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FEATURE

DUG 2012: Rice Cites Energy Industry For Its Role In Assuring America's Bright Future

Three major shocks have roiled the world in the past decade or so: the 9/11 attack, the global financial crisis, and Arab Spring, said Dr. Condoleezza Rice, former U.S. Secretary of State, speaking at Hart Energy's DUG Conference & Exhibition in Fort Worth. As these events have unfurled, they have shaken Americans' faith in their country and hurt the standing of the United States in the world community.

"On 9/11, a group of stateless terrorists from the failed state of Afghanistan came across, and probably at a cost of about \$300,000, brought down the World Trade Center and blew a hole in the Pentagon and threatened America like it had not been threatened since the War of 1812," said Rice. The 9/11 terrorist attack changed forever America's concept of physical security. "We realized we had to be concerned not so much with great powers but with failed states, failing states and ungoverned spaces."

NGL PRICES & FRAC SPREAD

Ethane Prices Continue To Tumble At Conway

Ethane prices moved in opposite directions between Mont Belvieu and Conway as the Gulf Coast price rose 7% while the Mid-Continent price fell 22%, which pushed its frac spread into a negative zone. However, there isn't any real rejection of ethane at Conway because it is traded as an E-P mix and propane remains profitable at the hub.

The Mont Belvieu price of 48¢ per gallon (/gal) was the highest at the hub in a month as the market seemed to correct itself, although there are reports of increased volatility ahead of next month when several ethylene plants are expected to come back online. The Conway price dipped to 12¢/gal,



Courtesy: Tom Fox

The 2008 global financial crisis still reverberates throughout the world. "That shock changed American's conception of what constitutes economic prosperity and security," she said. "Americans were living in homes they could not afford, and homes that were worth less than what they owed."

The third great shock was the Arab Spring. In Rice's view, the upheaval in the Middle East was caused by rigid, authoritarian

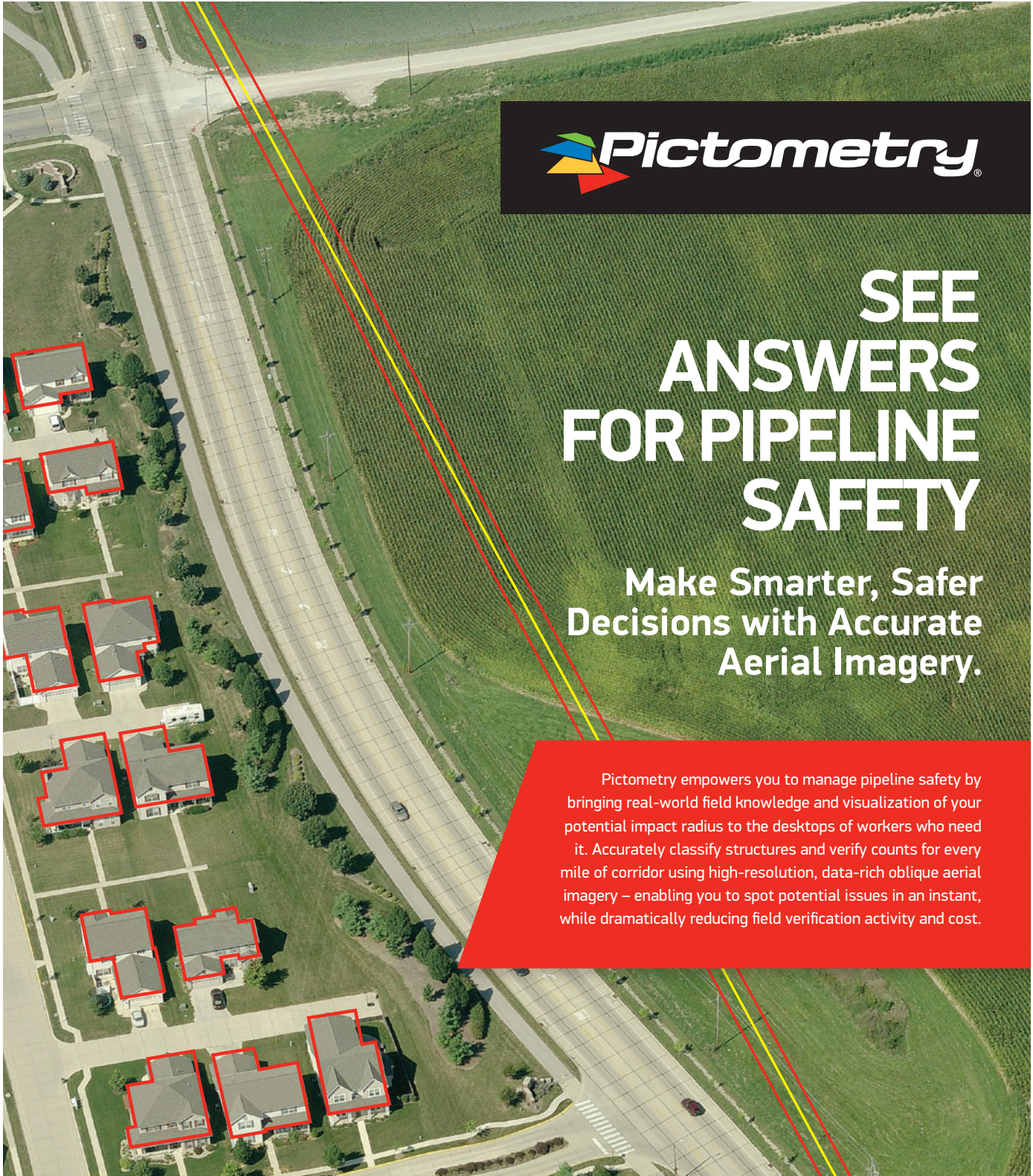
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its lowest price since Hart Energy has been compiling weekly prices in 2001.

This price isn't likely to improve until Kinder Morgan secures the necessary permits to being transporting approximately 13,000 barrels per day (b/d) E-P mix from Conway to Nova Chemicals' petrochemical complex Sarnia, Canada via the Cochin pipeline. This service was expected to have started the first of this month, but has been delayed by the permit process.

