have any potential natural gas refund accrue from the time FERC brought a case instead of when it actually proves it, an approach currently used in electricity markets, according to Cantwell.

"It will allow FERC to act more like a cop catching a robbery in progress instead of trying to piece together what happened at a crime scene after the fact," she said.

EPACT authority

The 2005 Energy Policy Act (EPACT) gave the utility regulatory commission its initial authority to investigate and prosecute energy market manipulation, and FERC has used this authority to conduct 135 investigations resulting in 27 settlements totaling $65 million in civil penalties, Cantwell said.

She said FERC's enforcement actions against Amaranth Advisors LLC for allegedly manipulating markets under this authority resulted in $291 million in civil penalties. "However, I understand that in the case of Amaranth, this hedge fund liquidated its assets before FERC could complete its enforcement action, leaving little left for FERC to collect: only the $291 million in penalties it originally sought. That falls quite short of the estimated $9 billion Amaranth's shenanigans cost natural gas consumers," she said.

FERC would welcome this additional authority, according to one of the hearing's witnesses, Anna Cochrane, acting director of the commission's enforcement office. "Congressional action to give the commission cease-and-desist authority for violations of the [Federal Power Act] and [Natural Gas Act] and the ability to freeze assets of entities that violate the market manipulation rules would give the commission the same enforcement tools that both the SEC and CFTC have long possessed. In addition, authority to temporarily suspend market rules on file under the FPA when necessary to protect against potential abuse of market power could be useful," she said in her written statement.

Cantwell said that while S. 672 would give FERC necessary new tools for fighting energy market manipulation, other steps need to be taken. "We need to make the line of what is and what isn't acceptable market behavior brighter. This will ensure markets function more efficiently and effectively," she said.

She pointed out that when the subcommittee held a related hearing on energy markets in September, the price of gasoline was around $3.85/gal. "Now, just 6 months later, the price has dropped almost exactly in half to a national average of $1.96/gal. In these challenging economic times, every

American is thankful that energy prices are closer to historical levels. But they still wonder: What happened?" Cantwell said.

Close correlation

She said another of the witnesses at the hearing, Robert F. McCullough Jr., managing partner at McCullough Research in Portland, Ore., detected a close correlation between financial and physical oil markets last year, in contrast to the US Energy Information Administration, which based its conclusions on factors influencing supply and demand.

"Thanks to his work, and several hearings this committee has held in previous years, we have learned that we don't have the necessary data collection or focus to understand what really drives oil market prices. All we really know now is that supply-and-demand is only part of the equation," she said.

Cantwell said the second legislation the hearing would examine would establish an office within EIA to collect and analyze information from physical and paper oil markets. This would improve EIA's ability to predict future energy prices and help regulators police markets more effectively, she said.

In his written testimony, McCullough said no federal agency has been directed to investigate and explain last year's extraordinary crude oil price changes despite oil's arguably being the US economy's most important commodity.

"The inability of the federal government to fully investigate oil price behavior in 2008 is fundamentally a data problem. Perhaps it is not a coincidence that oil is the most opaque of our nation's energy supplies. The transparency legislation that you are discussing today is a step in the right direction because it will expand EIA's ability to track oil inventories within the US by owner," he said.

Difficult and expensive

Howard K. Gruenspecht, EIA's acting administrator, testified that efforts are under way to develop data about short-term price impacts beyond supply and

Two views of line proposal

A proposal by US Sen. Maria Cantwell (D-Wash.) to amend a section of the Natural Gas Act so interstate gas pipelines would be subject to the same refund procedures as electricity suppliers has drawn differing reactions.

"Simply put, the current system is broken. It favors pipelines over consumers by allowing pipelines to keep overcharges rather than giving consumers their money back when their rates are shown to be excessive," said the American Public Gas Association and 19 other groups in an Apr. 6 letter to Senate Energy and Natural Resources Committee Chairman Jeff Bingaman.

The issue is much more complex, the Interstate Natural Gas Association of America said on Apr. 2. It goes to the core of the relationship between gas pipelines and federal regulators, the ability to raise private capital to expand systems, and the importance of such investments to US energy, environmental, and economic goals, said INGAA Pres. Donald F. Santa Jr.

"The natural gas model of regulation embodied in the NGA is not broken.... The current regulatory system for natural gas pipelines works well," he said in his own letter to Bingaman.

Key difference

APGA and the other groups said the Federal Power Act gives the Federal Energy Regulatory Commission authority to order refunds from electricity suppliers from when the complaint was filed. They said that NGA Section 5 states that a gas pipeline rate reduction can occur only after FERC issues an order, which can be years later.

"It makes no sense to allow pipelines to continue to keep billions of dollars of consumers' money, especially in the current economic climate. Instead of going to the pipelines' shareholders, these dollars should be rightfully returned to consumers," they argued.

Santa pointed out that the refund authority, which was added to the FPA in 1988 and amended in 2005, was a direct response to complaints about wholesale electricity prices, which can increase dramatically and fluctuate due to market volatility.

'Largest portion'

Interstate gas pipeline rates reflect only the cost of transporting the gas, he said. "The largest portion of the consumer bill is the unregulated cost of the gas itself, which would be unaffected by the results of a complaint against an interstate pipeline," he said.

While overall gas pipeline transportation costs are low, delivery system bottlenecks can significantly affect prices and volatility, Santa continued. Interstate gas pipelines are, by their very nature, capital-intensive projects where investors depend on rate certainty to recover their financial commitments, he said.

"A growing number of energy experts advocate using the NGA as a model for reforming the FPA to facilitate expansion of the electric transmission grid. It is easy to understand why," he added. According to FERC, about 1,000 miles of high-voltage electric transmission have been built in the US since 2000, compared with more than 10,800 miles of gas transmission pipeline, Santa said. ✦

demand. He also warned that adopting procedures outlined in the market transparency bill could prove to be both difficult and expensive.

He said that earlier in March EIA held a workshop on the relationship between futures and financial market activity and the underlying physical market for crude oil with staff members from the CFTC, Federal Reserve Board, Government Accountability Office, and International Monetary Fund. Presentations and discussions highlighted several points, including the need for better and more accessible data on trader activity, the need to examine alternative theories of trader behavior, and the need to continue examining the role of fundamentals with better and more accurate data.

"Looking ahead based on our current understanding, EIA staff believe that effective analysis of the effects of trading on resulting prices will require not only better data, but a much stronger theoretical approach as well. Analysts within and outside EIA continue to grapple with understanding the gap between very short-term and longer-term price formation. A comprehensive theory of how trader behavior affects longer-term prices is simply not well developed. Without a well-developed theory, analysts are reduced to data mining and testing unformed hypotheses," Gruenspecht said.

Limited availability of aggregate data which can be used to track trader strategy and behavior compounds the challenge, he continued. "In the most obvious example, the position information that the CFTC publishes is separated into categories of commercial and noncommercial traders, categories that do not map cleanly to hedgers and speculators. Without a way of identifying trades and positions taken for speculative purposes, direct analysis of the effects of speculation on price formation is not really possible," he said. ✦

DOI offers initial estimates of OCS oil and gas figures

Nick Snow
Washington Editor

The US Outer Continental Shelf holds an estimated 66-115 billion bbl of oil and 362-565 tcf of natural gas, the US Department of the Interior said.

The agency, which began regional OCS meetings Apr. 6, noted the figures contain significant data gaps.

Estimates of technically recoverable reserves were based on a regional assessment of the entire OCS that the US Minerals Management Service completed in 2006.

These estimates also include assessments of new areas identified for inclusion in the 2010-15 draft proposed 5-year OCS leasing program.

The numbers should be considered general indicators and predictors of oil and gas potential, said a report that MMS developed in response to a Feb. 10 order by US Interior Secretary Ken Salazar.

MMS noted new areas in the Atlantic, eastern Gulf of Mexico, Pacific, and Alaska OCS were identified for inclusion in the draft proposed 5-year oil and gas program.

Salazar added 6 months to the public comment period and broadened its scope to include renewable and alternative energy sources. He also scheduled public meetings in each of the four OCS planning areas during April.

"Although leasing has not occurred in these areas for about 25 years, previous exploration has occurred in portions of these areas and some contain active leases with producing oil and gas fields. Updated research and exploration regarding the likely location of energy resources and environmental impacts are necessary to fill in data gaps," the report said.

Hydrocarbon endowment

MMS undertook the 2006 OCS assessment under a provision of the 2005 Energy Policy Act. Mean estimates of the total OCS hydrocarbon endowment were 115 billion bbl of oil and 633.6 tcf of gas, or a total of 228.2 billion boe. More than 18% has been produced and another 11% is contained within various resource categories representing near-term and midterm production.

"Notably, even after more than 50 years of exploration and development on the OCS, 70% of the mean boe total endowment is represented by undiscovered resources. More than half of this potential exists in areas of the OCS outside of the central and western Gulf of Mexico," the report noted.

Of the estimated undiscovered technically recoverable resources on the OCS, the largest amounts are in the Gulf of Mexico (41.21-49.11 billion bbl of oil and 218.83-249.08 tcf of gas) and offshore Alaska (8.66-55.14 billion bbl and 48.28-279.62 tcf), said the 2006 assessment.

For the 2010-15 draft proposed program, estimated economically recoverable resources under prices of $60/bbl and $6.41/Mcf totaled 52.16 billion bbl and 200.85 tcf. The amounts rose to 64.85 billion bbl and 270.43 tcf at $110.74/bbl and $11.74/Mcf, and 70.79 billion bbl and 307.04 tcf at $160/bbl and $17.08/Mcf.

The report also examined potential contributions from wind, wave, and tidal energy operations on the OCS. The Atlantic OCS has the greatest renewable energy potential of the four planning areas, with offshore wind power likeliest to make a substantial contribution in the next 5-7 years, it said.

Atlantic concentration

"Substantial wind resources exist offshore the Atlantic Coast, near high-energy demand centers. Strong wind

resources also exist offshore California, Oregon, Washington, and Hawaii, but it appears that the majority of this resource lies in deep waters where technology constraints are potentially significant," the report said.

Alaska also has ocean areas with outstanding renewable energy resource potential, but they are not expected to be developed in the near term because of harsh weather and their distance from high-energy demand centers, the report added.

It also identified several safety and environmental factors that could restrict OCS energy development. Oil spills were cited as a major concern but spill-prevention efforts are believed effective.

Understanding sea floor habitats will be important in leasing decisions for renewable and traditional energy resource development, the report said. Some information already has been gathered, but there are significant data gaps for a number of areas, it indicated.

"In some cases, exploration seismic surveys for oil and gas production, followed by required site-specific, high-resolution hazard surveys, could provide detailed information about the seabed with regard to drilling hazards as well as for evaluating benthic habitats."

Coastal impacts

The report also cited coastal impacts ranging from wetland losses along the US Gulf Coast to heavily developed or protected Pacific Coast areas that reduce options for pipelines or utility corridors to support shore-based construction.

"While there are refineries and ports capable of supporting heavy industry, for the most part the Atlantic region lacks existing onshore infrastructure geared to supporting offshore activity. Additionally, a significant portion of the coast, except portions of South Carolina and Georgia, are either developed or are state or federally protected shorelines," the report said.

Potential oil and gas impacts on fisheries range from damage caused by accidental oil spills to space-use conflicts, habitat alterations, and seismic surveys.

"Key challenges for renewable energy development common to all OCS areas include offshore space-use conflicts, artificial reef effects, habitat alteration, noise from pile driving, and effects from electromagnetic fields," the report said.

In addition to seismic surveys that will be necessary to close gaps in OCS oil and gas resource evaluation, the report said offshore renewable energy technologies are still developing, so standardized protocols and technical design criteria are needed.

"The experience, knowledge, and tools exist to ensure that offshore energy development is developed in a comprehensive and environmentally sound manner. By obtaining stakeholder input (locally and nationally), compiling existing information, and acquiring new data where needed, conducting objective analyses using monitoring data to manage adaptively, and applying the necessary mitigations and safeguards along the way, we can achieve our national energy, economic, and environmental goals," the report said. ✦

EIA conference: Ample US natural gas supplies pose challenges

Nick Snow
Washington Editor

US natural gas supplies are sufficiently ample that prices should continue in the $4-6/Mcf range for the near term, market observers said Apr. 7 during the US Energy Information Administration's 2009 annual conference.

"Any perception that domestic supplies could run short is wrong, especially with the growth of hydraulic fracturing. Instead, we're in a much more difficult period of determining how and when this impressive national asset can be developed. The industry must develop a simple, incisive message," said Rick Smead, a director at Navigant Consulting Inc.

Other panelists suggested that demand for gas to generate electric power could grow if the administration of President Barack Obama exerts pressure through the US Environmental Protection Agency to close older coal-fired power plants in an effort to reduce carbon emissions.

"There's a lot of schizophrenia driving natural gas. There's a push for renewables that may create some demand. There also are several pro-gas people in the administration, and still others who would like to regulate hydraulic fracturing under the Clean Water Act," said Christine Tezak, an independent consultant who formerly was with the Stanford Cos.

"It could not be more serendipitous for the Obama administration to have prices around $4[/Mcf] because it makes it easier to switch if pressure builds to shut some coal-fired generation down," Tezak said.

Demand for gas to provide backup supplies to intermittent power sources such as wind and solar also could grow, according to Brian Jefferies, executive director of the Wyoming Pipeline Authority. He suggested that states with extensive oil and gas production experience could compete aggressively to develop policies to encourage gas production from shales.

"There is a lot more gas supply than demand. From 2005 to 2008, we added more deliverability than all the oil we import from Saudi Arabia," said James Simpson, vice-president of analytics and managing director at Bentek Energy LLC.

In the Haynesville shale play, technology is making gas that was bud-

geted at $7/Mcf producible at $4/Mcf, Simpson said. "Now, for the first time, the industry can ramp up and down in fairly small increments," he said.

Other panelists suggested that additional LNG could reach US markets despite low prices because of falling demand in Europe and Asia. But they were skeptical that economics would justify building a gas pipeline from Alaska's North Slope to the Lower 48 states any time soon, although some said demand for gas within the state could lead to construction of pipelines there. ✦

Nanotechnology seen boosting recovery factors

Bob Tippee
Editor

Nanotechnology, the control of matter on the atomic and molecular scale, might someday boost the average global recovery factor of oil and gas by 10 percentage points, said an oil company executive at the RMI Oilfield Breakfast Forum in Houston Apr. 8.

Paul Ching, chairman, chief executive officer, and president of Meridian Resource Corp., Houston, described nanotechnology research conducted by the Advanced Energy Consortium (AEC) at the University of Texas at Austin, where he is executive advisor.

Ching said nanosensors have the potential to assess rock and fluid properties from inside the pore spaces of reservoirs.

He estimated the possible gain in average recovery factor, which he put at 28-30% now, in response to a question. Responding to another question, he estimated that commercial use of downhole nanosensors might begin in 5-10 years.

Research in the use of nanotechnology in the oil and gas industry is more advanced for materials and fluids, he noted, predicting an "explosion" in application of the technology in those areas in the next 5 years.

Among other speakers:

• Dan Pickering, copresident of Tudor, Pickering, Holt & Co. Securities, predicted an extended period of business difficulty in the oil and gas business, saying, "This is not a V-bottom environment."

The market for natural gas, he said, "will get worse before it gets better."

But a drilling response already in progress in the US foreshadows a gas market turnaround. The weekly average number of rigs drilling for gas has fallen to about 800, only one third of capacity. To keep US gas supply in balance with demand, Pickering said, the gas rig count needs to be 1,000-1,100.

The oil market will rebound before gas, he said. Globally, production at 85 million b/d is 95% of total capacity.

"When demand gets better it's pretty easy to close up a 5% gap," he said. "Oil to us feels tighter than gas over the next 3, 4, or 5 years."

• Derek Mathieson, vice-president and chief technology and marketing officer of Baker Hughes, noted that the oil and gas market strength that ended last year generated "significant growth in technology" and accelerated development from collaboration among service and operating companies.

But the downturn, he said, has created "negative forces" including excessive reductions in technology budgets, layoffs of engineers and scientists, dominance of price in purchase decisions, slow adoption of new technology because of diminished access to drilling sites and fewer collaborative projects, and what he called "management distraction from the value of technology."

• Steven Newman, president and chief operating officer of Transocean, expressed optimism about long-term prospects for deepwater drilling.

For now, the "midwater" market is "more of a challenge," he said, although longer term prospects are good "because nobody's building midwater rigs now."

He expressed "concern" about the jack up market because demand is decreasing while the supply of rigs continues to increase.

He noted the growing importance of national oil companies for drilling contractors and the industry in general and said that, as they expand operations in their own countries and elsewhere, companies of that type "are looking for more than just a rig." ✦

Minister: Qatar to complete North field study in 2012

Uchenna Izundu
International Editor

Qatar expects in 2012 to have the results from its study analyzing the effects of its gas projects from the major North gas field, Qatar's petroleum minister told OGJ.

"It is too early to share any results of the study," Abdullah Bin Hamad Al-Attiyah said at the OPEC International seminar in Vienna. North field will be producing 25 bcfd by 2011 once its LNG, gas-to-liquids, and domestic gas projects come on stream.

In 2005, Qatar imposed a moratorium on further developments to ensure optimal reservoir management and the productive life of the reservoir. The moratorium was expected to end in 2008, and several projects, such as the

Marathon-Petro-Canada and ConocoPhillips GTL proposal, have been put on hold pending the study's results.

North field, off Qatar in the Persian Gulf, holds an estimated 900 tcf of gas, making it the world's largest gas deposit. The Qatari authorities are determined to implement a production strategy that will deliver gas for its people now without compromising future generations. High costs have been a major barrier for project development, forcing ExxonMobil in 2007 to cancel its Palm GTL plant, which had a proposed capacity of 154,000 b/d.

Qatar is on track to develop an LNG capacity of 77 million tonnes/year within the next 2 years.

South Hook project

Despite weak gas demand amid the global recession, Al-Attiyah said Qatargas, now the world's largest LNG exporter, would proceed with projects underpinned by long-term commitments. Its first commissioning cargo from Qatargas 2 arrived Mar. 20 at the South Hook regasification terminal in Wales (OGJ Online, Mar. 23, 2009). South Hook will deliver as much as 2 bcfd into the UK natural gas grid when it reaches full operational capacity later this year.

South Hook LNG Terminal Co. Ltd. is owned 67.5% by Qatar Petroleum, 24.15% by ExxonMobil Corp., and 8.35% by Total SA. The terminal forms part of the wider Qatargas 2 joint venture, which will supply gas to the UK. It is the world's first full LNG value chain investment. The terminal, which is being completed in two phases, includes five LNG storage tanks, a regasification plant, ship unloading systems, and a jetty to allow berthing of the world's largest LNG vessels.

However, Train 4, with a capacity of 7.8 million tonnes/year at the Qatargas 2 facility, has suffered technical problems at the commissioning stage with key machinery and equipment, and it had been difficult to find the skilled labor to build it. The Qatargas 2 partners previously had said the mega trains would reduce cost because of economies of scale and advanced technologies. Commercial LNG production is expected to start any time now.

RasGas is preparing to deliver its first cargo to Italy in the summer from its newly completed, 7.8 million tonnes/year Train 6. India's Petronet also will take LNG in the fourth quarter of this year. "People are still asking for gas. We have to keep the world supplied and our customers happy," Al-Attiyah added.

More research

Qatargas and Shell have committed to work closely together on researching LNG logistics under a memorandum of understanding. The companies will focus on optimizing supply chains to deliver to LNG global markets. Research will take place at the Qatar Shell Research & Technology Centre at the Qatar Science & Technology Park.

Al-Attiyah said no capacity had yet been set for the proposed refinery and petrochemical complex under study in China. Last June, Qatar Petroleum International (QPI) signed a letter of intent with PetroChina Co. Ltd. and Shell (China) Ltd. to assess the viability of the project.

"We hope to have a complex refinery in 2013," he told OGJ. "It will be world scale and will produce refined fuels and petrochemical products."

PetroChina will have a 51% shareholding, QPI 24.5%, and Shell 24.5%. ✦

Role seen for integrated companies as NOCs grow more dominant

Nick Snow
Washington Editor

National oil companies will become increasingly dominant, but will need to work with investor-owned integrated firms, panelists said Apr. 7 during the US Energy Information Administration's 2009 annual conference.

"Even though [NOCs'] resource bases continue to grow, they have different priorities. We don't expect integrated oil companies to go away, but we do see them supplying the talent necessary to produce from increasingly difficult formations," said David Knapp, senior editor of global oil markets with Energy Intelligence Group.

Growth of NOCs will make it harder to predict supply trends because of their different priorities, observed Eduardo Gonzalez-Pier, executive advisor to the director-general of Mexico's Petroleos Mexicanos.

"As fields grow mature and become more difficult to produce, [NOCs] will have to work more closely with service companies and integrated oil companies. That poses a particular challenge in Mexico because of its view of oil as a national resource," Gonzalez-Pier said.

While NOCs unsuccessfully tried to work with service companies before returning to integrated oil companies as partners, integrateds also are finding that strong NOCs are their most effective partners, according to Fareed Mohamedi, partner at PFC Energy.

Mohamedi predicted that the Organization of Petroleum Exporting Countries may struggle to keep up with world demand. "For us, demand destruction has shifted the day of reckoning by about 2 years," he said.

Panelists agreed that NOCs, which have adopted more straightforward business models, are doing better than those that have had to follow political agendas. They said Brazil is doing better than Venezuela and Bolivia and that Malaysia's Petronas has successfully adopted an industrial approach, which is helping it prosper while meeting national goals. ✦

Tullow finds more Uganda oil, nears award of Congo blocks

Eric Watkins
Oil Diplomacy Editor

Tullow Oil PLC announced a new oil discovery in Uganda and also is negotiating with neighboring Congo (former Zaire) to reacquire exploration rights to two blocks there.

The announcements coincided with reports that China's three main oil companies—China National Petroleum Corp., China Petroleum & Chemical Corp., and China National Offshore Oil Corp.—are looking to acquire stakes in the Uganda blocks already being worked by Tullow and its partner Heritage Oil Corp., Calgary.

Heritage and Tullow hold interests in three licenses on the Ugandan side of the Lake Albert rift basin. Heritage is operator of Blocks 1 and 3A, holding a 50:50 stake with Tullow, while on Block 2 Tullow is operator with a 100% stake.

Meanwhile, Tullow appears close to official award of two blocks to which it has long sought exploration rights on the Congo (former Zaire) side of Lake Albert. And Kenya's Mombasa-to-Eldoret oil pipeline could eventually be extended to the Albert rift basin—site of recent world class oil discoveries—once the line has been extended to Kampala, Uganda.

Congo exploration

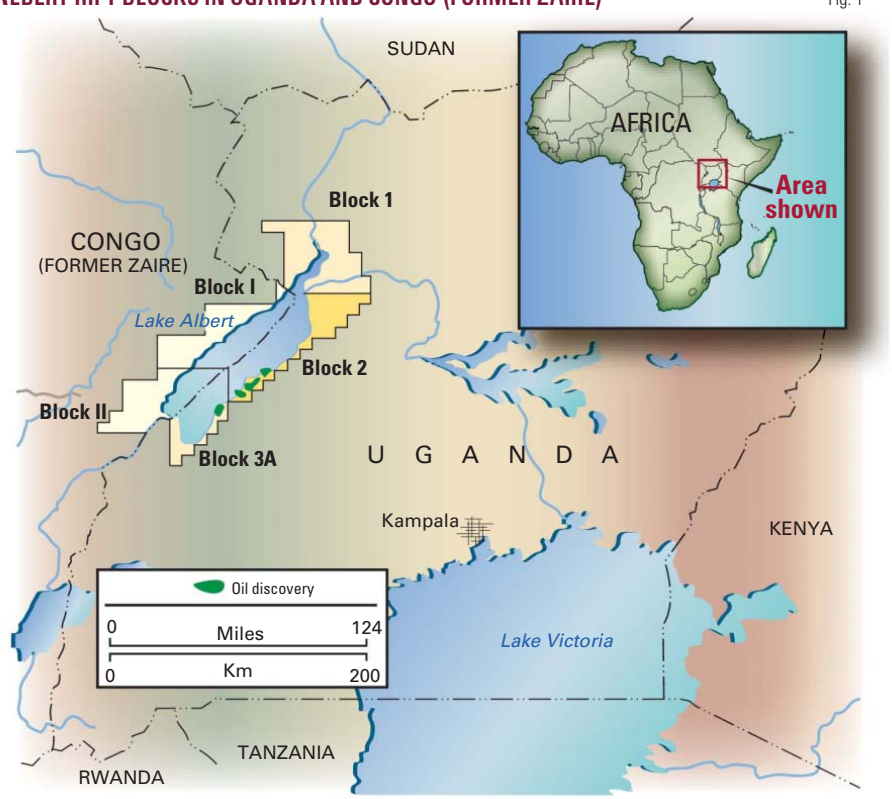
Tim O'Hanlon, vice-president of Tullow's African business, said the UK firm is close to acquiring the rights on Blocks 1 and 2 on the Congo side of the oil-rich Albertine rift as well.

Congo Oil Minister Rene Isekemanga Nkeka said a final decision on the blocks is due shortly, but Tullow would share the blocks with other operators.

"[Tullow] will certainly be there... They will be an operator on both blocks," Isekemanga Nkeka told Reuters in an interview. "They will work with other operators. The government doesn't want a monopoly system."

The companies had signed a production-sharing agreement with Congo in

ALBERT RIFT BLOCKS IN UGANDA AND CONGO (FORMER ZAIRE) Fig. 1



July 2006 for Blocks 1 and 2. However, the country revoked their exploration rights in 2007 before they could start drilling, claiming the firms used Ugandan military forces to violate its borders.

Relations between the two countries worsened in 2007 when a military conflict resulted in the killing of Carl Nefdt, a Heritage-contracted geologist.

In November 2007, Congo soldiers also arrested two geologists working for Mineral Services Ltd., a Heritage Oil subsidiary, contending that they had illegally entered Congo from Uganda.

To end any further disputes, the governments of Uganda and Congo in May 2008 agreed to redraw the border between the two countries, recognizing that the ongoing dispute presented an obstacle to oil exploration.

In March, Uganda and Congo agreed to upgrade diplomatic relations to ambassadorial level, and according to analysts, this is expected to end years of strained relations and open the way to commercial development of the reserves. O'Hanlon said the governments both recognized the importance of cooperating and of having the same oil company operating on both sides of the Albert rift.

Discoveries, prospects

O'Hanlon's statements coincided with an announcement by Tullow that the Karuka-2 exploration well drilling the Vundu prospect on Uganda's Block 2 encountered oil-bearing sands.

Tullow said the Karuka-2 exploration well, which was drilled and logged, reached a total depth of 897 m and encountered "limited thin-bedded, oil-bearing sands" at 764-772 m.

Karuka-2, 6 km southwest of Karuka-1, is a higher-risk well designed to test upside potential in the secondary escarpment play.

"Downhole pressure testing and sampling indicate movable waxy crude in a reservoir close to a possible oil-water contact," Tullow said. "However the upside potential in the structure is limited."

The Karuka-2 well is being suspended and the rig will then move to drill the amplitude supported Nsoga prospect in the Victoria Nile Delta play. That well is expected to spud in April.

In addition, the company said the Nabors 221 rig is fully rigged up on the shore of Lake Albert and was to have spud the Ngassa-2 exploration well in late March.

"Ngassa is the largest prospect in the basin and is expected to take up to 90 days to drill," Tullow said.

Chinese companies

In addition to the Congo government, the Tullow-Heritage success in Uganda is exciting the interest of mainland China's three largest oil and gas companies.

All three Chinese firms are said to be interested in bidding for a stake in the Uganda development in a deal expected to reach about $500 million, but Beijing tends to choose one mainland company to proceed with a bid to prevent multiple Chinese companies from bidding the price higher.

"They're looking to sell down to raise funds for development and mitigate risk," an analyst told the South China Morning Post, referring to Tullow and its partner Heritage Oil. "There should be big enough interest, and I would expect to see the Koreans and Japanese in there as well."

Pipeline transport

Tullow and partner Heritage Oil disclosed in February 2009 that exploration in Uganda had so far shown resources of at least 600 million bbl, enough to support construction of a 1,500-km pipeline across Kenya to the Port of Mombasa on the Indian Ocean.

Habib Kagimu, chairman of Tamoil Uganda Ltd., which in 2006 won the tender to construct the 360-km pipeline extension from Eldoret, Kenya, to Kampala, said his firm's current plans also call for extending the pipeline from Kampala to the Albert rift in Uganda to transport oil from discoveries there to Mombasa for global export.

Echoing earlier statements by Ugandan officials, Kagimu confirmed, over Uganda's national WBS TV, that work on the often-delayed pipeline extension from Eldoret to Kampala will start in April and will take 15 months to complete, with a further extension of the line to the rift area already in the planning stage.

"Our engineers have designed the pipeline in such a way that, in the future, it will be able to transport oil from Uganda back to Mombasa for export," said Kagimu, who added that the pipeline eventually could also be extended from Kampala to Rwanda and Burundi.

There remains debate over the extension to the Albertine rift basin, however, as some Ugandan officials oppose the construction of the export link and instead propose retaining the oil to be refined in Uganda, a proposal that Tamoil and exploration firms Heritage Oil, and Tullow reject as not feasible.

In January, Ugandan state media reported that Uganda and Kenya had formed a joint coordination committee to fast-track the Eldoret-Kampala pipeline, which had been postponed several times since 2006.

The New Vision newspaper reported that harmonizing bilateral and international agreements defining legal, commercial, financial, taxation, transportation, and custom issues had delayed the pipeline project. According to the Ugandan energy ministry, however, most of these issues have been resolved, and it also expects work on the extension to Kampala to start in April.

Libya-based Tamoil, which in 2006 won the tender to construct the line, will hold a 51% stake in the pipeline, while Uganda and Kenya will jointly hold the remaining 49%.

Meanwhile, Kenya's government has approved a year-old offer from Essar Oil & Gas Ltd., Mumbai, to buy a 50% stake in Kenya Petroleum Refineries Ltd., which operates Kenya's only refinery, a 4 million tonne/year complex in Mombasa (OGJ Online, Mar. 30, 2009). ✦

Chad

An ExxonMobil Corp. subsidiary plans to start production from Timbre field in Chad in 2009.

Oil production, shipped through the Chad-Cameroon pipeline, averaged 127,000 b/d in 2008, the majority coming from Kome, Miandoum, and Bolobo fields. Maikiri field went on production in 2007.

Waterfloods and production optimization are continuing to maximize recovery, the company said.

Hungary

A group of companies will sidetrack the 2006 PEN-104 well in Hungary's Peneszlek area of the Nyirseg permits to a higher part of the structure and will drill a new well in mid-2009.

PEN-104 produced 500 MMcf from August 2008 to January 2009. Petro-Hungaria, a 37.5% owned subsidiary of DualEx Energy International Inc., Calgary, decided to drill the sidetrack after shooting 3D seismic and as a consequence of a compressor failure in the regional gas supply infrastructure.

Next is PEN-105, far upstructure from PEN-12, which tested gas from the base Miocene volcaniclastics in 1983. PEN-102A is to be sidetracked later in 2009.

Other interests in the project are Ascent Resources PLC 45.23%, Geomega Ltd., Budapest, 8%, Leni Gas & Oil PLC 7.27%, and Swede Resources AB 2%.

New Zealand

L&M Petroleum Ltd., Auckland, is close to spudding coalbed methane wells in the western Southland basin on New Zealand's South Island.

Bogle-1 is to go to 585 m to further probe Beaumont formation coals encountered in the Goodwin-1 and Wairaki-1 wells. Bogle-1 will also test the deeper, gassier Morley coals.

Next to be drilled are Mount Linton-1 and Belmont-1. Four more wells may be drilled in 2009, including the first stratigraphic tests to confirm the extent of Beaumont coals in each of the Takitimu North and Longwoods coal trends.

The company holds PEP 38226 (Waiau) and PEP 38238 (Blackmount).

Papua New Guinea

InterOil Corp., Toronto, said the independently estimated contingent resource for its Elk/Antelope discovery in Papua New Guinea is 3.4 tcf of gas and 59 million bbl of condensate.

Antelope-1, on PPL 238 in the eastern Papuan basin, flowed at the rate of 382 MMscfd and 5,000 b/d in early March, when PPL 236, 237, and 238 were extended for a further 5 years "in respect of what we consider the most prospective half of the original acreage," InterOil said.