In addition, the Alliance pipeline has been receiving a record amount of gas from the Bakken shale. This has resulted in a record

(continued on page 3)



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amount of ethane – estimated between 50,000 to 55,000 b/d – being processed by Aux Sable, further limiting the market for Conway. En*Vantage noted that with E-P mix prices so low at Conway that traders could enter the market, which happened the last time prices fell below 15¢/gal, in February.

While the Conway frac spread margin theoretically fell to a negative state, the Mont Belvieu margin improved 9%. This figure should increase in May once the ethane cracker turnarounds are completed and the fractionator turnarounds begin. It is possible that ethane prices could rise as much 10¢/gal once cracking capacity returns.

Mont Belvieu propane prices were largely unchanged this week as the price was down 1% to \$1.19/gal, but the Conway price tumbled 5% to 89¢/gal due to its relationship to ethane at the hub. The Mont Belvieu margin fell 2% while the Conway margin dropped 7% as a result of the increased price of natural gas prices at both hubs. Natural gas prices at both hubs experienced gains as the Conway price rose 6% to \$1.93

Current Frac Spread (Cents/Gal)				
April 20, 2012	Conway	Change from Start of Week	Mont Belvieu	Start of Week
Ethane	11.78		47.66	
Shrink	12.82		12.68	
Margin	-1.04	-134.33%	34.98	9.01%
Propane	88.74		119.22	
Shrink	17.68		17.50	
Margin	71.06	-7.12%	101.72	-2.13%
Normal Butane	159.13		189.96	
Shrink	20.01		19.81	
Margin	139.12	-2.69%	170.15	-0.38%
Iso-Butane	188.33		202.12	
Shrink	19.22		19.02	
Margin	169.11	-3.96%	183.10	-1.32%
Pentane+	226.90		236.22	
Shrink	21.65		21.43	
Margin	205.25	-2.98%	214.79	-1.09%
NGL \$/Bbl	41.28	-3.99%	52.92	0.27%
Shrink	7.07		7.00	
Margin	34.21	-5.83%	45.93	-0.17%
Gas (\$/mmBtu)	1.93	6.04%	1.91	3.24%
Gross Bbl Margin (in cents/gal)	77.64	-6.02%	106.24	-0.20%
NGL Value in \$/mmBtu				
Ethane	0.65	-21.99%	2.62	7.41%
Propane	3.08	-4.76%	4.14	-1.37%
Normal Butane	1.72	-1.67%	2.05	-0.01%
Iso-Butane	1.17	-3.02%	1.26	-0.91%
Pentane+	2.89	-2.18%	3.01	-0.71%
Total Barrel Value in \$/mmBtu	9.51	-4.68%	13.08	0.69%
Margin	7.58	-7.07%	11.17	0.27%

NGL PRICES						
Mont Belvieu	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
April 18 - 24, '12	47.66	119.22	189.96	202.12	236.22	\$52.92
April 11 - 17, '12	44.37	120.88	189.98	203.98	237.92	\$52.78
April 4 - 10, '12	43.30	119.24	188.14	205.38	238.92	\$52.43
March 28 - April 3, '12	47.77	123.56	189.00	205.56	240.74	\$53.81
March '12	50.09	125.86	192.84	207.42	245.13	\$54.99
February '12	46.97	122.28	186.50	192.29	239.97	\$52.99
1st Qtr '12	53.93	125.90	192.36	204.32	238.95	\$55.05
4th Qtr '11	84.49	144.13	188.16	227.18	224.44	\$61.34
3rd Qtr '11	76.03	153.87	188.27	208.52	237.59	\$61.59
2nd Qtr '11	75.14	149.59	186.75	202.07	248.23	\$61.42
April 20 - 26, '11	81.55	148.10	193.73	205.30	259.75	\$63.46
Conway, Group 140	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
April 18 - 24, '12	11.78	88.74	159.13	188.33	226.90	\$41.28
April 11 - 17, '12	15.10	93.18	161.84	194.20	231.96	\$42.99
April 4 - 10, '12	16.30	93.32	161.23	191.83	232.65	\$43.16
March 28 - April 3, '12	19.66	99.38	164.84	189.50	236.12	\$44.79
March '12	29.33	107.37	172.94	193.41	241.34	\$48.21
February '12	22.65	100.24	160.71	173.94	227.79	\$44.18
1st Qtr '12	26.93	103.34	168.65	184.75	227.16	\$45.92
4th Qtr '11	34.29	129.43	160.82	204.27	196.08	\$48.23
3rd Qtr '11	46.69	143.07	166.30	199.68	210.98	\$53.06
2nd Qtr '11	52.63	139.38	170.76	192.47	236.00	\$55.34
April 20 - 26, '11	55.50	137.48	177.90	199.98	251.53	\$57.21

(Above) Data Provided by Intercontinental Exchange. Individual product prices in cents per gallon. NGL barrel in \$/42 gallons | Source: Frank Nieto

(Left) Price, Shrink of 42-gal NGL barrel based on following: Ethane, 36.5%; Propane, 31.8%; Normal Butane, 11.2%; Isobutane, 6.2%; Pentane+, 14.3%, Fuel, frac, transport costs not included. Conway gas based on NGPL Midcontinent zone, Mont Belvieu based on Houston Ship Channel.

Shrink is defined as Btus that are removed from natural gas through the gathering and processing operation. Source: Frank Nieto

per million Btu (/MMBtu) while the Mont Belvieu price rose 3% to \$1.91/MMBtu.

Heavy NGL prices were down slightly from last week at both hubs despite crude oil prices largely remaining unchanged. While Mont Belvieu prices for heavy NGLs decreased slightly, Conway prices decreased an average of 2%. These decreases are largely due to refinery turnarounds that are limiting demand.

The theoretical NGL barrel price dropped 4% at Conway to \$41.28 per barrel (/bbl) with a 6% drop in margin to \$34.21/bbl. The improved ethane prices at Mont Belvieu helped to increase the barrel price very slightly at the hub to \$52.92/bbl with a slight decrease in margin to \$45.95/bbl.