The Production Retention License application in respect of the Elk and Antelope structure in PPL 238 being progressed for 101,250 acres.

Alberta

Unbridled Energy Corp., Calgary, gauged a flow of 2.3 MMcfd of gas at 1,300 psi after 3 days from Mississippian Elkton at its 16-21 well in the Chambers play in the Alberta foothills 150 miles northwest of Calgary.

Unbridled management and Schlumberger jointly designed an acid treatment for the well. A gathering line is needed to connect the well. Operator Unbridled said the formation underlies a large part of its acreage.

The company plans to test the Cretaceous Second White Specks shale, which is 400 ft thick at 9,000 ft just above the Elkton, in an existing vertical well using a large slick-water stimulation later in 2009. This formation and the deeper Cretaceous Rock Creek formation could be horizontal drilling candidates.

Several operators have made economic horizontal completions in the Rock Creek formation to the north. Other operators working in the area, west of Ferrier field, include EnCana Corp., Devon Energy Corp., Husky Energy Inc., and Altima Resources Ltd.

Montana

Brigham Exploration Co., Austin, Tex., brought on line its third consecutive Ordovician Red River discovery that resulted from using 3D seismic stratigraphic attributes to identify reservoirs.

The Friedrich Trust 31-1 began producing Mar. 17 at an early rate of 200 b/d and fell to 145 b/d in late March. Brigham owns 77% working interest.

New York

Unbridled Energy Corp., Calgary, was spudding a well on a 2D seismic structure near Chautauqua Lake, western New York, to test the gas potential of the Cambrian Potsdam and Theresa sandstones and Ordovician Utica shale and Trenton/Black River sandstone.

Proposed depth wasn't given, but AFE is $1.589 million, of which the New York State Energy Research & Development Authority will cover 90%.

Unbridled will core the formations and run substantial logs to evaluate porosity and permeability.

The company also plans to test a 250-ft thick Devonian age shale behind pipe in an existing depleted Medina gas well.

Texas

Gulf Coast

GeoPetro Resources Co., San Francisco, plans to reduce inlet pressure at its Madisonville, Tex., gas treatment plant and complete two more wells.

The improvements should also allow much higher rates from the Magness and Fannin wells already producing. GeoPetro plans to rework the Mitchell well and frac and connect the Wilson well. All four wells produce from Cretaceous Rodessa.

GeoPetro did not endure a ceiling test writedown but is evaluating possible farmout of assets other than the Madisonville project.

Companies adopt efficient waste-management units

Andrew Ive
North Yorkshire, UK

Until recently, the prevailing perception of the oil and gas industry operating in emerging areas was that waste represented an unwelcome inconvenience. Because primary infrastructure was not designed to handle waste, oil company health and safety executives were assigned the task. And a general reluctance surrounded the whole issue.

Lately, however, corporate image and stakeholder interest have become driving forces as the industry responds to growing public and government awareness of environmental factors. New "grassroots" thinking is paving the way, and enterprising methods for cost-effective waste management are coming to the fore.

Effective waste management actually can help increase profitability rather than draining the bottom line.

Industry has learned the hard way that it no longer can leave the problem of handling waste to local services, which are often underdeveloped. Oil and gas companies have had to accept the duty of care and to adopt acceptable methods for disposal on site. The fines levied for non-compliance no longer can be ignored—even in some emerging markets where fines represent an income source for burgeoning local administrators.

In the process of examining what materials are used, exported, and left behind, it is possible to improve industry's performance, particularly in emerging areas where a dearth of legislation can be used to environmental and corporate advantage.

Waste management evolving

With the right approach, it's feasible to meet the spirit of UK, US, and European Union regulations worldwide. Formerly, contractors dealt with waste by digging a large hole and burying it, but now viable means have been developed to minimize construction refuse and to turn seismic or drilling waste into resources through recycling initiatives with zero waste going to a landfill.

A BP PLC-Sonatrach project in the mid-1990s needed to establish water services and waste management for the In Salah dry gas project and the In Amenas gas condensate field, both in Algeria.

Before starting construction on gas treatment plants and associated pipelines, BP needed to establish water and

Incinerators placed at oil and gas projects enable waste disposal on site, which means lower labor and transportation costs. Incinerators generally are used for food waste when composters are unavailable.

A patented Mobile Materials Recycling Facility is an easily transported container that houses all equipment needed to process waste at a project site. An integral generator and a combined office-store are supplied in a second unit not shown.

sewage infrastructure for four desert communities.

Using me as an outside consultant, BP-Sonatrach developed an environmental management system to handle the 4 kg /day/person of waste generation by more than 2,000 workers involved in the construction phase.

Amid sandstorms, extreme heat, and the threat of finding venomous snakes and spiders in the waste, BP needed to deal with waste quickly, efficiently, and cost effectively. For the In Amenas project, the design had progressed to a standalone waste management center that was devised with 20-ft containers.

A generator in a separate container supplied power to operate the equipment housed in the other containers. The waste management center was ready to use immediately, and the waste water treatment plant took 1 month to build and was used for several years, requiring minimal maintenance.

Watchwords: the 4 Rs

The watchwords of waste management—Remove, Reduce, Reuse, Recycle—depend upon supply-chain purchasing protocols, worker behavior, storage and handling methods, and strict segregation of waste types.

With everyone working to achieve good waste-management and recycling systems, the company, personnel, and local populace develop a relationship that benefits all, providing:

- A healthier site with no smells.
- A tidier site with fewer accidents.
- Fewer disease borne vectors.
- Local employment opportunities.
- Improved company image.
- Compliance with legislation, reducing the incidence of costly fines.
- Positive use of waste to create new resources.
- Huge financial and environmental savings in waste transportation.

What once might have sounded too good to be true now has been tried and proved. Projects worldwide are using simple guidelines and cost-effective equipment that reduce waste and save money for the operator.

The key issue is to establish the right thinking at the onset of each project and to ensure that approach is maintained consistently by all personnel throughout the project. That said, retrofits are by no means to be avoided. In time, engineers themselves become the site environmentalists.

The equipment and resources to handle the waste management are inexpensive to install. Their costs are recouped several times over in terms of lower waste-removal expenses.

The main objective of waste-management equipment is to reduce volume. Vehicles carrying 50-90% air—as is normally done—means higher expenses in waste trucks, labor, diesel, and increases a project's carbon footprint.

The use of specialized equipment to break down waste into smaller volume is a quick, easy method that immediately produces massive savings on traditional waste disposal methods.

A wide range of equipment is available to treat all types of waste. Given technological advancements within the last 15 years, suppliers have grasped the difficulties, developing innovative equipment that is both mobile and versatile.

Most equipment can be delivered in a single mobile Materials Recycling Facility (MRF). This containerized unit ar-

rives complete with everything required for a basic processing plant, ready to use on day one, powered by a generator installed in a second container if required. Once a project is finished, the MRF can be moved to the next project.

Similarly, the safe storage and transportation of chemicals from rig to rig can be handled with specially adapted ISO containers that can be moved with 24 cu m of chemicals in place. With packaging integrity protected, chemicals last longer, and the site is made safer with less danger of wind-blown contamination.

Assigning responsibilities

The question of who manages the waste on any site is a key factor. The assignment of responsibility to individuals is essential for segregation of waste at source because if wastes are mixed, the battle is partly lost. Conflicts of interest will arise if the catering contractor (who also produces waste) is solely assigned the task because the contractor's waste operatives inevitably are coerced into taking mixed waste. Outside contractors are easier to manage, especially when it comes to transporting recyclates from the site.

Ideally, a qualified consultant instigates a system tailor-made for each project covering the following key aspects:

- Drafting the relevant parts of the tender documents and contracts to tackle waste from the beginning.
- Calculating the amount of waste expected based on manpower and project type.
- Analysis of local recyclers and waste methodologies.
- Producing a holistic waste management plan.
- Recommending equipment.
- Assisting with equipment installation.
- Training personnel on the use and maintenance of equipment.
- Providing specialist advice and solutions for handling hazardous waste.
- Incorporating waste into existing environmental management systems.
- Training engineers to become environmentally aware.

Handled well, waste management provides not so much a chore as a chance to excel, and a great advantage when a company is being audited for ISO 14001, for example, with certification process auditors increasingly looking at waste management as an indicator of overall performance. ✦

The author

Andrew Ive (andy.ive@btinternet.com) has 36 years of wide-ranging engineering, design, inspection, and supervisions experience. In recent years, he has combined his engineering contract work for major UK companies with development of his own designs, for onshore and offshore, with patents awarded. He holds a BS in science and technology with a Higher National Certificate in mechanical engineering from Kingston College in London. Along with several postgraduate diplomas, he has charterships of the Institute of Environmental Management and Assessment and the Chartered Institute of Waste Managers. He also is certified in the IOSH safety system.

European LNG demand trends unclear amid continued global economic turmoil

Chris Holmes
Purvin & Gertz Inc.
London

The last couple of years have proven to be dramatic for the global LNG industry, matching few of the industry's expectations of only a few years ago. From early 2007 until the end of 2008, the global LNG market has been supply constrained with strong Asian demand attracting an increasing number of cargoes from the Atlantic Basin.

During this time Asian buyers have shown a willingness to pay a premium for spot, flexible supply, and global LNG trade flows have responded accordingly. This situation is unlikely to prevail for much longer, however.

As the global economic situation continues to deteriorate, the outlook for the LNG industry, as is the case for many other resource-based industries, is uncertain. Apart from the potential for reduced gas, hence LNG demand, there is considerable supply expansion under way with nearly 85 million tonnes of new gas liquefaction capacity scheduled to be commissioned over the next 2-3 years, increasing global production capacity by yearend 2008 by nearly 40%.

With Europe expected to be as badly affected by the current economic crisis as any other region of the world, the outlook for LNG imports into the continent is unclear, especially over the near term. Without doubt, from the second half of this year there will be sufficient global LNG supply to meet near-term European demand, but the real question is the magnitude of LNG demand pull from European buyers and the degree of competition from pipeline gas that is the main source of European imported supply.

While the dispute earlier this year between Russia and the Ukraine, which resulted in curtailed gas supply into southern and central Europe, presents a strong case for expanded LNG imports, any policy changes in that direction are unlikely to be made and implemented for years to come.

Increasing demand

After 2 years of flat LNG demand, imports into Europe increased in 2008 to 44.8 million tonnes of LNG. This represents a 9% increase over 2007 imports of 41.1 million tonnes and a 6% increase over 2006 imports of 42.3 million tonnes. Spain has increased its share of total imports and in 2008 accounted for more than half of the total volume. Spain's imports of LNG have increased to 23.6 million tonnes in 2008 from 18.3 million tonnes in 2006.

France remained the region's second largest importer although its share decreased to 20% in 2008 from 25%

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UK's National Grid Grain LNG terminal at yearend 2008 started up an expansion that increased its import capacity by 50%, to 14.8 million tonnes from 9.8 million tonnes. The £310 million investment is supported by long-term contracts with E.On, Iberdrola, and Centrica, which took all the additional capacity. This third phase expansion brings National Grid's investment at the site, according to the company, to more than £750 million and enables the terminal to import around 20% of forecast UK gas demand by 2010-11. (Photograph from National Grid Grain LNG)

in 2006. French imports decreased to 9.1 million tonnes in 2008 from 10.7 million tonnes in 2006. Of the remaining countries, imports into Belgium declined by 0.8 million tonnes over 2006-08 to 2.3 million tonnes, and imports into Greece and Portugal increased by around 0.3 million tonnes each to reach 0.7 million tonnes and 2.1 million tonnes, respectively.

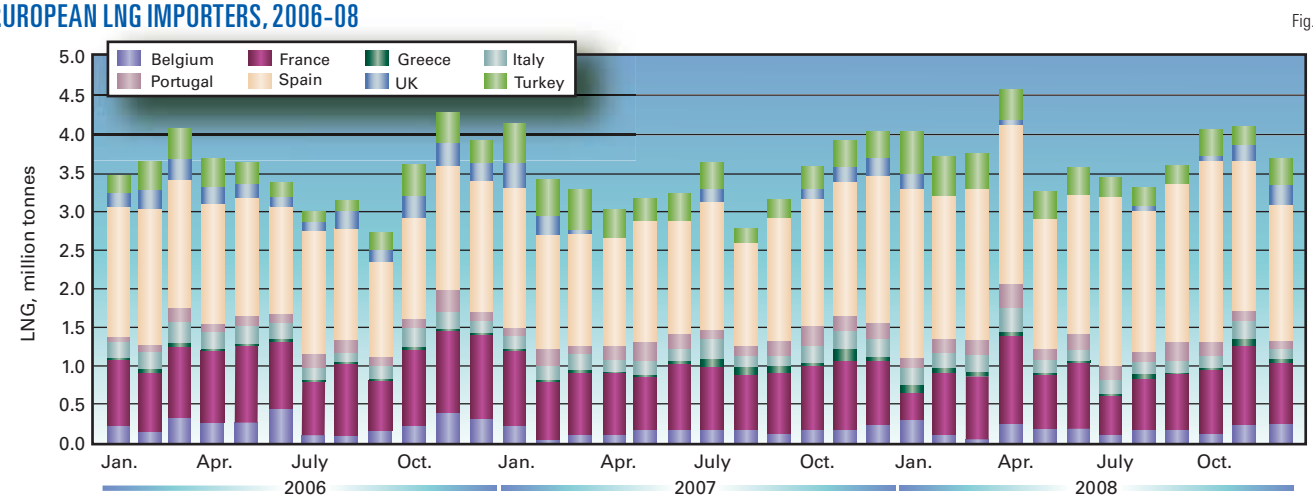
LNG imports into Italy have remained relatively constant in the region at 2.1-2.3 million tonnes, while those into Turkey increased by 1 million tonnes to 4.3 million tonnes. Since start-up of the UK's Isle of Grain LNG import terminal in mid-2005, imports have been on a declining trend falling to just 0.8 million tonnes in 2008 from 2.5 million tonnes in the first full year of the terminal's operation in 2006.

Not unsurprisingly for a seasonal market, imports of LNG into Europe exhibit some variation throughout the year with imports tending to peak in winter months and be at their lowest in summer months (Fig. 1). Over the last 3 years, LNG imports have averaged 3.8 million tonnes/month during winter (October to March) and 3.3 million tonnes/month in summer (April to September).

As of yearend 2008, Europe had total

EUROPEAN LNG IMPORTERS, 2006-08

Fig. 1



Source: Waterborne Energy Inc., European Waterborne LNG Report

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Technology developments reach operations in 2008-09

Warren R. True
Chief Technology Editor-LNG/Gas Processing

The LNG industry in the past year has passed more technology milestones in its rapidly evolving recent history.

Offshore-based discharge of LNG into regional South American markets made an appearance in June 2008 and again in early 2009. The world's first fixed offshore terminal was installed in Europe in late 2008. And the world's largest LNG carrier, the first of the Q-Max series of tankers was commissioned and delivered to its Qatari owner.

Argentina, Brazil

Floating LNG continued to evolve from the foundation set by Excelerate Energy.

In June 2008, the company announced delivery of Argentina's first LNG cargo to the newly constructed import facility at the port city of Bahía Blanca, about 400 miles south of Buenos Aires.

Natural gas, revaporized from LNG, flowed through the Bahía Blanca GasPort directly into Argentina's gas distribution system. The GasPort was South America's first LNG receiving facility and the world's second dockside regasification facility after Excelerate's installation at Teesside, UK.

At the Bahía Blanca, the company's LNG regasification vessel Excelsior docked alongside a dedicated jetty and connected to an onshore natural gas pipeline via Excelerate's specially designed dockside high-pressure gas off-loading arm. LNG cargoes will be supplied to the docked vessel via traditional LNG carriers using Excelerate's ship-to-ship LNG transfer protocol, said the comapny.

The jointly developed Bahía Blanca GasPort allows delivery of up to 400 MMcfd with initial capacity to import up to three LNG cargoes/month, each to contain about 3 bcf of natural gas.

Earlier this year in Brazil, Petrobras received the world's first floating storage and regasification unit vessel, the Golar Spirit, following commissioning tests on the vessel's regasification trains (OGJ, Mar. 16, 2009, p. 64).

Called an "FSRU," the vessel went into service at Petrobras's offshore LNG terminal, off Pecem, Ceara state. Each of its three regas units can send out up to about 130 MMcfd, with two units normally working while the third remains on standby.

At Pecem, Petrobras placed LNG unloading arms and high-pressure gas arms on a pier. An LNG carrier berths on the side away from the FSRU and unloads its cargo with the unloading arms onto the FSRU, which would then regasify the LNG and move the natural gas ashore via the HP gas arms (Fig. 1).

Later in 2009, Petrobras will use the Golar Spirit to commission a second offshore LNG terminal, in Guanabara Bay, Rio de Janeiro. In the meantime, Blackwell said a second LNG carrier, the Golar Winter, is undergoing conversion at the Keppel yard.

In late June of last year, Shell Gas & Power Developments BV issued a formal invitation to tender for front-end engineering and design and engineering, procurement, and construction of a 3.5 million tpy floating plant.

In January 2009, Petrobras took delivery of the Golar Spirit, the company's first offshore LNG terminal off Pecem (Fig. 1; photograph from Golar LNG; copyright Petrobras)

LNG import and regasification capacity of 78 million tonnes/year (tpy; Table 1). Thus, throughput in winter equates to average capacity utilization of nearly 58%, while summer capacity utilization has averaged slightly more than 50%.

Primary source

Imports into Europe have come mainly from within the Atlantic Basin, although its share of total supply has declined to 86.5% in 2008 at 38.8 million tonnes from 88% in 2006 at 37.1 million tonnes (Fig. 2). As there have been no imports from the Asia-Pacific region over this time, the remaining imports have come from the Middle East, increasing by 1 million tonnes to 6.1 million tonnes in 2008 from 5.1 million tonnes in 2006.

Over the last 3 years, around 70% of Middle East supply has been sold into Spain, although increasing volumes have been sold into Belgium with start-up of a supply agreement from RasGas in early 2007 and a small quantity has also been sold into France.

Middle East supply into Europe has been fairly constant in terms of seasonality, which means that Atlantic Basin supply has taken most of the seasonality swing.

Within the Atlantic Basin, the main

Tugs and tenders near Algeciras, Spain, maneuver the world's first fixed offshore LNG terminal last year as it moves toward its Adriatic station off Porto Levante, Italy (Fig. 2; photo from ExxonMobil).

The tender was issued to three consortia consisting of engineering and shipyard contractors selected after a prequalification exercise undertaken by Shell. Bids were to be announced by yearend 2008 with award of contracts possible during 2009. At OGJ press time in mid-March, no announcements had been made.

Shell said it had invested in development of FLNG technology over the last 10 years, and, at the time of this announcement, claimed to have been looking closely at several potential developments, particularly in Asia-Pacific.

Terminal, vessel delivered

Two other industry innovations moved from fabrication to installation.

In September last year, the world's first offshore LNG terminal arrived at final location off the Italian coast (Fig. 2).

The Adriatic terminal will store and regasify LNG to deliver 775 MMcfd (8 billion cu m/year) when it reaches full operations later in 2009.

The terminal left its construction site in Algeciras, Spain, in late August on the 1,700-mile trip, arriving Sept. 15. The terminal was positioned about 10 miles off Porto Levante, Italy, in the Adriatic Sea, in about 95 ft of water and was being connected via pipeline to Italy's natural gas grid.

The Adriatic LNG project is owned by ExxonMobil Italiana Gas, Qatar Terminal Ltd. (a Qatar Petroleum 100%-owned subsidiary), and Edison. The terminal will receive natural gas produced from Qatar's North field, the largest nonassociated natural gas field in the world.

Finally, last year saw delivery of the first of the world's largest LNG carriers.

Qatargas Operating Co. Ltd. and its shipping company Nakilat took possession of the LNG Q-Max Mozah (see cover). The 266,000-cu m vessel was built at Samsung Heavy Industries' shipyard on Geoje Island, South Korea. It is Nakilat's flagship and was the first of 14 Q-Max vessels on order and the first of 25 wholly owned LNG carriers in its fleet of 54 vessels being built in the Korean shipyards for Qatar's LNG expansion projects, according to the company.

Mozah will ship LNG produced by Qatar Liquefied Gas Co. Ltd. II ("Qatargas 2") to markets in Europe.

The company said the Q-Max has 80% more capacity than conventional LNG carriers with about 40% lower energy requirements due to the economies of scale created by its size and the efficiency of the engines.

suppliers have been Algeria, Egypt, Nigeria, and Trinidad that collectively have accounted for more than 96% of supply. The small amount of LNG produced by Libya is sold into Spain under a long-term agreement, while BG, as sole lifter of LNG from Equatorial Guinea, has either sold its entitlement to higher priced Asian markets or retained it for direct sale to its own downstream customers.

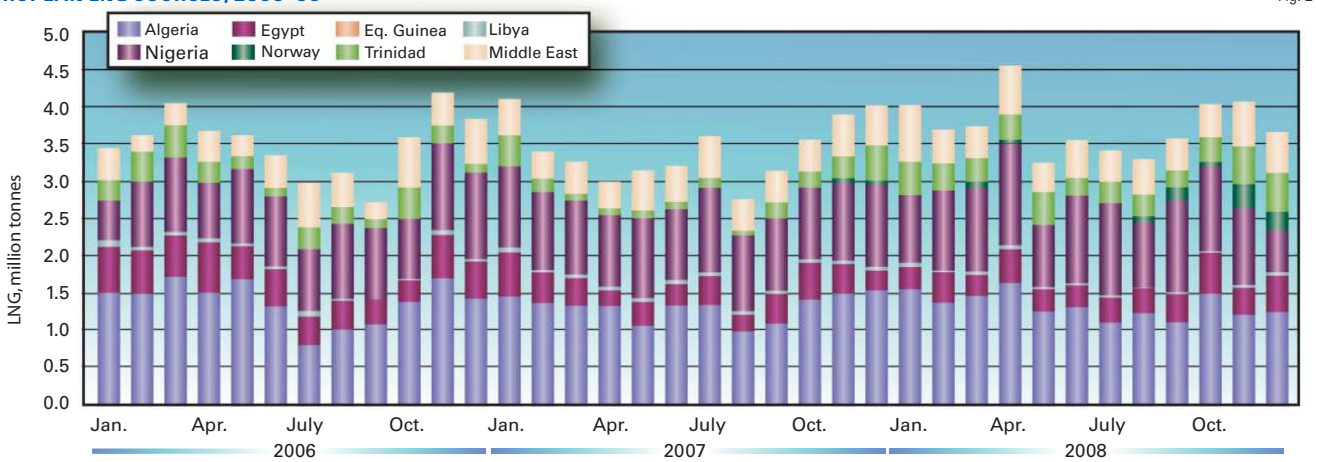
Since start-up of the Snohvit LNG plant in late 2007, Norway has started to emerge as a supplier to Europe, although the volumes have been relatively small to date.

Of the main suppliers, Algeria is the largest accounting for more than 40% of total Atlantic Basin supply to Europe, although Algerian exports have fallen to 15.8-15.9 million tonnes in the last 2 years from 16.6 million tonnes in 2006. In part this drop has been due to some Algerian output being sold into Asian markets but also because of technical problems with the country's gas liquefaction plants that restricted output during the second half of last year.

Nigeria has been the second largest exporter to Europe with its share of total rising to nearly 35% in 2007 and more than 32% in 2008 from 30% in 2006. This has been due mainly to start-

EUROPEAN LNG SOURCES, 2006-08

Fig. 2



Source: Waterborne Energy Inc., European Waterborne LNG Report

EXISTING EUROPEAN LNG IMPORT TERMINALS

Table 1

Country	Location	Operator	LNG capacity, million tpy
North Atlantic Europe			
France	Montoir-de-Bretagne	GdF	7.6
UK	Isle of Grain	Grain LNG (National Grid Transco)	10.0
UK	Teesside	Excelerate Energy	—
South Atlantic Europe			
Portugal	Sines	Galp Atlantico (Transgas)	4.0
Spain	Bilbao	Bahia de Bizkala Gas	5.3
Spain	Huelva	Enagas	8.7
Spain	Mugardos	Reganosa	2.7
Spain	Sagunto	Planta de Regasificacion de Sagunto	2.8
Mediterranean Europe			
France	Fos-sur-Mer	GdF	7.3
Greece	Revithoussa Island	DEPA	1.0
Italy	La Spezia	Snam Rete Gas	2.6
Spain	Barcelona	Enagas	10.5
Spain	Cartagena	Enagas	7.7
Turkey	Izmir	Egegaz LNG	4.3
Turkey	Marmara Ereglisi	Botas	4.3
Total capacity			**78.7**

up of Trains 4 and 5 at the Bonny LNG plant through 2006 and of Train 6 in the early part of last year. Again Nigeria has also been a significant seller of LNG into higher priced Asian markets over the last 2 years with exports to Europe remaining around 12.5 million tonnes in 2007 and 2008.

Exports from Egypt to Europe have declined over the last 2-3 years in both market share and absolute terms. The country's share of total Atlantic Basin exports has fallen to less than 12% from nearly 16%, while the volume has declined to around 4.4 million tonnes in each of the last 2 years from 5.9 million tonnes in 2006. Again one of the primary reasons for this is that some output from the two Egyptian LNG plants has been sold into the premium Asian market.

The remaining supplier of note, Trinidad, has seen its exports to Europe increasing in both market share and absolute terms over the last 3 years, the former increasing to 11.4% from 8.3% and the latter to 4.4 million tonnes from 3.1 million tonnes.

Flexible supply from Trinidad has proven to be responsive to regional price variations, the price premium over Henry Hub in both Asia and Europe from the middle of 2007 being sufficient to draw cargoes away from the "natural" outlet for Trinidadian exports, i.e., the US.

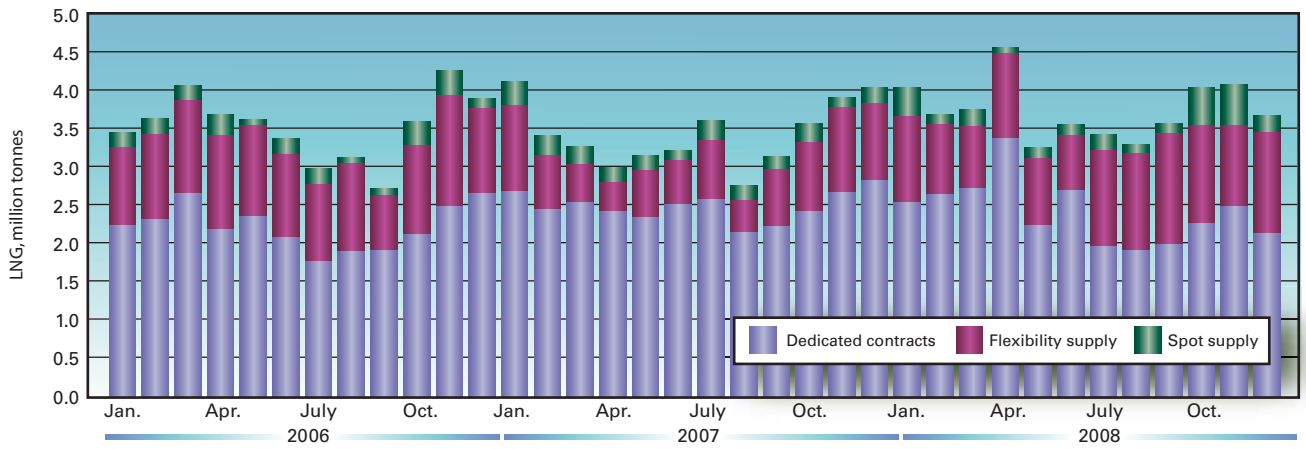
One of the emerging characteristics of the global LNG market has been an increase in the amount of supply that has a degree of diversion capability or destination flexibility. While most global LNG trade continues to occur as dedicated or fixed-destination supply governed by long sales-and-purchase agreements that prevent diversion, an increasing number of contracts have come into force in recent years that contain provisions to enable diversion.

These may either come in the form of larger credit-worthy companies willing to take total market and price risk or sales-and-purchase agreements that allow the offtaker to seek the market of highest return with some form of profit-sharing mechanism contained in the pricing provisions.

The quantity of LNG supply imported into Europe as dedicated or fixed supply has increased to 29-30 million tonnes in each of the last 2 years from an estimated 26.7 million tonnes in 2006, and its share of total supply increased to 73% in 2007 from 63% but declined back to 65% in 2008 (Fig. 3). By comparison, the share of dedicated or fixed trade on a global basis has declined to 70% in 2008 from an

TYPE OF EUROPEAN LNG IMPORTS, 2006-08

Fig. 3



Source: Purvin & Gertz estimates based on Waterborne Energy Inc., European Waterborne LNG Report data

estimated 75% of the total in 2006.

Flexible trade into Europe has experienced considerable volatility over the last 2-3 years. In 2006, flexible trade amounted to an estimated 13.5 million tonnes accounting for 32% of total European imports, but both share and absolute volumes declined in 2007 to 8.9 million tonnes and 22%, respectively, only to rebound in 2008 to 13.2 million tonnes and nearly 30%, respectively.

By comparison, the share of flexible trade on a global basis has increased to 25% in 2008 from an estimated 20% in 2006. Spot LNG imports have remained around an estimated 5% of total supply over the last 3 years, which is comparable with the global average.

Increasing complexity

These data are the results of both the dynamic complexity of supply and demand fundamentals in the European gas market and its increasing influence on global LNG trade. Structurally, Europe has been a net importer of natural gas, and this situation will only deteriorate in the future as indigenous regional production declines and demand continues to grow.

Most of the main gas markets in Northern Europe are now mature with limited growth potential from the industrial and residential-commercial sectors, while some growth potential exists from power generation. Consequently, there are likely to be different factors to influence future gas demand in these countries.

Over the longer term, economic and population growth as well as the relative price of gas to the end-user compared with such competing fuels as oil and coal will mainly drive demand. These factors will tend to affect demand from the industrial and power generation sectors.

Over the shorter term, weather will be a major influence on demand as the severity of the northern European winter will translate into more significant month-on-month demand changes as the effect of the underlying growth trend has become less influential due to the maturity of the gas market.

Factors affecting demand in southern Europe are a little more diverse, as there is greater variation in the maturity of the markets in this region. Italy has a well developed gas market, while those in the Spain, Portugal, Greece, and Turkey are less well developed with all sectors having the potential for future growth. Seasonality of demand in these countries tends to be less significant than in Northern Europe although it does exist.

From an LNG perspective and apart from Italy, there is limited gas storage capacity in these Mediterranean European countries with the result that LNG is often the source of balancing supply during times of crisis. This was evident in the early part of 2009 when both Greece and Turkey sought additional supply from the flexible, spot market as pipeline supply from Russia was curtailed as a result of its dispute with the Ukraine.

Another major factor that will impact future European LNG imports is the hydropower reserve in Spain. Because hydropower contributes to around 15% of Spanish power supply, during times of low rainfall thermal, mainly gas-fired, power is called upon to make up the deficit.

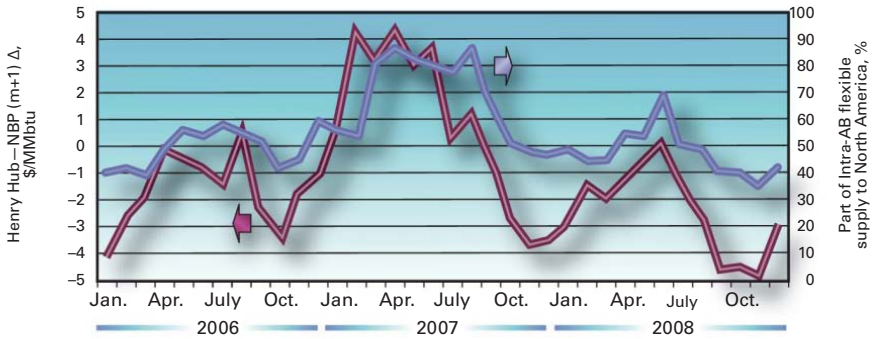
With very limited storage capacity, Spain has limited ability to meet such demand shortfalls. It therefore tends to make up any shortfall with increased purchases of LNG. This was evident in the early part of 2008 as precipitation in second-half 2007 had been well below average with the result that hydropower availability was severely restricted in the early part of the following year.