Despite the decreased pricing for heavy NGLs, the most profitable NGL to make at both hubs were all heavys with C₅₊ lead-

ing the way at both hubs at \$2.05/gal at Conway and \$2.15/gal at Mont Belvieu. This was followed, in order, by isobutane at \$1.69/gal at Conway and \$1.83/gal at Mont Belvieu; butane at \$1.39/gal at Conway and \$1.70/gal at Mont Belvieu; propane at 71¢/gal at Conway and \$1.02/gal at Mont Belvieu; and ethane at a theoretical negative of 1¢/gal at Conway and 35¢/gal at Mont Belvieu.

Natural gas in storage for the week of April 20 increased 47 billion cubic feet to

2.548 trillion cubic feet (Tcf) from 2.501 Tcf last week, according to the Energy Information Administration. The storage figure for the week of April 13 was revised by the EIA from 2.512 Tcf following resubmitted data from operators. This was 52% greater than the 1.676 Tcf figure posted last year at the same time and 55% greater than the five-year average of 1.640 Tcf.

After experiencing cooler than normal temperatures in the Northeast last

week, the National Weather Service's forecast for next week appears to hold the possibility of marking the beginning of the cooling season. Warmer than normal temperatures are anticipated throughout most of the country with the only exceptions being in portions of New England, Florida, Texas, and California. The Pacific Northwest's forecast is calling for cooler than normal weather for late April. — **Frank Nieto**

INSIDE LOOK AT PROCESSING

Kinder Morgan To Acquire KKR Interest In Midstream Assets For \$300 Million

Kinder Morgan Energy Partners, L.P. (NYSE: KMP), signed a definitive agreement with an investment vehicle affiliated with Kohlberg Kravis Roberts & Co. L.P., (KKR) whereby KMP will purchase from KKR its 50% interest in the joint venture that owns the Altamont gathering, processing and treating assets in the Uinta Basin in Utah and the Camino Real Gathering System in the Eagle Ford shale for \$300 million in KMP common units. El Paso Corp. (NYSE: EP) owns the other 50% of the joint venture. KMP anticipates this transaction will close subsequent to the completion of Kinder Morgan, Inc.'s (NYSE: KMI) acquisition of El Paso, which is expected to occur by the end of May.

"We are pleased to reach this agreement with KKR which, upon closure of both transactions noted above, will increase Kinder Morgan's ownership in this joint venture to 100% —50% at KMP and 50% at KMI," Duane Kokinda,

president of Kinder Morgan's intrastate pipelines, said in a news release. Upon closing, the transaction is expected to be immediately accretive to cash distributable to KMP unitholders.

Marc Lipschultz, KKR's global head of energy and infrastructure, commented in the release, "Since forming our joint venture over a year ago, it has been a pleasure partnering with the El Paso team on building out an exciting midstream business. Today's transaction with Kinder Morgan reflects the strategic investments made by the partnership in both the Altamont and the Camino Real systems, with both of these assets benefiting from attractive long-term fundamentals. We are pleased to transfer our 50% interest in the partnership to Kinder Morgan, a world class midstream operator that will continue to invest in these important assets."

With over 1,100 miles of pipeline infrastructure, the Altamont system includes over 450 well connections with producers, and it operates a processing plant with the design capacity of 60 million cubic feet per day (MMcf/d) and a 5,600 barrel per day (Bpd) natural gas liquids fractionator. The Camino Real Gathering System has 150 MMcf/d of gas gathering capacity and 110,000 Bpd of oil gathering capacity.

— **Business Wire**

LNG Exports Grab Wall Street's Attention

North American liquid natural gas exports are rising, and investors are starting the process of sorting through the players to see which ones will capitalize most. One likely candidate is Cheniere Energy, which market-watchers claim is

set to dominate the U.S. liquefied natural gas market (LNG).

Wall Street buyers are lining up to buy Cheniere stock, which has turbo-charged from \$9 per share to \$17 per share in the last 60 days, as indications from Wash-

ington D.C. signal an approval of the company's proposed \$10 billion liquefied natural gas export facility in Louisiana.

The plant would make Cheniere the primary exporter of liquefied natural gas. Media outlets have reported that

it's basically a done deal, a message that certainly resonated with LNG investors the week of April 8-13, when the stock jumped more than 10%.

Renewable energy investor Travis Hoiium, presumably speaking for a wide swath of investors, said the export plant would make Cheniere the go-to resource for U.S. LNG exports going forward.

"The opportunity to export in the LNG market is enormous because demand overseas is growing," he writes in a recent research note for the investment web site, the *Motley Fool*. "Cheniere could have a near monopoly on domestic exports if approved, but there are still challenges if the project moves forward. The company would need to finance the deal, and it would be years until any real revenue started flowing in. Those are two risk factors that will keep me from buying today, but speculators are jumping on board despite the risks."

Cheniere already has facilities -- largely unused, by the way, thanks to low U.S. demand for natural gas -- that handle LNG imports. The new facility, located near Cameron, La., will process and transport LNG to foreign countries.

With the Edinburgh, Scotland-based investment firm Wood McKenzie recently estimating that the global LNG market should be "quite high" through 2018, any U.S. liquefied natural gas exporter would command a huge advantage in the natural gas marketplace.

Who are the largest potential foreign customers?

A Bloomberg report sites Japan and Spain as potentially deep-pocketed clients of Cheniere -- each country is paying nine times more for natural gas fuel than current price levels in the U.S.

Cheniere has the U.S. LNG export market in those two countries to itself -- it's the only natural gas provider in the

U.S. with a license to export LNG overseas to countries that do not share a free-trade agreement with Uncle Sam.

Sure, the term "near monopoly" is a powerful one. But in Cheniere's case, it's probably not hyperbole. Only five years ago, the market for North American natural gas was a weak one with more investors betting *against* huge inventories and betting *on* a shortage of natural gas -- and for a few years, that's pretty much what happened.

In fact, only five years ago, anticipated demand for natural gas was widely viewed as a big problem not for the rest of the world, but for the U.S. and Canada. To accommodate expected demand for natural gas in North America, Cheniere rushed several LNG receiving plants into development, particularly along the Gulf of Mexico, but those facilities went largely unused as the shale oil and gas boom hit the U.S. like an energy tsunami.