Pipeline vs. LNG

From a gas supply perspective, some European gas traders and marketers have a unique opportunity to arbitrage between pipeline supply and LNG

INTRA-ATLANTIC BASIN TRADE, 2006-08

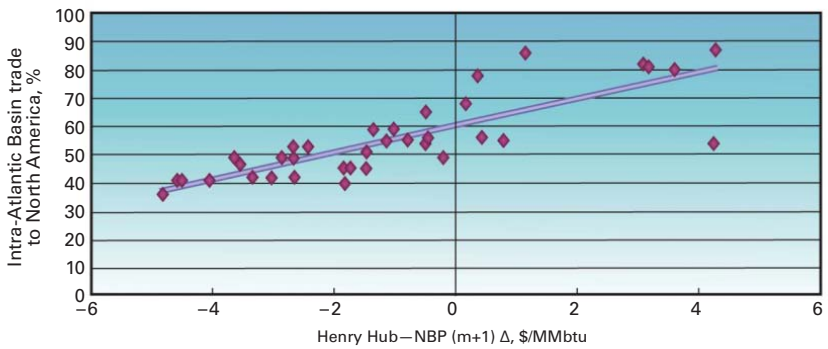
Fig. 4



Source: Purvin & Gertz analysis

ATLANTIC BASIN TRADE

Fig. 5



Source: Purvin & Gertz analysis

supply. Typically pipeline gas supply contracts are priced by indexation to heating oil and residual fuel oil with a 6-9 month time lag. This provides a certain degree of predictability over the near-term price of future pipeline gas supply.

With gas trading hubs starting to emerge throughout Europe and a futures market developing, those traders who have access to LNG supply have the opportunity to arbitrage between imported pipeline and LNG supply. Furthermore, with a spot LNG market starting to emerge in Asia with prices that are compared with either crude oil or refined products, these traders can also exploit any regional prices difference that may emerge.

During 2008 the amount of gas imported by pipeline by major LNG importing countries increased on a comparable basis relative to the previous year, although diverging trends existed throughout the year. Until third quarter, pipeline imports were higher than in the previous year. During this time oil prices were rising, with the result that pipeline border prices were lagging oil prices while spot LNG and traded gas hub prices tended to reflect prevailing oil prices.

During the last quarter of the year, however, pipeline imports were lower than the previous year as the peak oil prices of the middle of the year resulted in higher pipeline border prices, yet spot LNG and traded hub gas prices reflected prevailing lower oil prices with the result that LNG imports increased.

Anther interesting supply dynamic is that around LNG imports into the UK, which have been far lower than envisioned since start-up of the Isle of Grain import and regasification facility in mid 2005. While initial imports were at reasonable levels, they have since declined.

The prime reason for this has been start-up in late 2006 of the Langeled and Balgzand Bacton Line (BBL) pipeline from Norway and the Netherlands, respectively. The Langeled pipeline gives Norway considerable influence over gas prices at the UK's gas trading hub, the National Balancing Point (NBP), as the existence of this pipeline and other pipelines to continental Europe enables it to exploit any arbitrage opportunities between prices in the UK and the continent.

Thus far, the Norwegian strategy appears, in the summer months, to be to push gas into the NBP market that is then reexported to continental Europe for injection into storage and, in the winter months, to keep supply at levels that prevent imports from continental Europe via the UK Interconnector pipeline. Thus, NBP tends to be at a discount to continental European prices in the summer months and at a premium in the winter.

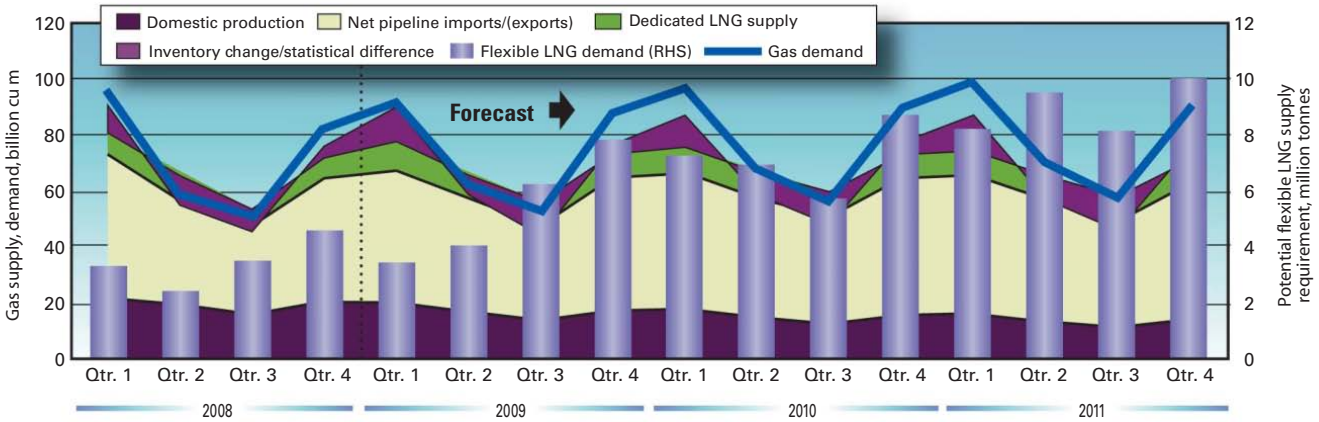
Increasing response

Over the last few years it has become increasingly apparent that LNG trade within the Atlantic Basin responds to price differences between Europe and the US. Comparison of the difference in Henry Hub price and the month ahead (m+1) NBP price (as a proxy for European prices) and the flow of intra-Atlantic Basin flexible LNG trade (i.e., flexible trade that remains within the Atlantic Basin that excludes trade that flows out of the Atlantic Basin to Asia) shows good correlation (Figs. 4 and 5).

This, therefore, suggests that the direction of LNG trade responds to price differences between markets. A similar analysis compares the amount of flexible LNG trade that leaves the Atlantic Basin for Asia vs. the price difference between Japanese spot LNG prices and Henry Hub. It shows similar results, although the degree of correlation is not as high or the slope as steep. Interestingly enough there does appear to be a $2/MMbtu price difference between Japanese spot prices and Henry Hub prices that will trigger exports out of the Atlantic Basin to Asia.

EUROPEAN GAS, LNG SUPPLY, DEMAND OUTLOOK*

Fig. 6



*For Belgium, France, Italy, Spain, and UK only.
Source: Purvin & Gertz

Outlook uncertainty

So what does the future hold for LNG supply into Europe?

Probably the single biggest challenge facing sellers of gas into the European market is the deteriorating economic situation. Evidence has started to emerge of declining gas demand in the industrial and power generation sectors of the main LNG importing countries during the end of last year, particularly in Italy, Spain, and the UK. With the economic downturn expected to be more severe and more prolonged than many had forecast last year.

Purvin & Gertz's current forecast is for the rate of gas demand growth to slow sharply this year and be stronger in 2010. Within this forecast, however, there are many diverging trends with flat or declining industrial demand in France, Italy, and the UK and declining or flat power generation demand in Italy, Spain, and the UK.

Power generation demand in France will increase marginally due to commissioning of a new gas-fired power generation capacity. This forecast is based on winter temperatures to be equal to the average for the last 5 years. Should this not be the case, then residential-commercial demand, which accounts for around 50% of total demand, could be substantially different from that forecast.

On the supply side, UK natural gas production appears to be in terminal decline, and nothing appears on the near horizon that is likely to change this prospect. The only new pipeline project that will result in increased pipeline gas imports is from Algeria to Spain; that is expected to come on stream during the course of this year.

Of the existing pipeline agreements, several expire during the course of the next 2-3 years. For the sake of this supply-demand analysis, it has not been assumed that all of these will be extended in their current form. The net effect after considering dedicated LNG supply agreements is that the gas supply shortfall will increase in Europe over time.

Naturally, flexible LNG will be called upon to meet this shortfall, although it should be noted that the shortfall may be overstated should existing pipeline import agreements be extended.

Fig. 6 presents Purvin & Gertz's view of the near term gas supply-demand and LNG demand pull situation in the main European LNG importing countries.

Gas demand in Fig. 6 is represented by the line, while domestic production,

EUROPEAN LNG IMPORT TERMINALS UNDER CONSTRUCTION

Table 2

Country	Project	Location	Operator	LNG capacity, million tpy	Start-up year
North Atlantic Europe					
Netherlands	Gate Terminal	Rotterdam	Gasunie/Vopak/RWE	7.8	2011
UK	Dragon LNG	Milford Haven	Dragon LNG (4Gas, BG, Petronas)	6.6	2009
UK	South Hook LNG	Milford Haven	ExxonMobil, Qatar Petroleum	7.8	2009
South Atlantic Europe					
Spain	Mugardos expansion	Mugardos	Reganosa	2.7	2013
Mediterranean Europe					
France	Fos Cavaou	Fos Cavaou	GdF/Total	7.3	2009
Italy	Isola di Porto Levante (offshore)	North Adriatic Sea	QP/ExxonMobil/Edison	6.3	2009
Italy	OLT Offshore Cross Gas	Livorno, Tuscany	Offshore LNG (E.On/Iride)	2.7	2011
Spain	Barcelona expansion	Barcelona	Enagas	2.0	2009-10
Total capacity				**43.2**	

fixed or dedicated contracted pipeline, and LNG imports, and movements in and out of inventory are represented by the area graph. The difference between the line and the area graph in Fig. 6 is the expected gas supply shortfall (in billion cubic meters).

This gas demand shortfall, which represents the demand pull on flexible LNG, is also represented by the column graph that shows quarterly flexible LNG demand in million tonnes on the right hand scale.

Fig. 6 shows that, although the demand pull for flexible LNG near term is relatively weak, it does improve over time as the economic situation improves and pipeline gas contracts expire.

It should also be noted that the LNG import requirement into the UK will grow strongly from 2010. The main contributing factors to this forecast are a continuation in decline of UK North Sea production and increased utilization of capacity in the Langeled and BBL pipelines.

The capacity of these pipelines has yet to be tested fully, but in all likelihood there will be times during winter months when they and the UK Interconnector are operating at or near full capacity with the result that there will be an increased pull on LNG imports.

Currently, several LNG import and regasification facilities are under construction that will come on stream over the next few years (Table 2). These projects will add more than 50% to existing LNG import capacity. The good news is that development of this capacity appears to be keeping pace with the expected increase in LNG imports into Europe, and it is not expected that LNG import capacity will be a limiting factor on future imports into Europe.

Author's note: Sources for data in this article are the Waterborne Energy Inc., European Waterborne LNG Report, and Purvin & Gertz Inc., Global LNG Market Outlook. ✦

The author

Chris Holmes (chholmes@purvingertz.com) is a vice-president with international energy consultants Purvin & Gertz Inc. in its London office. He has worked for Amoco (UK) Ltd., as a process engineer at its Milford Haven refinery and as a refined products trader in London and for international energy advisers Gaffney, Cline & Associates as a senior consultant. He holds a BSc (honors) in chemical engineering from the University of Birmingham.

Economic crisis clouds outlook for Asia-Pacific's LNG demand

Alexis Zhiying Aik
Sook Ching Wong
FACTS Global Energy
Singapore

Tomoko Hosoe
East-West Center
Honolulu

Shahriar Fesharaki
FACTS Global Energy
Honolulu

Asian LNG demand growth has been critical in the growth of global LNG, accounting for an average 50% of global incremental consumption since 2000. In 2008, incremental demand growth in Asia was substantially higher than in other regions, as imports of key consumers such as Japan and Korea pushed up regional growth.

Europe's marginal consumption growth coupled with Asia helped offset a massive decline in LNG imports into the Americas, specifically the US. While global LNG demand has grown by an average 8%/year since 2000, preliminary estimates for 2008 indicate essentially no growth. This was partly due to project delays and will certainly change this year as new projects push LNG into the market.

There are questions, however, about just how much LNG the market can absorb. Significant uncertainty surrounds prospects for the next few years as the depth of the current global financial crisis has yet fully to reveal itself.

Given that the Asian market has not only driven incremental demand growth in recent years, but has also accounted for about two thirds of the global LNG market, it is important to understand growth prospects for the region, as they will have implications for the global LNG market.

This article will look at demand among Asian LNG importers over the next few years.

It must be noted that while the term LNG "demand" is commonly used, it is a bit of a misnomer. A more accurate term would be "likely imports." Even if an economy slows or contracts sharply (as we expect to see in 2009), LNG imports can increase with the delivery of new contracted volumes.

Of course, this does not necessarily indicate strong demand but rather a supply push. This would likely be accompanied by price weakness and reduced demand for spot cargoes. For the purpose of this piece, we stick with convention and refer to "demand."

Economies suffer

The global economy has slowed significantly over the past 6-8 months. The US financial crisis was the initial trigger, but the impact soon spread to other geographic regions and economic sectors.

Originally, Asia appeared to weather

Korea Gas Corp. operates three LNG import terminals, the one at Incheon (shown here) being the oldest, starting up in 1996. At Incheon, 18 tanks can store nearly 2.5 million cu m of LNG. Data for 2007, the most recent available, show that South Korea ranked second in total LNG imports behind Japan. Korea Gas is set to receive the first cargoes from Sakhalin 2 in second-quarter 2009. (Photograph from Kogas)

the crisis. Most monetary authorities had accumulated substantial foreign reserves and regional banks were typically well capitalized. Regulatory oversight had also improved following the 1997-98 Asian economic crises. Some briefly speculated (or hoped) that Asian economies had largely "delinked" from the US and Europe and would come through the crisis relatively unscathed.

The past few months, however, have made clear that talk of such a delinkage from the global economy was misguided. October-November 2008 economic data showed clear signs of slowdown. Meanwhile, key indicators of energy use are off sharply.

After averaging some 14%/year growth since 2002, Chinese power demand was down by 3% year-on-year (y-o-y) in October 2008 and 8% in November 2008. Auto sales also slowed sharply in both China and India. The impact of lethargic global and regional trade on highly export-dependent economies, such as Singapore, Taiwan, and Hong Kong, has become readily apparent and will affect demand for the power sector as well as industrial use.

New markets

In spite of the recent economic turmoil, the Asia-Pacific LNG market will remain relatively robust beyond 2009. Fig. 1 shows our base-case scenario.

While imports in 2008 increased by an estimated 4.7% from 2007 levels, they will contract slightly in 2009. This reduction in demand, however, will be tempered by relatively strong growth in China and, to a lesser extent, India.

Fig. 2 illustrates the region's incremental imports by country through 2011. The majority of incremental demand growth will come from such new markets as China and India, while the more mature markets of Japan, Korea, and Taiwan will experience slower growth in 2010-11. Several factors are at play here for each country that is examined.

Japan

In 2008, LNG imports in Japan increased 3.7% to 69.3 million tonnes from 2007 levels, driven primarily by the power sector because of nuclear power problems and strong industrial sector demand. Tokyo Electric Power Co.'s (TEPCO) 8.2 Gw Kashiwazaki-Kariwa nuclear power plant remained closed throughout 2008. Other utilities, including Kansai Electric Power Co. and Chubu Electric Power Co., also closed some of their units for both planned and unplanned inspections.

Japan's actual consumption, meanwhile, totaled 68.5 million tonnes in 2008, up 2.1%, compared with 67.2 million tonnes in 2007. Electric utilities accounted for 61% of Japan's total consumption and city gas utilities accounted for the rest. While Japan's natural gas demand growth was strong in first and second quarters 2008, the industrial

sector's demand started to weaken in the third quarter.

By December 2008, city gas demand by the industrial sector fell significantly in the Tokyo, Nagoya, and Osaka regions, as Japanese economic activities had been hit by global economic recession. Japan's economic growth is led mainly by external demand; demand contraction of automobile, electronics goods, and other machinery products in overseas markets are directly hurting manufacturing industries.

Even Toyota, one of Japan's leading manufacturers, is struggling with sagging demand for automobiles in domestic and overseas markets. Reducing exports, restricted corporate investments, and dull consumer spending will put further downward pressure on the Japanese economy.

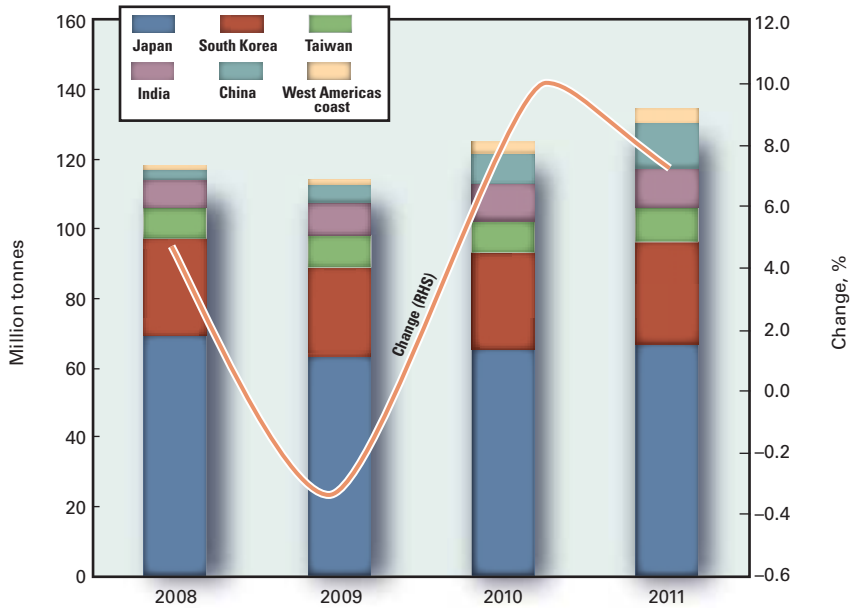
Japan's economic growth rates for 2009 will be in a range of –2.6% and –3.5% from the previous year. We believe that power and city gas demand from the industrial sector (especially in Nagoya, which hosts Japan's mainstay export manufacturers, including Toyota) in 2009 will decline significantly from 2008. Toyota's domestic production for February-April 2009 will be half of the same period last year (i.e., 9,000 cars/day). This marks the lowest production level in the past 30 years.

Looking ahead, we expect Japan's LNG imports for 2009 to decline by 5.9 million tonnes from 2008. Power sector demand will decline by 5% because some troubled nuclear units (at least two units) at TEPCO's Kashiwazaki-Kariwa nuclear power plant will resume operation this year. Industrial demand in 2009 will fall by 15% and residential-commercial demand will increase by a mere 0.3% y-o-y.

In 2010, the industrial sector's demand will increase by 3% y-o-y and the power sector by 3.7%. Still, total LNG imports in 2010 (65.3 million tonnes) will be lower than the 2008 level. By 2011, we believe demand will come back to 2007 levels at about 66.8 million tonnes.

ASIA-PACIFIC LNG IMPORT FORECAST

Fig. 1



Korea

Korean imports of LNG posted a healthy growth of 6.6% in 2008 vs. 2007, primarily due to higher imports in the early part of the year. LNG was favored over oil products in the industrial and power sectors due to lower unit cost when compared with competing oil products. In addition, the start of a new long-term contract with MLNG Tiga in 2008 increased available supplies.

Looking ahead, we forecast LNG imports in 2009 will contract by about 6%, as gas demand in the industrial and power sectors weakens due to slowing economies. In 2010, we expect the Korean economy will begin to show signs of recovery and corresponding gas demand will grow by 5%, driven primarily by the city gas sector, while imports will increase by roughly 7%. By 2011, LNG imports will reach 29.2 million tonnes, an increase of 6.6% over 2010 levels.

Taiwan

With an estimated 79% of gas supply allocated to the power sector, the outlook for Taiwan's LNG demand in the next 3 years greatly depends on developments in this sector. The downturn in global economies has hit Taiwan hard as domestic electricity sales sank due to lackluster performance from, especially, the industrial sector. In 2008, preliminary estimates were for lower electricity sales (–2%) y-o-y from a weakening global economy and the hike in domestic electricity prices.

For 2009, it is likely that overall growth in electricity sales will slow further along with gross domestic product growth. Lackluster demand from the industrial sector will bear the brunt of weak external markets, reducing overall power needs. Although this will slow overall growth of LNG demand for the nation, the delays in additional nuclear power generation capacity (nuclear power plant No. 4) will cushion the contraction in LNG demand.

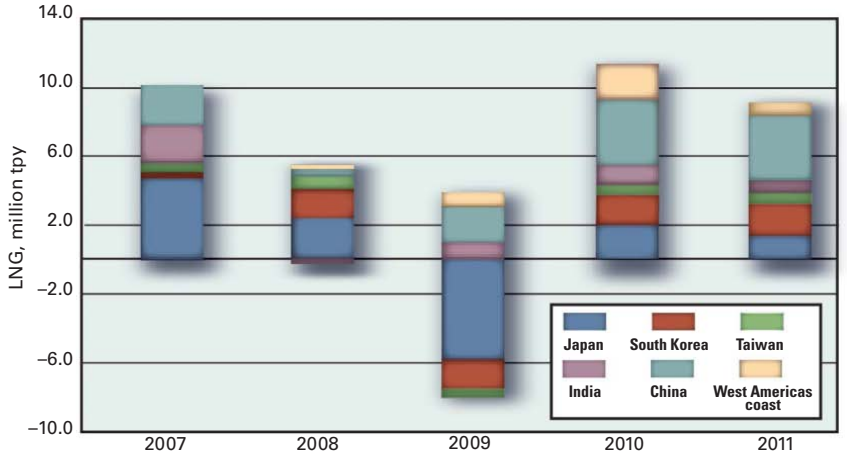
Overall, the Taiwanese market seems well supplied for 2009, reducing the need for any spot purchases for the year. LNG demand will be around 8.6 million tonnes for the year, rising to some 9.8 million tonnes by 2011.

India

Preliminary estimates are that India's 2008 LNG imports fell by more than

ASIA-PACIFIC LNG IMPORT BY COUNTRY*

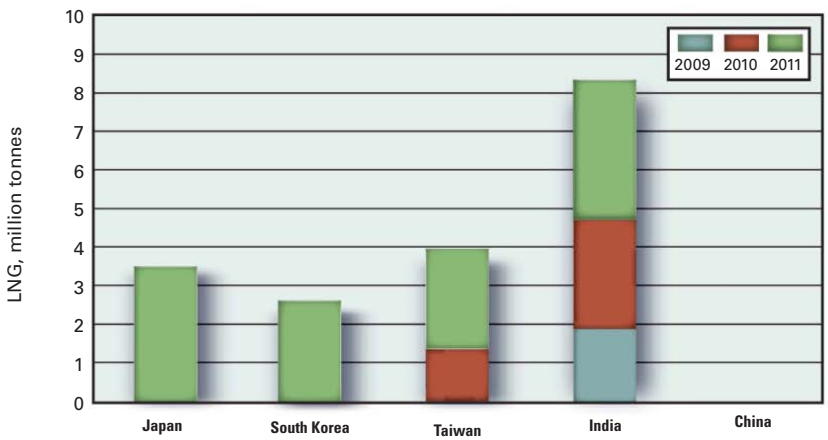
Fig. 2



*Year-on-year change.

ASIA-PACIFIC UNCONTRACTED LNG DEMAND

Fig. 3



2% compared with 2007 levels. The recent decrease in spot LNG prices, however, is resulting in continued use of LNG, as there is large unmet demand for natural gas in India. The current affordability in various sectors in India has risen over the last 3-4 years, and most sectors are capable of paying a delivered gas price of $7-9/MMbtu.

LNG imports can be used to fill immediate deficits as KG basin volumes are likely to materialize more slowly than expected, gradually increasing in 2009 and reaching some 20-30 million std. cu m/day by yearend 2009 or early 2010.

In the future, although the economy is slowing, we anticipate LNG importers in India to take advantage of the near-term weakness in international LNG prices and increase LNG imports, keeping in accordance to the level of regasification capacity available. Our projections show LNG imports of 9.2 million tonnes in 2009, rising to around 11.1 million tonnes in 2011.

China

The Chinese economy has been slowing down since third-quarter 2008, which has affected energy demand considerably. For natural gas, the impact has also been felt, and we see a slowdown of consumption growth in the short run. Compared with oil, coal, and electric power, however, natural gas demand is growing much faster, thanks mainly to higher domestic production. For 2008, China imported 3.3 million tonnes of LNG, up from 2.9 million tonnes in 2007.

In 2009, we project that China will import 5.4 million tonnes of LNG. The higher imports of 2009 over 2008 are boosted by a number of factors, such as completion of new terminals (Fujian and Shanghai) and start-up of new supply contracts from Tangguh, MLNG Tiga, and Qatargas II.

Despite the increase, however, 2009 imports are still lower than previously anticipated due to the slowing economy, which heavily depends on exports. In 2010-11, imports will continue to grow robustly primarily due to the ramp up of contractual volumes from Tangguh, MLNG Tiga, and Qatargas II, as well as a new supply contract with Total, which is slated to commence in 2010. China will account for more than 45% of the Asia-Pacific's incremental demand growth from 2008-11.

West Coast Americas

In light of weakening global economic conditions, we have revised downwards our LNG demand projections for terminals operating on the West Coast of the Americas (Mexico and Chile). States in the northwestern region of Mexico have close economic (trade) relations with the US. Hence, given the deterioration of the US economy, natural gas demand by the power and industrial sectors will weaken as industrial production falls.

The Mexican state of Baja California, where the 7.7-million-tpy Energia Costa Azul LNG receiving terminal is located, is home to numerous manufacturing operations, which include consumer electronics and automobile production. More than 90% of the natural gas in the northwestern region is consumed by the power sector.

Similarly, Chile (with one LNG receiving terminal aiming to start up in mid-2009) may demand lower LNG

volumes to feed the power and industrial sectors as copper exports slow on the back of a global economic recession and reduced construction activity. (Chile is the world's largest copper producer.)

Another terminal aims to start up in 2010 and may come on line amid a relatively weak economic environment. Since the economic crisis is global and not just US focused, we do not anticipate a significant drop (vs. our previous projections) in LNG flowing into the terminals on the West Coast of the Americas as exemplified by our base-case scenario.

Wild cards that may affect the amount of LNG heading to Mexico's Energia Costa Azul terminal include, among others, the pace and breath of economic recovery, LNG demand in alternative markets such as Asia, and the price of natural gas in the US relative to prices Asian buyers are willing to pay to secure non-long-term cargoes. These factors will determine in part whether diversions will take place.

Observations

Perhaps surprisingly, given the poor near-term economic outlook, the Asia-Pacific region will experience relatively strong growth in LNG imports through 2011. In nominal terms, the largest growth in imports will be in China, the West Coast of Americas, and India.

That being said, however, most of this demand growth will be filled by existing or upcoming LNG supply contracts. If we look at uncontracted LNG demand in the Fig. 3, showing the difference between committed supply and forecast demand, we can see that the real opportunities for suppliers are in India, followed by Taiwan and Japan. Uncontracted demand for the region stands at about 1.9 million tonnes in 2009, 4.2 million tonnes in 2010, and 12.2 million tonnes in 2011. India alone accounts for more than one-third of the total uncontracted demand through 2011.

The limited amount of room for incremental LNG supplies to go to the Asia-Pacific market in the next few years will surely lead to higher imports to markets such as the US, which has a large liquid gas market, in addition to substantial storage capacity.

Moreover, given the significant amount of liquefaction capacity coming on stream for the period, coupled with the fact that US gas prices are expected to remain $3-4.5/MMbtu in 2009, we expect to see continued weakness in spot and short-term LNG prices, at least for the next couple of years.

Suppliers are mistaken if they believe they can place substantial volumes into the Asia-Pacific market over the next few years, as there simply is not enough demand given existing commitments, even at relatively lower prices. The end result is likely to be a continuation of relatively weak LNG prices (compared with the last couple of years) as supply is plentiful and uncontracted demand in one of the key markets remains relatively soft until supply growth begins to curtail in 2012. ✦

The authors

Alexis Zhiying Aik is a senior consultant and head of the gas team in Singapore for FACTS Global Energy. Her coverage includes LNG demand-supply scenarios and pricing issues for both natural gas and LNG sectors. In addition to leading studies dealing with LNG procurement and pricing analysis, she has presented at several oil and gas briefings and conferences in Asia, the Middle East, and the US. Aik holds a bachelors in business management from Singapore Management University and she was formerly a fellow of the East-West Center Asia-Pacific leadership program.

Tomoko Hosoe is a project specialist at the East-West Center, Honolulu, with a focus primarily on downstream oil and natural gas and LNG East of the Suez, energy policy, environmental and nuclear power issues, with a special emphasis on Japan. She has participated in various projects, such as Japan's gas and power market deregulation, oil and gas demand outlook, LNG pricing analysis, various market feasibility studies, energy security and cooperation among ASEAN+3, and Asia-Pacific Economic Cooperation member economies. Hosoe holds a masters in public affairs from the School of Public and Environmental Affairs—Public Management—at Indiana University.

Shahriar Fesharaki is vice-chairman of FACTS Global Energy, Honolulu, overseeing gas consulting activities at FGE. His focus is on new business development, specifically looking at new growth opportunities for FGE. He also specializes in LNG marketing and is responsible for providing buyers and sellers with sourcing and placement strategies for LNG. He holds an MBA with an emphasis on international business from the University of Hawaii, Manoa, and was previously with the Bank of Hawaii.

Sook Ching Wong is a senior analyst and gas specialist with FACTS Global Energy. Before joining FGE, she held research and knowledge-centric positions with the Maritime Institute of Malaysia, the Institute of Bankers Malaysia, and the Institute of Southeast Asian Studies, Singapore. At FGE, her focus is on conducting research and analysis on the downstream natural gas and LNG sectors of the Asia-Pacific region. She holds an MEc and a BSc in economics and management with honors from the University of Malaya, Malaysia, and the University of London.

Equipment/Software/Literature

New rupture disks feature 95% operating ratio

New versions of the STAR X and ULTRX rupture disks each feature a 95% operating ratio. The company's reverse acting family of disks now includes the ULTRX HP and STAR X HP, which utilize a precision manufacturing technology to achieve and control burst pressures at tight tolerances. This high precision version of these products allows them to be pressurized up to 95% of the rated (marked) burst pressure under normal operating conditions for ratings above 40 psig.

The maker says that this increased operating ratio performance results in lower maintenance costs, increased productivity, and reduced material loss by improving performance and production and maintenance flexibility. The ULTRX HP is suited for fully liquid systems as well as gaseous or partial gas-liquid systems. The STAR X HP is designed to provide protection at burst pressures as low as 13 psig.

Source: **Continental Disk Corp.,** 3160 W. Heartland Drive, Liberty, MO 64068.

New disk based tape replacement storage solution

PetroStor, a new scalable disk storage platform, provides users with petabytes of on line capacity.

Tested and qualified with this firm's exploration and production software, the solution is suited for companies that need fast access to seismic files and archived project data.

Unlike traditional tape alternatives, the firm points out, the PetroStor storage solution provides upstream users instant access to all their seismic files and project data archives. Combining enterprise-class storage from NetApp with real-time compression from Storwize, the PetroStor storage solution lowers storage costs to less than $1,000/terabyte. It enables storage administrators to increase their storage capacity, along with data reliability and performance, while reducing associated infrastructure footprint, cooling, and power costs, as well as administrative costs associated with tape transcription and re-mastering.

The company says that lower disk-storage costs help increase the volume of data that can be kept at hand. Analysis can be performed more efficiently when data are readily available, resulting in more timely decisions and lower overall exploration costs, the firm adds.

Also the company says it already has multiple deployments using Storwize real-time compression because its customers are generating high volumes of business-critical data. Based upon strategic alliances with NetApp and Storwize, the company is offering a solution that provides users cost-effective on line access to all their current and archived data. Their data are now not only more available but also more secure because users no longer need to worry about physical deterioration of tapes, the firm notes.

Source: **Landmark,** 5 Houston Center, 1401 McKinney St., Suite 2400, Houston, TX 77010.

Woolslayer Companies Inc.,

Tulsa, has named Thomas L. Wingerter CEO and member of the WCI board of directors. Dewayne Vogt remains WCI president and chief engineer. Wingerter joins WCI from Pinpoint Drilling & Directional Services LLC, a privately held integrated drilling and directional services company in Dallas. Prior to his 4-year tenure with Pinpoint, he was with Parker Drilling Co. for 25 years. He retired from Parker in 2003 as vice-president of global operations.

Wingerter

Woolslayer is a worldwide provider of design, engineering, and fabrication of oil field masts, derricks, and drilling equipment components. The company also provides structural design and analysis, computer-aided design, feasibility studies, inspection and repair, and project management.