That was then and this is now. The massive amounts of shale gas under North American dirt has dramatically changed the equation, and now the demand theater has changed, away from the U.S. and to huge middle-class markets in Europe and across the Pacific Rim.

Those are all concrete reasons why Cheniere's stock hit a four-year high on, of all days, Friday, April 13.

Some experienced Wall Street money managers think Cheniere's luck should hold out no matter what day it is. Ethan Bellamy, a senior research analyst at Robert W. Baird & Co., and one of the top oil and gas stock pickers in the U.S. in 2009 and 2010, according to the *Financial Times*, says that Cheniere is first in line among U.S. natural gas companies to benefit from LNG exports.

"What's interesting about Cheniere is it started out as an LNG import company, but as the supply situation in the United



States changed with unconventional resources, they actually have decided to go the other way and serve as an exporter of LNG," says Bellamy, in an April 11 interview with the *Wall Street Transcript*. "On February 27, (the investment firm) Blackstone announced that it was going to invest \$2 billion into Cheniere Energy Partners in order to facilitate the construction of the liquefaction train on the Gulf Coast at Sabine Pass."

That deal paves the way for financing the new export facility, whose total cost may run to \$5 billion, but Cheniere has cleared that hurdle, and the fact that the cash is coming from a reputable financial backer is icing on the cake.

"The first two trains are expected to be \$4.5- to \$5 billion, so they've got a significant sum of capital behind them from a premier financier," Bellamy adds. "So I think it's likely, both from a regulatory and from a financing perspective, that the project gets done."

He says that investors may have to show some patience with Cheniere before the stock really pays off. "The problem with megaprojects is they take time to complete," explains Bellamy. "They're going to start that construction project now, but gas prices could be significantly different by the time they're done. The economics will be substantial enough for them to export gas profitably to Europe, for example, but that's a lot of risk. The supply situation, as we've seen in the last five years,

can change pretty drastically over the course of two or three years.”

Right now, that supply situation is decidedly weighted in Cheniere’s favor.

With a near monopoly on select overseas bourses, and access to enough natural gas to light and heat the homes and businesses of tens of millions of foreign

consumers, Cheniere may be just now heating up—just as the U.S. liquefied natural gas export market is heating up, too. — **Brian O’Connell**

DUG 2012: Rice Cites... (continued from page 1)

regimes that refused to peacefully transfer power to their citizens. Unlike big, multi-ethnic democracies such as Brazil and India that can change politicians and policies peacefully, the Arab states were ruled by dictators or monarchs that used repression and fear to keep their people in line.

“If men and women are denied the ability to change their circumstances peacefully they will do it by force,” said Rice. “When fear is what separates the authoritarian from his people, and that breaks down, all that stands between the dictator and his people is anger. That’s a terrible way to make political reform. And what we are seeing in the Middle East is when political reform comes too late.”

Rice’s concern is that we are in for a rocky ride in the Middle East, a volatile and most crucial region, because extremists are coming to the fore. The U.S. should be encouraging the remaining monarchies in the Middle East, in

such countries as Bahrain, Saudi Arabia and Jordan, to move to constitutional monarchy. “We do have some ability to influence these events, and we do have important friends in the Middle East who need to reform,” she said.

National energy security is a key part of dealing with the three shocks. “For a long time, we are going to be dependent on hydrocarbons and on petroleum-based products. We need to do everything we can to develop clean sources, and to make certain we are leaving nothing on the table in terms of what we can develop in North America,” she said.

And, thanks to the technological revolution that has unleashed abundant supplies of unconventional resources, the next Secretary of State could indeed be dealing with a world where energy independence is within America’s reach.

Certainly, problems in the Middle East would not be over. “But to be able to deprive some of the world’s worse actors of

that great source of money—and therefore the ability to export their trouble—would make a tremendous difference to our security and our future.”

The United States has had a view of how human history ought to unfold, and that view is of free markets and free people. “I am optimistic that we will get hold of our fiscal circumstances at home, deal with our economic growth and take advantage of the tremendous gift that is before us of energy independence,” said Rice.

“If indeed we are able fully to put together a policy that marries economic growth, alternative energy sources and unconventional hydrocarbons, and do it from a North American platform that includes Canada, the U.S. and Mexico, geopolitics will be changed forever.”

And America’s oil and gas industry, with its inventiveness and technological sophistication, will have helped make that happen. — **Peggy Williams**

Amount Of Capital Available To Upstream, Midstream Is ‘Truly Staggering’

Panel members at Mergermarket’s Houston conference earlier this month offered their perspectives about finance as it applies to oil and gas exploration. They talked about the upstream and midstream financing, private equity, investment strategies and business practices.

Here’s a sampling of the comments:

Alfonso Leon, vice president of Planning and Strategy for Apache Corp.: “Some people need to realize that this is a very volatile business. There have been

some success stories, but we just came off of 2008. ... “A cautious approach to a balance sheet goes a long way. If you’re rolling the dice for a potential quick profit -- in and out -- maybe you’ll get lucky. But you can also lose your shirt.

“For us, managing for growth for over five decades, being very careful with our balance sheet, not using that credit card for the last dollar, a highly balanced portfolio -- 50 percent oil, 50 percent gas, and then 50 percent North America

and 50 percent not North America -- has been very, very valuable and honestly has kept us in business. I think all of this capital coming in might just generate opportunities for us a couple of years down the line.”

Janet Clark, executive vice president and chief financial officer, Marathon Oil Corp.: “If you have cash on the balance sheet, it’s really the cheapest source of capital that you can find. But you do have to look at the overall capital struc-

ture, and you do want to have some debt in that capital structure to maximize return on equity.

“We (Marathon) choose not to maximize the value of equity by having a maximum leverage because we think that you can ultimately add greater value for your shareholders if you have the right firepower when the time comes.”

Michael Jamieson, co-head of Citigroup’s North American Group: “I have spent roughly 20 years of my career focused mostly on the midstream sector and the upstream sector. When we look at what’s happening across both of those sectors with the amount of capital and the amount of activity that is currently in the energy sector, it truly is staggering how much capital is being spent and how much new capital is coming to support the spending of the industry.

“When you look at the private equity side of the equation, whether it’s on the upstream or the infrastructure side, at Citi we track capital rates for the purpose of investing in energy sector. When you look at upstream and midstream, right now there’s about \$30 billion of available capacity to the investor.”

Brad Thielemann, director, EnCap Investments LP: That’s the number I’ve

seen as well -- \$30 billion available. This year we looked at funds that are currently raising money just for oil and gas opportunities, and it’s \$27 billion to \$28 billion being raised. As we look at all the deals, we think that [number] will get raised.

“There’s a lot of appetite from institutional investors. I think there are a lot of reasons for that -- just from a macro standpoint and trying to figure out what sectors they want to be in. They’ve watched since the early 2000s and seen pretty strong returns. I think it’s good for the industry. We’ve gotten to the point where with all of these resource plays it’s really capital intensive. The average well back in 2001 was about \$1 million. Ten years later it’s more than \$5 million. Just the intensity of capital going into the ground is much greater.”

Hana Askren, Mergermarket, the panel moderator: “The most interesting aspect of financing for me is that there seems to be a divide in the way E&P companies think about financing. That goes for M&A as well as operations. Some, like the infamous company that shall not be named, run their companies on the edge of the balance sheets and use any financing structure available, from royalty trusts, VPPs, JVs with multiple compa-



nies, asset sales, debt, and various kinds of equity to bring capital in the door at a reasonable cost, which is something you can do right now and can’t always do.

“But others, like some of the [corporations represented] on the panel today, are more risk-averse and try to keep their balance sheets simple. As one person said to me, ‘They save their pennies in order to be protected in case of a market or commodity crash and also so they can take advantage of M&A and other activities when they come up.’ ”

– **Mike Madere**

PIPELINES & TECHNOLOGY

Process Engineering Software Upgrades Improve Processing Results

Natural gas resources of all kinds continue to be exploited at an accelerating pace. There is growing worldwide interest in increased development of both conventional and unconventional sources of gas, including shale gas. Consequently, engineers are in the spotlight to design flexible midstream infrastructure to process gas and associated liquids efficiently, rapidly and for maximum profitability. Adding to the pressure on process

engineers, project parameter and goals are more than ever a moving target.

Several innovations in software used by process engineers have begun to show results in the past few years, assisting in this dynamic environment. This article looks at two case studies that each demonstrate the use of advanced tools and work flows. The net result of each is a significant business benefit to the facility owner-operators and, in the second case,

to the engineering organization. These are reflected in reduced capital requirements and better overall project payback and lifecycle profitability.

BACKGROUND

Process simulation modeling systems have become an essential part of design or revamp and optimization of gathering systems, pipeline transportation, gas separation plants, sweetening units,

dehydration units, NGL plants, and the like. These tools have largely replaced the use of spreadsheets or other calculations, even at the feasibility stage of a project. Key reasons for the use of models is their flexibility when the project developer changes design objectives midway in a project, along with the ability to more accurately predict operating performance. However the models, used alone, have some limitations. Most importantly, a project investor or capital investment executive needs to know the capital and operating costs of a proposed project as part of their decision-making process. Also, engineers need good ways to easily compare design alternatives and communicate the analysis and alternatives to others.

One of the innovations introduced by Aspen Technology is the embedding of rigorous capital estimating models so that they can be activated by the process engineer from within the process simulation model. Another innovation is the close integration of the simulation model with a so-called simulation workbook, in Excel, that can be used to both perform sensitivity analysis on the process model flow sheet and also to display key parameters of each alternative for management review. [Reference 1]

CASE STUDY 1: Troubleshooting a gas booster station and dehydration unit.

One of the organizations that has recently used the integrated modeling-economics approach is Kuwait Oil Co. (KOC). KOC was faced with a gas dehydration package that was underperforming and targeted for revamp or replacement. Management was initially leaning strongly toward the revamp approach, as being intuitively the better economic alternative. However the engineering team, led by senior process engineer, Venkata Madhusudana Rao Kapavarapu,

was given the opportunity to conduct a comparative analysis of several options, using process simulation models integrated with estimating models, and reliability and maintenance prediction tools. [References 2, 3]

The revamp approach involved achieving reduced water content of the export gas and reducing combined glycol loss, through replacement of column internals, new elements in the absorber unit, and other fixes. Modeling of this approach showed, as expected, lower capital costs for this approach. However the overall negative operating profitability impact was significantly higher due to several factors, including higher predicted maintenance and component replacement incidence, aging equipment, as well as a revenue hit from the process train shutdown period for the revamp project.

The replacement approach involved installation of a totally new gas dehydration unit in parallel and then switching over production. Modeling of this approach, combined with the economics modeling, show a higher capital cost, but a significantly lower overall lifecycle cost due to reduced maintenance incidence, slightly better predicted gas yields, and significantly higher revenue because of a much shorter shutdown period, along with the ability to run the old unit up to the time to switch over to the replacement dehydration unit.

The integrated workflow, in which the process model for each alternative was able to feed into the economic model and rapidly project relative operating and capital costs with +/- 35% reliability, proved to be a critical tool in convincing management to go forward with the replacement unit. Without these tools, engineers may never have had the opportunity to seriously consider the replacement option. Most would probably

KEY NORTH AMERICAN HUB PRICES	
2:30 PM CST / April 26, 2012	
Gas Hub Name	Current Price
Carthage, TX	2.08
Katy Hub, TX	2.06
Waha Hub, TX	2.06
Henry Hub, LA	2.11
Perryville, LA	2.08
Houston Ship Channel	2.04
Agua Dulce, TX	1.88
Opal Hub, Wyo.	1.97
Blance Hub, NM	1.96
Cheyenne Hub, Wyo.	1.99
Chicago Hub	2.21
Ellisburg NE Hub	2.26
New York Hub	2.30
AECO, Alberta	1.75

Source: Bloomberg

not have been able to present credible cost information for decision-making due to the time and effort, which would have required a completely separate department's involvement: the estimating group. This would have forced KOC into the more conservative approach.