Seismic Micro-Technology,

Houston, has expanded its software donation program to geoscience students in 160 colleges and universities in key oil and gas regions around the world. The goal of SMT's educational grant program is to place software in the classroom so graduating students are equipped for the job market with hands-on workstation experience. SMT KINGDOM software donations are utilized for teaching and research at academic institutions in 27 countries. Beginning in 2001, 3-year grants, including all maintenance support and updates, have been donated, with a total estimated value of more than $150 million.

SMT is a market leader for Windows-based geoscientific interpretation software. SMT software enables intuitive interpretation, validation, risk reduction, and data management in one integrated executable.

Schweitzer Engineering Laboratories Inc.,

Pullman, Wash., has announced that it is now 100% employee-owned. Founded by CEO and Pres. Edmund O. Schweitzer III in 1984, SEL employs 1,800 people worldwide and supports products in 126 countries. SEL employees previously held a partial stake in the privately held company. Transition to a 100% employee-owned structure is part of SEL's long-term strategy for sustained growth, stability, and customer focus.

SEL serves industry worldwide through the design, manufacture, supply, and support of products and services for industrial power system protection, monitoring, control, automation, and metering.

NovaDrill,

Provo, Utah, has named Andy Szescila to its board of directors. A 34-year upstream oil and gas industry veteran, he previously was COO of Baker Hughes Inc. NovaDrill is commercializing a complete directional drilling and formation evaluation system for drill bit, MWD, and LWD markets, made up of advanced elements that can be integrated or used individually.

Founded in 2008, NovaDrill is funded by upstream technology venture capital firm Energy Ventures in partnership with Novatek, an industry leader in industrial diamonds.

IMPORTS OF CRUDE AND PRODUCTS

	Districts 1–4		District 5		Total US		
	3–27 2009	3–20 2009	3–27 2009	3–20 2009	3–27 2009	3–20 2009	*3–28 2008
	1,000 b/d						
Total motor gasoline	1,207	989	4	147	1,211	1,136	944
Mo. gas. blending comp.	884	788	0	12	884	800	590
Distillate	263	449	0	0	263	449	322
Residual	272	261	97	115	369	376	316
Jet fuel–kerosine	58	38	92	18	150	56	111
Propane–propylene	249	137	36	23	285	160	145
Other	(116)	126	117	108	1	234	762
Total products	**2,817**	**2,788**	**346**	**423**	**3,163**	**3,211**	**3,190**
Total crude	**8,634**	**8,186**	**920**	**1,198**	**9,554**	**9,384**	**10,283**
Total imports	**11,451**	**10,974**	**1,266**	**1,621**	**12,717**	**12,595**	**13,473**

*Revised.
Source: US Energy Information Administration
Data available in OGJ Online Research Center.

Additional analysis of market trends is available through **OGJ Online**, *Oil & Gas Journal's* electronic information source, at http://www.ogjonline.com.

OIL&GAS JOURNAL online research center

OGJ CRACK SPREAD

	*4-3–09	*4-4–08	Change	Change, %
	$/bbl			
SPOT PRICES				
Product value	56.89	115.09	–58.20	–50.6
Brent crude	48.66	102.04	–53.38	–52.3
Crack spread	8.23	13.05	–4.82	–36.9
FUTURES MARKET PRICES				
One month				
Product value	59.10	117.80	–58.71	–49.8
Light sweet crude	50.32	103.49	–53.17	–51.4
Crack spread	8.77	14.31	–5.54	–38.7
Six month				
Product value	61.22	112.65	–51.44	–45.7
Light sweet crude	56.92	100.89	–43.97	–43.6
Crack spread	4.30	11.76	–7.46	–63.5

*Average for week ending.
Source: Oil & Gas Journal
Data available in OGJ Online Research Center.

PURVIN & GERTZ LNG NETBACKS—APR. 3, 2009

Receiving terminal	Liquefaction plant					
	Algeria	Malaysia	Nigeria	Austr. NW Shelf	Qatar	Trinidad
	$/MMbtu					
Barcelona	9.70	6.24	8.93	6.15	6.76	8.86
Everett	3.28	1.52	2.98	1.64	1.97	3.52
Isle of Grain	2.99	1.24	2.48	1.16	1.68	2.50
Lake Charles	1.58	0.05	1.40	0.19	0.32	2.07
Sodegaura	4.02	6.46	4.28	6.21	5.08	3.51
Zeebrugge	5.80	3.41	4.84	3.27	3.91	4.94

Definitions, see OGJ Apr. 9, 2007, p. 57.
Source: Purvin & Gertz Inc.
Data available in OGJ Online Research Center.

CRUDE AND PRODUCT STOCKS

District	Crude oil	Motor gasoline		Jet fuel, kerosine	Fuel oils		Propane–propylene
		Total	Blending comp.[1]		Distillate	Residual	
	1,000 bbl						
PADD 1	13,178	58,107	38,879	9,157	53,310	13,164	2,730
PADD 2	85,607	51,919	23,093	7,321	33,718	1,411	13,456
PADD 3	187,446	71,158	40,917	12,870	40,657	16,024	21,238
PADD 4	14,972	6,410	2,487	576	3,321	248	[1]833
PADD 5	58,224	29,199	24,181	9,616	13,147	4,668	—
Mar. 27, 2009	**359,427**	**216,793**	**129,557**	**39,540**	**144,153**	**35,515**	**38,257**
Mar. 20, 2009	**356,583**	**214,568**	**125,867**	**39,344**	**143,932**	**34,714**	**37,738**
Mar. 28, 2008[2]	**319,164**	**224,710**	**113,610**	**38,067**	**109,720**	**39,736**	**24,897**

[1]Includes PADD 5. [2]Revised.
Source: US Energy Information Administration
Data available in OGJ Online Research Center.

REFINERY REPORT—MAR. 27, 2009

District	REFINERY OPERATIONS		REFINERY OUTPUT				
	Gross inputs	Crude oil inputs	Total motor gasoline	Jet fuel, kerosine	Fuel oils		Propane–propylene
					Distillate	Residual	
	1,000 b/d						
PADD 1	1,157	1,189	2,029	117	266	114	36
PADD 2	2,903	2,895	2,096	163	847	47	203
PADD 3	7,316	7,194	2,837	724	2,109	230	625
PADD 4	508	502	288	17	168	10	[1]161
PADD 5	2,518	2,378	1,483	390	492	185	—
Mar. 27, 2009	**14,402**	**14,158**	**8,733**	**1,411**	**3,882**	**586**	**1,025**
Mar. 20, 2009	**14,451**	**14,135**	**8,723**	**1,393**	**3,713**	**621**	**1,034**
Mar. 28, 2008[2]	**14,361**	**14,207**	**8,608**	**1,505**	**3,856**	**705**	**1,070**
	17,621 Operable capacity		**81.7% utilization rate**				

[1]Includes PADD 5. [2]Revised.
Source: US Energy Information Administration
Data available in OGJ Online Research Center.

OGJ GASOLINE PRICES

	Price ex tax 4-1-09	Pump price* 4-1-09	Pump price 4-2-08
	¢/gal		
(Approx. prices for self-service unleaded gasoline)			
Atlanta	151.9	198.4	329.7
Baltimore	153.8	195.7	319.6
Boston	151.8	193.7	314.7
Buffalo	139.1	200.0	336.0
Miami	145.1	196.7	342.7
Newark	189.4	222.0	306.0
New York	123.6	184.5	316.0
Norfolk	150.0	188.4	317.3
Philadelphia	151.7	202.4	324.1
Pittsburgh	159.3	210.0	322.8
Wash., DC	172.9	211.3	325.3
PAD I avg	153.5	200.3	323.1
Chicago	155.6	220.0	357.7
Cleveland	156.0	202.4	324.3
Des Moines	158.1	198.5	324.3
Detroit	145.0	204.4	323.0
Indianapolis	139.1	198.5	328.0
Kansas City	156.9	192.9	319.7
Louisville	157.6	198.5	335.4
Memphis	156.5	196.3	325.7
Milwaukee	151.0	202.3	322.3
Minn.-St. Paul	156.7	200.7	318.6
Oklahoma City	152.1	187.5	317.4
Omaha	151.7	197.0	327.8
St. Louis	153.0	189.0	312.9
Tulsa	151.9	187.3	310.7
Wichita	150.1	193.5	312.6
PAD II avg	152.8	197.9	324.0
Albuquerque	158.2	194.6	317.6
Birmingham	153.3	192.6	327.5
Dallas-Fort Worth	151.4	189.8	321.5
Houston	150.1	188.5	320.5
Little Rock	153.2	193.4	325.2
New Orleans	151.5	189.9	322.8
San Antonio	150.2	188.6	315.2
PAD III avg	152.6	191.1	321.5
Cheyenne	156.8	189.2	312.7
Denver	155.4	195.8	331.6
Salt Lake City	148.0	190.9	324.9
PAD IV avg	153.4	191.9	323.1
Los Angeles	144.0	211.1	352.2
Phoenix	161.4	198.8	309.9
Portland	177.7	221.1	347.2
San Diego	161.0	228.1	364.2
San Francisco	166.0	233.1	379.8
Seattle	165.2	221.1	355.3
PAD V avg	162.6	218.9	351.4
Week's avg.	**154.4**	**200.0**	**327.2**
Mar. avg.	**147.6**	**193.2**	**319.7**
Feb. avg.	**144.0**	**189.6**	**303.1**
2009 to date	**142.1**	**187.7**	—
2008 to date	**266.5**	**310.1**	—

*Includes state and federal motor fuel taxes and state sales tax. Local governments may impose additional taxes.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

REFINED PRODUCT PRICES

	3-27-09 ¢/gal		3-27-09 ¢/gal
Spot market product prices			
Motor gasoline (Conventional-regular)		Heating oil No. 2	
New York Harbor	140.00	New York Harbor	141.45
Gulf Coast	139.25	Gulf Coast	139.45
Los Angeles	148.00	Gas oil	
Amsterdam-Rotterdam-Antwerp (ARA)	135.27	ARA	145.37
Singapore	144.05	Singapore	145.40
Motor gasoline (Reformulated-regular)		Residual fuel oil	
New York Harbor	135.00	New York Harbor	97.93
Gulf Coast	146.75	Gulf Coast	102.45
Los Angeles	159.50	Los Angeles	110.25
		ARA	95.43
		Singapore	100.43

Source: DOE Weekly Petroleum Status Report.
Data available in OGJ Online Research Center.

BAKER HUGHES RIG COUNT

	4-1-09	4-2-08
Alabama	3	5
Alaska	12	9
Arkansas	47	44
California	21	34
Land	20	33
Offshore	1	1
Colorado	55	123
Florida	0	0
Illinois	1	0
Indiana	1	2
Kansas	21	12
Kentucky	8	12
Louisiana	131	142
N. Land	71	47
S. Inland waters	6	17
S. Land	17	25
Offshore	37	53
Maryland	0	0
Michigan	0	0
Mississippi	10	12
Montana	0	14
Nebraska	0	0
New Mexico	35	74
New York	1	8
North Dakota	46	54
Ohio	7	12
Oklahoma	106	206
Pennsylvania	30	22
South Dakota	0	2
Texas	416	904
Offshore	4	9
Inland waters	1	2
Dist. 1	10	26
Dist. 2	15	41
Dist. 3	37	54
Dist. 4	42	93
Dist. 5	100	185
Dist. 6	74	125
Dist. 7B	11	35
Dist. 7C	16	75
Dist. 8	42	126
Dist. 8A	13	21
Dist. 9	18	34
Dist. 10	33	78
Utah	18	38
West Virginia	24	23
Wyoming	37	68
Others—NV-5; TN-3; VA-3; WA-2	13	10
Total US	**1,043**	**1,830**
Total Canada	**75**	**126**
Grand total	**1,118**	**1,956**
US Oil rigs	224	362
US Gas rigs	808	1,458
Total US offshore	44	64
Total US cum. avg. YTD	**1,623**	**1,774**

Rotary rigs from spudding in to total depth.
Definitions, see OGJ Sept. 18, 2006, p. 42.

Source: Baker Hughes Inc.
Data available in OGJ Online Research Center.

SMITH RIG COUNT

Proposed depth, ft	Rig count	4-1-09 Percent footage*	Rig count	4-2-08 Percent footage*
0-2,500	51	5.8	82	6.0
2,501-5,000	58	63.7	114	52.6
5,001-7,500	141	20.5	205	20.4
7,501-10,000	225	3.5	419	2.6
10,001-12,500	210	3.8	473	4.0
12,501-15,000	201	—	296	—
15,001-17,500	116	—	114	—
17,501-20,000	58	—	75	—
20,001-over	36	—	35	—
Total	**1,096**	**7.7**	**1,813**	**7.5**
INLAND	10		28	
LAND	1,040		1,730	
OFFSHORE	46		55	

*Rigs employed under footage contracts.
Definitions, see OGJ Sept. 18, 2006, p. 42.

Source: Smith International Inc.
Data available in OGJ Online Research Center.

OGJ PRODUCTION REPORT

	[1]4-3-09	[2]4-4-08
	1,000 b/d	
(Crude oil and lease condensate)		
Alabama	21	20
Alaska	731	720
California	660	651
Colorado	64	65
Florida	6	6
Illinois	28	26
Kansas	108	106
Louisiana	1,469	1,283
Michigan	16	16
Mississippi	62	60
Montana	91	85
New Mexico	168	162
North Dakota	206	146
Oklahoma	179	171
Texas	1,375	1,337
Utah	60	55
Wyoming	151	148
All others	68	70
Total	**5,463**	**5,127**

[1]OGJ estimate. [2]Revised.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

US CRUDE PRICES

	4-3-09 $/bbl*
Alaska-North Slope 27°	35.34
South Louisiana Sweet	53.00
California-Kern River 13°	45.50
Lost Hills 30°	53.80
Wyoming Sweet	39.51
East Texas Sweet	48.50
West Texas Sour 34°	41.25
West Texas Intermediate	49.00
Oklahoma Sweet	49.00
Texas Upper Gulf Coast	42.00
Michigan Sour	41.00
Kansas Common	48.00
North Dakota Sweet	42.50

*Current major refiner's posted prices except North Slope lags 2 months. 40° gravity crude unless differing gravity is shown.
Source: Oil & Gas Journal.
Data available in OGJ Online Research Center.

WORLD CRUDE PRICES

$/bbl[1]	3-27-09
United Kingdom-Brent 38°	51.19
Russia-Urals 32°	48.96
Saudi Light 34°	48.54
Dubai Fateh 32°	49.76
Algeria Saharan 44°	51.99
Nigeria-Bonny Light 37°	52.89
Indonesia-Minas 34°	54.26
Venezuela-Tia Juana Light 31°	51.62
Mexico-Isthmus 33°	51.51
OPEC basket	50.96
Total OPEC[2]	50.15
Total non-OPEC[2]	50.02
Total world[2]	50.10
US imports[3]	49.47

[1]Estimated contract prices. [2]Average price (FOB) weighted by estimated export volume. [3]Average price (FOB) weighted by estimated import volume.
Source: DOE Weekly Petroleum Status Report.
Data available in OGJ Online Research Center.

US NATURAL GAS STORAGE[1]

	3-27-09	3-20-09	3-27-08	Change, %
	bcf			
Producing region	731	709	497	**47.1**
Consuming region east	642	664	580	**10.7**
Consuming region west	282	281	175	**61.1**
Total US	**1,655**	**1,654**	**1,252**	**32.2**
	Jan. 09	**Jan. 08**	**Change, %**	
Total US[2]	**2,141**	**2,055**	**4.2**	

[1]Working gas. [2]At end of period.
Source: Energy Information Administration
Data available in OGJ Online Research Center.