The net result of selecting the replacement unit option was a projected annual savings of 20% in operating costs, 30% in spare parts costs, and 20% in insurance premium costs for the dehydration unit. Also project life cycle was optimized and the production facility availability was increased.

CASE STUDY 2: Increase Capacity of a Gulf Coast NGL Facility by 30%

Burns and McDonnell, a mid-sized engineering and construction organization, employed a similar strategy in a recent revamp project performed for a U.S. Gulf Coast midstream client. Working within multi-dimensional project constraints, Elliott Robertson, process engineer at

Burns and McDonnell, reported that the use of modeling, economics and simulation workbook provided a powerful integrated toolset to evaluate a number of design alternatives and estimate costs to within 30%. [Reference 4]

Some of the challenges in performing this project were feedstock and product logistics uncertainties, multiple plants and business units, stringent real estate constraints, a fast track schedule, and a project team with mixed experience, not to mention several different existing simulation models describing units within the target facility undergoing revamp.

To address these challenges, Burns and McDonnell adopted some innovative approaches, integrating several engineering tools into a workflow that reduced the project cycle time, improved project team communications, and most importantly enabled better analysis and comparison of alternatives leading to better overall design results and capital costs.

The use of the simulation workbook enabled Robertson to present multiple design alternatives to the entire team as work proceeded, and then to serve as a communication method to the multiple business units of the client-side team. Three separate process units within the NGL facility were modeled, and for each unit the cases analyzed included a base case, economic base case and future de-

sign case. The workbook view enabled the team to study feed conditions, product uplift, and key unit constraints. The unified approach also enabled a better and more holistic analysis of suitability of existing equipment and optimization of capital spend, based on the governing rating cases.

The benefits seen by both Burns and McDonnell and their client included minimizing new equipment, improved constructability, reduced project duration and maximized product yield.

SUMMARY

Both of these organizations, Kuwait Oil and Burns and McDonnell saw the opportunity to use newly available software innovations, and were able to adopt these tools, self-train themselves using online training resources, use them on real projects, and most importantly achieve business impact, with very little lead time. Introducing economic models, such as AspenTech's capital cost estimating models, into the simulation models empowers process engineers to meet management objectives of accelerating project timetables and understand the impact of their engineering decisions on project costs much earlier in the design process.

As the pace of development of gas processing and delivery infrastructure continues unabated, the ability to adopt

and effectively use these tools quickly is a key advantage for process engineering teams. Understanding the costs of a proposed design is no longer a luxury but a business imperative today. – Ron Beck, Industry Marketing Manager, Aspen Technology Inc.

REFERENCES:

(1) Beck, R P, AspenTech. "Improve Decisionmaking for LNG project via an integrated technology", Hydrocarbon Processing. July, 2011, pp 51-54.

(2) Kapavarapu, Venkata Madhusudana Rao, Senior Process Engineer, KOC. "Project Optimization at a Conceptual Level by using Aspen HYSYS and Aspen Integrated Economics". May 23, 2011, AspenTech OPTIMIZE 2011 Global Conference, Washington DC.

(3) Kapavarapu, Venkata Madhusudana Rao, Senior Process Engineer, KOC. "Process Optimization using Simulation and Integrated Economics". Oct 24, 2011, MEPEC Conference, Manama, Bahrain.

(4) Robertson, Elliott, Burns and McDonnell, "Use of Aspen Plus, Aspen Capital Cost Estimator and Aspen Simulation Workbook in the Front End Loading Process for a Fast-Track NGL Expansion". May 23, 2011, AspenTech OPTIMIZE 2011 Global Conference, Washington DC.

Kinder Morgan Announces Binding Open Season To Move Light Condensate On Cochin

Kinder Morgan Energy Partners, L.P. (NYSE: KMP) announced the launch of a binding open season to solicit market interest for its Cochin Reversal Project, which would enable the company to offer a new service to move light condensate from Kankakee County, Ill., to existing terminal facilities near Fort Saskatchewan, Alberta, Canada.

The project involves Kinder Morgan modifying the western leg of its Cochin Pipeline to connect to the Explorer Pipeline Company in Kankakee County and to reverse the product flow to move the condensate northwest to Fort Saskatchewan. Subject to shipper support, timely regulatory approvals and necessary capital improvements, light condensate

shipments could begin on July 1, 2014. The project will provide approximately 75,000 barrels per day of light condensate capacity on Cochin, providing a new source of supply to meet the growing demand for diluent.

"Our proposal will provide the rapidly growing Canadian market with very cost-effective access to light condensate

from both the Eagle Ford Shale and the U.S. Gulf Coast,” said Don Lindley, vice president of business development for KMP’s Products Pipeline group. “This open season was prompted by significant, tangible interest expressed in the proposed reversal.”

Kinder Morgan is seeking binding commitments from interested customers for a minimum contract term of 10 years and 5,000 barrels per day minimum annual volume commitment. The binding open season will begin today and ends May 31, 2012, at 5 p.m. CDT.

Signed Transportation Service Agreements by prospective shippers must be submitted on or before 5 p.m. CDT May 31, 2012, to Karen Kabin, director of business development in Kinder Morgan’s Products Pipeline group, at (713) 369-9268.

Cochin is a multi-product pipeline consisting of approximately 1,900 miles of 12-inch pipeline operating between Fort Saskatchewan, Alberta, and Windsor, Ontario. Cochin traverses three provinces in Canada and seven states in the United States, transporting propane

and ethane-propane mix to the mid-western United States and eastern Canadian petrochemical and fuel markets. The pipeline includes 31 pump stations spaced at 60-mile intervals and five U.S. propane terminals. Underground storage, owned by third parties, is available at Fort Saskatchewan and Windsor.

Explorer Pipeline is a nearly 1,900-mile common carrier pipeline system that transports refined petroleum products, feedstock and diluent from the Gulf Coast throughout the Midwest.

– Business Wire

Constitution Pipeline Company Announces Customer Agreements

Constitution Pipeline Co., LLC, a joint development between Williams Partners L.P. (NYSE: WPZ) and Cabot Oil & Gas Corp. (NYSE: COG), announced the execution of precedent agreements for a proposed 121-mile pipeline designed to connect natural gas production in northeastern Pennsylvania with northeastern markets by spring 2015.

Cabot Oil & Gas has committed to transport 500,000 dt/day (dekatherms

per day), while Southwestern Energy Services Co., a subsidiary of Southwestern Energy Co. (NYSE: SWN) has agreed to transport 150,000 dt/day for a total takeaway capacity of 650,000 dt/day (enough natural gas to serve about 3 million homes).

The new 121-mile Constitution Pipeline is being designed to connect Williams Partners’ gathering system in Susquehanna County, Pa., to the Iroquois

Gas Transmission and Tennessee Gas Pipeline systems in Schoharie County, NY. Williams Partners will own 75% of Constitution Pipeline and, through its affiliates, will provide construction, operation and maintenance services for the new pipeline. Cabot will own the remaining 25%.

NEWS & TRENDS

FERC: Gas Production Hit All-Time High In 2011

Natural gas production and storage reached an all-time high in 2011, which combined to generate the lowest gas prices in 10 years, according to the Federal Energy Regulatory Commission (FERC) 2011 State of the Markets report released this week.

Natural gas production increased 7% in 2011 to a record 65 billion cubic feet per day (Bcf/d) due to continued shale play production. “Low prices and the drive to tap shale gas reserves have

RESIN PRICES – MARKET UPDATE – APRIL 27, 2012					
TOTAL OFFERS: 30,314,420 lbs		SPOT		CONTRACT	
Resin	Total lbs	Low	High	Bid	Offer
PP Homopolymer - Inj	5,473,152	0.74	0.86	0.72	0.76
HDPE - Inj	5,340,728	0.67	0.74	0.64	0.68
PP Copolymer - Inj	3,554,496	0.72	0.86	0.74	0.78
LDPE - Film	3,403,600	0.71	0.82	0.70	0.74
HDPE - Blow Mold	3,364,140	0.62	0.74	0.63	0.67
LLDPE - Film	3,226,508	0.71	0.79	0.67	0.71
LDPE - Inj	2,228,852	0.72	0.79	0.68	0.72
LLDPE - Inj	1,742,000	0.64	0.78	0.66	0.70
HMWPE - Film	1,410,944	0.70	0.76	0.66	0.70
GPPS	380,000	0.86	0.86	0.86	0.91
HIPS	190,000	1.03	1.03	0.97	1.02

Source: Plastics Exchange – www.theplasticsexchange.com



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Dick Morris
Political consultant, author

One of today's most outspoken political consultants and a Fox News contributor, Morris engineered President Clinton's stunning comeback re-election in 1996. Called "the most influential private citizen in America" by *Time* magazine, he handled the winning campaigns of more than thirty U.S. Senators and Governors as well as the successful campaigns of presidents or prime ministers of ten countries.

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touched off a race to reduce drilling costs and improve rig operating efficiency. These improvements resulted in production increases even as the natural gas rig count declined," the report said while noting that the rig count fell 6% in 2011.

"Growing supply outpaced demand, which led to record high natural gas storage going into the 2011/2012 winter and natural gas prices fell to lows not seen since the early 2000s," the report said.

Henry Hub gas prices dropped 9% from their 2010 level of mid-\$4 per million Btu (/MMBtu) to less than \$3/MMBtu by the close of the year. FERC noted that prices are expected to remain below \$4/MMBtu through 2014, which may result in a cut back on gas production.

The addition of new pipeline systems helped link supply basins to new mar-

kets, which helped to reduce regional price differentials, including for seasonal differentials.

"Average natural gas spot prices declined across the country by around 7% in 2011. This winter was the warmest in 60 years and the Northeast, which usually sees the highest winter prices, saw no sustained price spikes...Falling seasonal spreads reflect increased production and storage capacity, as well as greater year-round use of natural gas by power generators," the report said.

The elimination of the seasonal price differentials also means that building additional storage isn't very cost-effective, which will continue to push storage levels to record highs.

FERC also noted that many long-haul pipelines experienced decreases in trans-

portation capacity due to the increased production from the Marcellus shale that displaced flows from some traditional supply basins, such as the Rockies.

The lower natural gas price levels resulted in seven LNG terminals applying to redirect nearly 14 Bcf/d to foreign markets as the build-up in import terminals has proven to be unnecessary given the development of shale plays.

"To put this into perspective, 14 Bcf/d is about 21% of average daily U.S. natural gas production. EIA recently completed an assessment of the domestic price impact of U.S. LNG exports and concluded that U.S. natural gas prices could rise 9% at 6 Bcf/d of exports and 11% at 12 Bcf/d," the report said.

Although electric generation demand remained stable in 2011, gas-fired power

generation increased because gas prices became competitive with coal prices. While total gas consumption increased 1% for the year, gas-fired power generation rose 3% for the year.

In the past 10 years, natural gas-fired power generation has been responsible for 10% of the growth in natural gas consumption. The FERC report noted that a greater reliance on natural gas has also

increased the importance of coordination between gas-fired generators and pipeline operators.

“Concerns about coordination have been particularly strong in the Northeast, which is heavily dependent on natural gas and has experienced coincident peaks in both electric and natural gas demand during the winter season. It can also be a concern in parts of the

Southwest that lack robust storage infrastructure. Also, upcoming coal plant outages for emission retrofits are expected to lead to greater use of natural gas-fired plants. Regional grid operators continue efforts in areas of planning, reliability and market operations,” the report said.

– Frank Nieto

S&P Capital IQ: Midstream Liquids-Rich Assets Drive M&A Activity

M&A in the energy sector had a record year in 2011 and activity in 2012 already appears to be keeping up the same pace, according to a report issued today by S&P Capital IQ. The report, entitled Global Energy M&A Trends and written by S&P Capital IQ Solutions Architect, Kenneth Wee, can be found here.