Statistics

WORLDWIDE CRUDE OIL AND GAS PRODUCTION

	Jan 2009	Dec. 2008	1 month average — production — 2009	2008	Change vs. — previous year — Volume	%	Jan. 2009	Dec. 2008	Cum. 2009
	Crude, 1,000 b/d						Gas, bcf		
Argentina	615	608	615	614	2	0.3	116.4	117.5	116.35
Bolivia	40	40	40	42	–2	–4.8	42.0	42.0	42.00
Brazil	1,889	1,850	1,889	1,776	113	6.4	30.0	35.0	30.00
Canada	2,606	2,656	2,606	2,531	75	3.0	516.3	498.7	516.30
Colombia	600	590	600	554	46	8.3	22.0	22.0	22.00
Ecuador	500	490	500	500	—	—	1.0	1.0	1.00
Mexico	2,685	2,717	2,685	2,957	–272	–9.2	219.8	228.1	219.80
Peru	110	108	110	69	41	59.4	9.2	10.4	9.20
Trinidad	110	110	110	115	–5	–4.3	115.0	115.0	115.00
United States	5,075	5,123	5,075	5,093	–18	–0.4	1,854.0	1,862.0	1,854.00
Venezuela[1]	2,180	2,290	2,180	2,440	–260	–10.7	70.0	72.0	70.00
Other Latin America	83	83	83	83	—	–0.3	5.5	5.5	5.54
Western Hemisphere	**16,494**	**16,665**	**16,494**	**16,774**	**–280**	**–1.7**	**3,001.2**	**3,009.2**	**3,001.19**
Austria	17	17	17	17	—	0.1	5.4	4.9	5.40
Denmark	277	285	277	300	–23	–7.7	30.1	30.6	30.15
France	17	19	17	20	–3	–13.0	2.8	3.1	2.80
Germany	59	59	59	64	–5	–7.8	48.0	48.6	48.00
Italy	71	87	71	108	–37	–34.3	22.0	25.0	22.00
Netherlands	30	30	30	40	–10	–25.0	330.0	350.0	330.00
Norway	2,195	2,287	2,195	2,229	–34	–1.5	363.5	352.4	363.50
Turkey	37	38	37	39	–2	–4.9	—	—	—
United Kingdom	1,433	1,475	1,433	1,477	–44	–3.0	241.4	235.3	241.43
Other Western Europe	3	3	3	4	–1	–31.2	2.2	2.2	2.16
Western Europe	**4,139**	**4,300**	**4,139**	**4,298**	**–159**	**–3.7**	**1,045.4**	**1,052.0**	**1,045.43**
Azerbaijan	850	850	850	950	–100	–10.5	35.0	35.0	35.00
Croatia	14	14	14	16	–1	–9.4	5.5	5.7	5.54
Hungary	14	14	14	14	—	0.9	8.5	7.8	8.46
Kazakhstan	1,250	1,250	1,250	1,150	100	8.7	100.0	100.0	100.00
Romania	90	90	90	95	–5	–5.3	19.0	19.0	19.00
Russia	9,740	9,660	9,740	9,800	–60	–0.6	2,000.0	2,000.0	2,000.00
Other FSU	450	450	450	400	50	12.5	550.0	550.0	550.00
Other Eastern Europe	45	46	45	49	–4	–7.9	19.5	20.9	19.53
Eastern Europe and FSU	**12,453**	**12,373**	**12,453**	**12,473**	**–20**	**–0.2**	**2,737.5**	**2,738.4**	**2,737.52**
Algeria[1]	1,270	1,320	1,270	1,400	–130	–9.3	260.0	275.0	260.00
Angola[1]	1,790	1,830	1,790	1,895	–105	–5.5	5.0	5.0	5.00
Cameroon	80	80	80	90	–10	–11.3	—	—	—
Congo (former Zaire)	25	25	25	25	—	—	—	—	—
Congo (Brazzaville)	240	240	240	240	—	—	—	—	—
Egypt	680	700	680	650	30	4.6	130.0	135.0	130.00
Equatorial Guinea	320	320	320	320	—	—	0.1	0.1	0.06
Gabon	240	240	240	230	10	4.3	0.3	0.3	0.31
Libya[1]	1,650	1,720	1,650	1,770	–120	–6.8	35.0	38.0	35.00
Nigeria[1]	1,840	1,910	1,840	2,060	–220	–10.7	80.0	82.0	80.00
Sudan	500	500	500	480	20	4.2	—	—	—
Tunisia	91	88	91	84	7	8.3	8.6	8.3	8.59
Other Africa	221	221	221	221	—	—	9.1	9.1	9.10
Africa	**8,947**	**9,194**	**8,947**	**9,465**	**–518**	**–5.5**	**528.1**	**552.8**	**528.06**
Bahrain	169	170	169	169	—	–0.1	24.8	34.0	24.81
Iran[1]	3,790	3,880	3,790	4,100	–310	–7.6	290.0	300.0	290.00
Iraq[1]	2,370	2,410	2,370	2,290	80	3.5	20.0	22.0	20.00
Kuwait[1,2]	2,460	2,520	2,460	2,570	–110	–4.3	40.0	42.0	40.00
Oman	730	700	730	700	30	4.3	60.0	58.0	60.00
Qatar[1]	780	800	780	850	–70	–8.2	180.0	180.0	180.00
Saudi Arabia[1,2]	7,960	8,260	7,960	9,010	–1,050	–11.7	200.0	200.0	200.00
Syria	390	400	390	390	—	—	18.0	18.0	18.00
United Arab Emirates[1]	2,360	2,450	2,360	2,670	–310	–11.6	125.0	130.0	125.00
Yemen	290	290	290	320	–30	–9.4	—	—	—
Other Middle East	—	—	—	—	—	203.6	9.9	10.5	9.86
Middle East	**21,299**	**21,880**	**21,299**	**23,069**	**–1,770**	**–7.7**	**967.7**	**994.5**	**967.67**
Australia	480	507	480	409	71	17.3	120.0	121.9	120.00
Brunei	161	164	161	169	–8	–4.5	37.3	34.9	37.27
China	3,709	3,709	3,709	3,778	–69	–1.8	260.0	234.8	260.00
India	638	690	638	686	–48	–7.0	80.4	87.2	80.40
Indonesia[1]	830	840	830	835	–5	–0.6	210.0	220.0	210.00
Japan	19	19	19	20	–1	–4.8	12.5	12.4	12.46
Malaysia	740	740	740	780	–40	–5.1	140.0	140.0	140.00
New Zealand	39	37	39	65	–26	–40.0	11.0	10.0	11.00
Pakistan	66	68	66	68	–2	–2.9	126.3	124.3	126.26
Papua New Guinea	40	40	40	44	–4	–9.1	1.0	1.0	1.00
Thailand	259	228	259	217	42	19.3	32.6	25.0	32.55
Vietnam	250	250	250	300	–50	–16.7	15.0	15.0	15.00
Other Asia–Pacific	35	35	35	34	—	1.3	96.5	96.5	96.50
Asia–Pacific	**7,266**	**7,326**	**7,266**	**7,405**	**–140**	**–1.9**	**1,142.4**	**1,123.0**	**1,142.44**
TOTAL WORLD	**70,598**	**71,739**	**70,598**	**73,485**	**–2,887**	**–3.9**	**9,422.3**	**9,469.9**	**9,422.32**
OPEC	28,950	30,720	28,950	32,390	–3,440	–10.6	1,306.0	1,567.0	1,306.00
North Sea	3,927	4,067	3,927	4,024	–97	–2.4	734.0	723.1	733.96

[1]OPEC member. [2]Kuwait and Saudi Arabia production each include half of Neutral Zone. Totals may not add due to rounding.
Source: Oil & Gas Journal. Data available in OGJ Online Research Center.

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Prophecy fulfilled: Democracy stalls climate sacrifice

A prominent prophet of climate doom appears, after all, to be prophetic.

No, James Hansen of the NASA's Goddard Institute for Space Studies hasn't been proven right about a perilously warming Earth. For that to happen, something will have to change a temperature record that shows no warming trend in the past decade.

Where Hansen has been validated is in a recent jeremiad about political responses to his warnings of climatic catastrophe.

"The democratic process doesn't quite seem to be working," he told The Guardian of London. "Peaceful demonstrations," he said, might be in order.

Hansen, of course, is the scientist on call to Nobel Propagandist Al Gore. In fact, he was the voice of science allowed to be heard in the 1988 Senate hearing chaired by Gore that started the global warming panic.

Now governments are on the verge of sacrificing their countries' economies to warming precautions that may have negligible effect on global average temperature. And Hansen's complaining about democracy? Well, this is the celebrity scientist, easily NASA's most recognizable official, who once fussed about having been muzzled by an administration unwilling to let him set economic policy.

He's the scientist who, according to John Theon, a former supervisor, "embarrassed NASA" with his fearful forecasts.

And he's the scientist who declared in congressional testimony last year that chief executives of fossil energy companies who question his theories "should be tried for high crimes against humanity and nature."

Now the crisis is democracy itself.

Sure enough, American democracy hasn't quite prostrated itself to let a ruinously expensive climate program pass into effect without question.

The Senate on Apr. 1 defeated a move that would have let a simple majority pass the cap-and-trade system favored by the Obama administration and congressional leadership.

Apparently, there are senators who want to think twice about jettisoning whatever hope remains for American prosperity in deference to questionable fears about the climate. Some of them might even think alarmism is wobbling off its axle and wonder what that says about its scientific assertions.

For anyone repulsed by dissent, to be sure, democracy can be a big problem.

(Online Apr. 3, 2009; author's e-mail: bobt@ogjonline.com)

The Editor's Perspective

by Bob Tippee, Editor

Market Journal

by Sam Fletcher, Senior Writer

Volatile second quarter prices

Oil prices were sharply volatile entering the second quarter of 2009 and are likely to remain "within a rising trend," said Paul Horsnell, managing director and head of commodities research at Barclays Capital Inc. in London.

In an Apr. 1 report, Horsnell said after 5 successive days in which front-month benchmark US light, sweet crudes hit intraday highs of $54-55/bbl, prices then retrenched over the next 3 days to lows some $7/bbl below that. "That pattern has been symptomatic of trading over the past 4 months," he said, "with cycles of higher prices being sold into on recurrent macroeconomic worries and weak data. Throughout those cycles, the tension between the short term and the medium term has been a significant source of volatility. During periods of calmer or more constructive macroeconomic data flow, the widespread view that supply-side damage means that prices are too low on medium- and long-term supply grounds gains footing, but when the fear returns, the view that prices are too high on short-term demand grounds motivates further selling."

Horsnell said, "The strong volatility associated with that tension seems unlikely to disappear in the current quarter, and we would expect to see several more of these episodes of 10%-plus up and down moves over very compressed time periods. Rather than the swings themselves, the more important feature is whether there is any trend in the mid-ground for this particular tug-of-war."

Horsnell said, "The question is whether prices [are] oscillating within a tunnel that is heading upwards, is flat, or is heading lower. In other words, will the quarter see in broad terms higher highs, lower lows, or a flat trend?"

In terms of the average price for the Organization of Petroleum Exporting Countries' basket of 12 reference crudes, Horsnell said, "The low for the current cycle is $33.36/bbl set in December, the high is $50.77/bbl set last week, and the latest value is $46.65/bbl. We would doubt that there is another $13 of downside for the OPEC basket this quarter, while we would expect to see the value exceed $50.77 during the quarter; hence, on balance, we would see the pattern as being one of sharp swings within an upwards sloping tunnel." As of Apr. 3, the 2009 OPEC basket price averaged $43.27/bbl.

Rig market falters

The jack up rig market is in serious trouble, with day rates down 40% from a peak over the past 6 months to a current rate of $100,000/day, said analysts Apr. 6 in the Houston offices of Raymond James & Associates Inc. "In addition to rapidly declining demand, over 50 new builds are set to hit the water by the end of 2010, boosting supply by 15%," they said.

Raymond James analysts said, "We model jack up day rates falling as low as $55,000 (or 60-70% below the peak), though still well above cost-breakeven day rates of $40,000/day. Our outlook for the jack up market is now substantially worse than Wall Street's view."

They said, "Day rates will continue to fall unless a record number of jack ups are stacked. If the market is unwilling to stack the necessary amount, rates could reach cost-breakeven levels." They expect per-share earnings among "floater-oriented drilling contractors" to fall 15% in 2010, with the "more jack up-centric" contractors down more than 30%.

As a result, they said, "Several jack up contract options are being declined, and even some exercised options are in danger of being reduced or cancelled." The downturn will affect every offshore driller, "but some more than others," they said. "Given that we have seen a material rebound in energy equities off the bottom, thanks to the recent broader market rally, we advise taking profits (or selling into current strength) on the more jack up-driven names."

In New York, analysts at Barclays Capital reported the US rig count continued its steep descent during March, falling 54% below the peaks of the third quarter of 2008. They reduced the US rig count forecast to an average 975 for 2009 and 925 for 2010. A second-half recovery in 2010 should take the US rig count to 1,125 by yearend.

"Stimulation prices have dropped sharply in the US in recent weeks, with some larger jobs going for 40% less than late 2008 levels," said Barclays Capital analysts. "The Baker Hughes international rig count fell by 24 rigs in February, led by Europe and the Middle East. We continue to forecast a 12% decline in non-North American exploration and production spending in 2009 and a flat outlook in 2010."

(Online Apr. 6, 2009; author's e-mail: samf@ogjonline.com)

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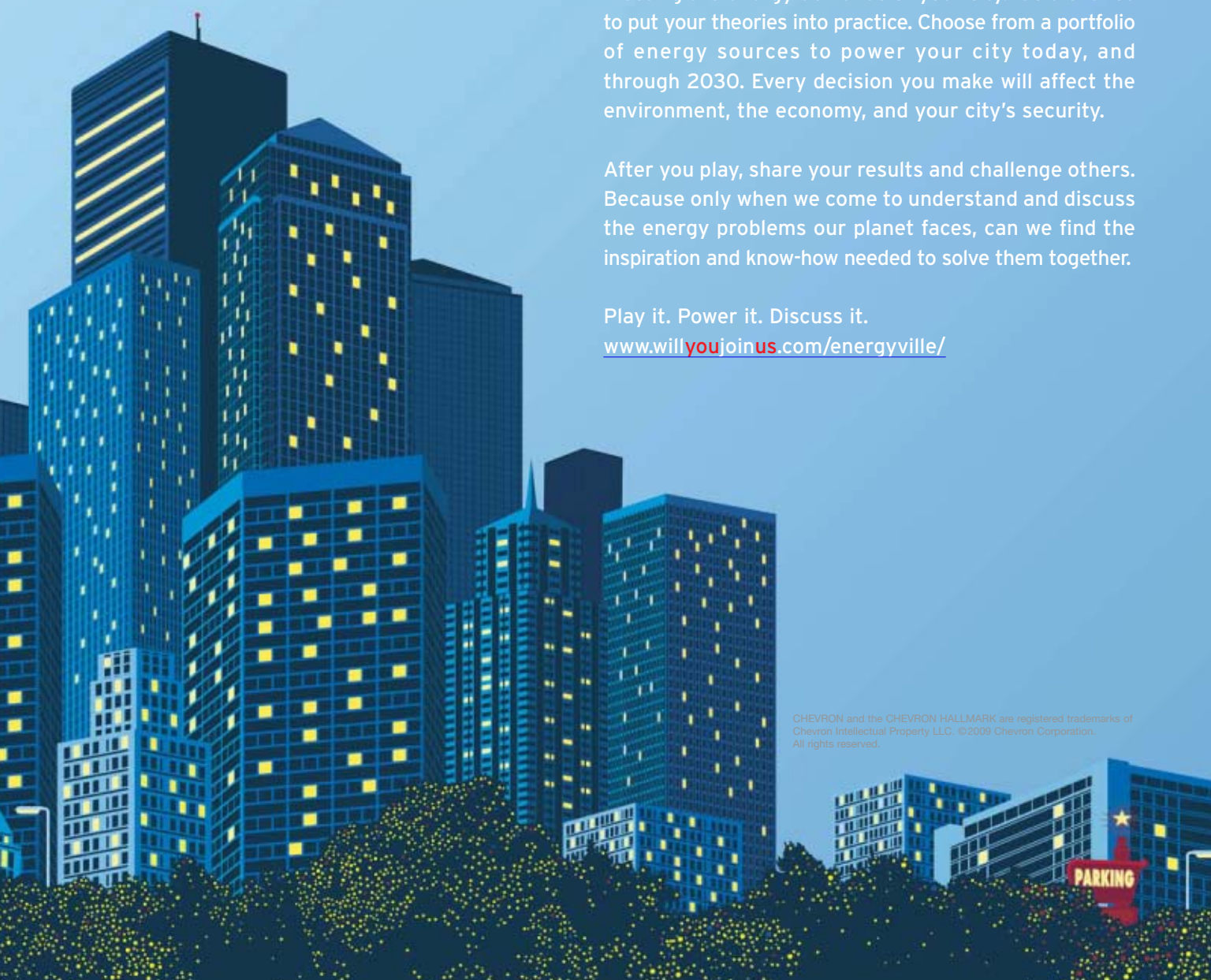

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