According to Wee’s research, on a global basis, over \$250 billion in energy M&A transactions were announced or completed in 2011. Of that volume about

\$200 billion of the transactions were U.S. or Canadian companies. Wee sees this trend continuing in 2012, with the lion’s share of activity taken up by the same list of key players.

“In 2011 as competition for production assets increased, the path to growth for oil and gas producers came from developing unconventional resources,” says Wee. “It appears that 2012 will not be any different, barring a new geopolitical crisis.”

Wee’s report notes that rising demand as well as increasing competition from national oil companies (NOCs) has led to exceptionally high levels of asset purchases in North America, which has large amounts of well-identified but undeveloped shale and tight gas reserves. As a result, activity in North America surpassed activity in all other regions in 2011 and this is not expected to change in 2012 if oil prices remain high.

Japanese LNG Imports Increased 18% In 2011

Japan purchased 83.18 million metric tons of liquefied natural gas (LNG) in fiscal year 2011, an 18% increase from its 2010 imports. This increase was a result of last year’s tsunami and earthquake

that caused a meltdown at the Fukushima nuclear power plant.

The resulting decrease in power generation caused an increased demand for natural gas-powered generation. This im-

port level was the highest by Japan since it began keeping track of LNG imports in 1980 and cost \$66 billion, up from \$42.9 billion in 2010.

Dominion Confident Objections Won’t Block Cove Point Liquefaction Project

Dominion (NYSE: D) is confident that its existing agreement with the Sierra Club and the Maryland Conservation Council permits the company to build a natural gas liquefaction plant proposed for its Cove Point facility in Lusby, Md.

“As with any project of this magnitude, we would expect some opposition from various special interest groups. The Sierra Club, which is a party to an agreement restricting activities on portions of the Cove Point property, has previously

expressed its opposition to all LNG export facilities,” Thomas F. Farrell III, Dominion chairman and chief executive, said in a news statement. “We have reviewed the regulations and agreements governing the site and are confident we can locate, construct and operate a liquefaction plant at Cove Point. The project can be built within the footprint of the existing facility without amending the agreement involving the Sierra Club and the Maryland Conservation Council.

Dominion plans to design, build and operate the facility with minimal environmental impacts.”

Farrell said that by adding on to an existing facility, the Cove Point project would have less environmental impact than other liquefaction projects proposed for greenfield sites. He also noted that the Cove Point facility has been cited many times for its environmental stewardship, such as for the restoration of the 190-acre Cove Point freshwater marsh, a

Maryland Natural Heritage Area along Chesapeake Bay.

Dominion announced earlier it is moving forward with its natural gas liquefaction project at Cove Point. At the end of March, Dominion signed binding precedent agreements with two companies, one of which is Sumitomo Corp., a major Japanese corporation with significant global energy operations. Between the two shippers, the planned project capacity of about 750 million cubic feet per day on the inlet and about 4.5 million to 5 million metric tons per annum on the outlet, is fully subscribed. Construction

is expected to begin in 2014, with an in-service date in 2017, pending receipt of necessary approvals, negotiating binding terminal service agreements with the shippers and successful completion of engineering studies.

Economic studies filed with Dominion's federal approval applications anticipate a number of significant benefits from the project, including:

An average of 750 construction workers would be employed during three-plus years of construction. There will be between 2,700 and 3,400 jobs associated with the project in Calvert County alone

at the peak of construction activity. Benefits to the natural gas and other industries would support another 14,600 jobs once the shippers begin natural gas exports.

About \$1 billion annually of additional federal, state and local government revenues would be generated directly and indirectly.

Owners of the natural gas rights would receive an estimated \$9.8 billion in royalties from production of natural gas over the life of the project.

The natural gas exports would lower the U.S. trade deficit by \$2.8 billion to \$7.1 billion annually.

SNAPSHOT

Israel May Retain Offshore Gas Supplies For Domestic Use Only

In the middle of a 15-year contract for supplies of natural gas from Egypt, Israeli officials may be forced to seek other sources for these supplies as the contract is under investigation by Egypt due to corruption allegations.

Last year's overthrow of Hosni Mubarak led to the infusion of a new Egyptian government that has been reviewing agreements by the previous government. The new leadership claims that Egypt lost \$714 million on the Israeli gas agreement and is planning to install new rates that benefit the country. Other leaders in the Egyptian government are seeking to prohibit exports to Israel, although such a measure would need to be approved by the executive branch.

Even with this potential disruption, it is likely that the biggest threat to Egyptian gas supplies to Israel revolve around the physical security of the supplies, according to Barclays Capital.

There have been 14 attacks on a natural gas pipeline in the Sinai Peninsula that transports natural gas to Israel and Jordan since Mubarak was ousted in Feb. 2011. "Regional security experts con-

tend that the Egyptian military has been unwilling to use a firm hand to maintain order in the Sinai since the fall of Mubarak and that a host of other undesirable elements – Al Qaeda operatives, drug smugglers, and human traffickers – have been drawn to the region because of the security vacuum," Barclays Capital said in a recent *Geopolitical Update*.

As approximately 60% of Israel's natural gas is supplied from Egypt, these developments are causing worry over the stability of supplies to Israel. Although supplies from Egypt could be threatened, Israel does have the advantage of having several large offshore deepwater gas basins that have the potential to make up a large bulk of their imports.

Together the Tamar, Dalit and Leviathan deepwater plays have an estimated 35 trillion cubic feet of estimated natural gas reserves. "If the fields were developed successfully, together they have the potential to become a strategic resource in the eastern Mediterranean. The fields, could, for example, allow Israel to eliminate its dependence on Egyptian natural gas imports, which is particularly



compelling, given the recent spate of bombings of the Egypt-Israel pipeline," Barclays Capital said.

The Israeli government originally intended for a portion of these reserves to be exported, but the issues in Egypt has given rise to calls from some government officials to reserves these potential supplies primarily for domestic use. In addition to helping the country achieve a modicum of energy independence, domestic use could eliminate any potential disputes with neighboring states over exports.

According to the investment firm, Israel is expected to decide what course to take with its offshore gas reserves after a report is issued from a Water and Energy Ministry committee in June.

– Frank Nieto

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