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Former Energy Secretary Likes 'Climate Epidemiology'

Chu discussed climate change and the natural gas revolution at this year's GPA convention.

BY **PAUL HART** | EDITOR, MIDSTREAM BUSINESS

Will climate change predictions go up in smoke? Possibly, Steven Chu, former energy secretary for President Obama, told the 93rd annual convention of the Gas Processors Association in Dallas.

In a wide-ranging conference keynote address, the Nobel laureate told his audience of more than 2,400 the current study of climate change is a form of epidemiology, which he defined as the science that looks for correlations between a disease and public health to determine if a habit or microbe is causing a disease, "not understanding the molecular or genetic causes for disease."

He cited the example of smoking and lung cancer. He used charts to show that lung cancer among men was rare at the start of the 20th century—a time when cigarette smoking was almost unknown. Cigarette smoking grew in popularity after World War I and peaked around 1965, yet lung cancer rates among men peaked some 25 years later, around 1980.

"On average statistically, there's a 25-year delay time between when you start smoking and when you get lung cancer," he explained, "and during that period, in the 1950s, 1960s and 1970s the [pro-smoking] argument was, 'you don't understand the biological mechanism, therefore this may not be true.' But by the '60s and '70s science had moved on to a correlation between smoking, heart disease and stroke." The cause and effect were years apart.

While speaking at the GPA annual convention, Steven Chu, former U.S. Secretary of Energy, said that the impacts from climate change may take many more years to peak. (Source: Gas Processors Association)

In the same manner, human-caused greenhouse-gas emissions today may not have a peak impact on the Earth's climate for many years. "We don't know what the delay is," Chu said, calling current global warming studies "climate epidemiology."

But he acknowledged that climate "is a very complex thing" that requires significant research

Continued on Page 12

HIGHLIGHTS FROM TODAY'S EDITION

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Toast Of The Coast

Sage Midstream plans to build an LPG export terminal along the West Coast.

PAGE 4

Gutting Out Gas

Encana continued to gut its gas portfolio by selling its U.S. LNG assets.

PAGE 4

Struggling To Reload

Key NGLs and gas storage levels continue to list, which may result in higher prices come this fall.

PAGE 2

Penalties Up, Incidents Down

There is a growing dichotomy between assessed penalties and actual pipeline incidents.

PAGE 7

Petchem Investments Growing

The American Chemistry Council forecasts more than $100 billion in U.S. petchem investments in the coming years.

PAGE 11

NGL PRICES & FRAC SPREAD | Week in Review

Gas, Liquids Storage Reloading Continues To Falter

BY **FRANK NIETO** | SENIOR EDITOR, MIDSTREAM BUSINESS

NGL prices experienced an uptick the week of April 9 as storage levels remain lower than in past years for most products. The product with the most volatility was propane. Despite having a faster build-up in stock levels from last year, stronger export demand is causing an increase in consumption levels. Should this situation continue until the end of summer, it is likely that there will be shortages, particularly at Conway, come the heating season this fall and winter.

The possibility of a tight market in the fall helped push prices up 4% to $1.13 per gallon (/gal) at Conway, its highest price since it was $1.14/gal the week of Feb. 26. The Mont Belvieu price increased 3% to $1.12/gal, its highest price since it was $1.29/gal the week of Feb.

CURRENT FRAC SPREAD (CENTS/GAL)

April 21, 2014	Conway	Change from Start of Week	Mont Belvieu	Last Week
Ethane	24.50		29.50	
Shrink	29.64		30.43	
Margin	-5.14	-156.55%	-0.93	-45.53%
Propane	113.32		111.48	
Shrink	40.95		42.04	
Margin	72.37	5.79%	69.44	3.92%
Normal Butane	121.84		124.74	
Shrink	46.35		47.60	
Margin	75.49	1.47%	77.14	0.86%
Isobutane	163.60		131.26	
Shrink	44.52		45.72	
Margin	119.08	4.68%	85.54	1.98%
Pentane+	230.78		229.38	
Shrink	49.57		50.90	
Margin	181.21	1.97%	178.48	3.92%
NGL $/Bbl	43.94	1.52%	43.44	2.33%
Shrink	16.33		16.77	
Margin	27.61	1.48%	26.67	3.11%
Gas ($/mmBtu)	4.47	1.59%	4.59	1.10%
Gross Bbl Margin (in cents/gal)	62.89	1.73%	61.21	3.15%
NGL Value in $/mmBtu (Basket Value)				
Ethane	1.35	-9.83%	1.62	0.14%
Propane	3.93	4.23%	3.87	2.84%
Normal Butane	1.32	1.52%	1.35	0.96%
Isobutane	1.02	3.82%	0.82	1.67%
Pentane+	2.98	1.89%	2.96	3.28%
Total Barrel Value in $/mmbtu	10.59	1.19%	10.62	2.21%
Margin	6.12	0.91%	6.03	3.06%

NGL PRICES

Mont Belvieu	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
April 9 - 15, '14	29.50	111.48	124.74	131.26	229.38	$43.44
April 2 - 8, '14	29.46	108.40	123.56	129.10	222.10	$42.45
March 26 - April 1, '14	29.36	105.98	123.98	128.56	221.78	$42.13
March 19 - 25, '14	29.47	103.86	124.72	127.92	219.00	$41.73
March '14	30.89	106.20	124.77	129.25	218.19	$42.21
February '14	38.25	143.12	139.85	143.10	210.70	$48.38
1st Qtr '14	34.50	129.51	137.62	141.49	212.60	$46.16
4th Qtr '13	26.76	119.81	142.56	145.02	210.66	$44.03
3rd Qtr '13	24.87	102.65	132.06	134.86	215.56	$41.21
2nd Qtr '13	27.12	91.38	124.01	127.46	204.12	$38.82
April 10 - 16, '13	28.48	94.08	130.76	133.70	206.52	$40.03
Conway, Group 140	**Eth**	**Pro**	**Norm**	**Iso**	**Pen+**	**NGL Bbl**
April 9 - 15, '14	24.50	113.32	121.84	163.60	230.78	$43.94
April 2 - 8, '14	27.17	108.72	120.02	157.58	226.50	$43.29
March 26 - April 1, '14	31.25	103.90	120.12	146.06	234.60	$43.63
March 19 - 25, '14	31.00	102.38	118.66	134.02	217.00	$41.81
March '14	32.20	107.10	119.02	136.50	225.70	$43.25
February '14	25.76	160.37	130.93	150.07	216.97	$48.92
1st Qtr '14	25.46	169.48	132.08	147.10	216.86	$49.93
4th Qtr '13	20.19	122.54	144.49	147.58	205.01	$43.33
3rd Qtr '13	20.80	99.22	129.23	142.77	209.94	$40.07
2nd Qtr '13	20.71	85.37	116.50	123.91	204.86	$36.89
April 10 - 16, '13	21.52	86.32	121.72	128.50	213.45	$38.11

(Above) Data Provided by Bloomberg. Individual product prices in cents per gallon. NGL barrel in $/42 gallons | Source: Hart Energy

(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.

19. LPG demand from exports are increasing at the same time as new terminals and projects are brought online.

Ethane prices continue to struggle as a large number of crackers along the Gulf Coast are down for maintenance. This caused the Conway price to drop 10% to 25 cents/gal and hold firm at 30 cents/gal at Mont Belvieu. The Conway price was the lowest price at the hub since it was 20 cents/gal the week of Feb. 5.

Heavy NGL prices improved across the board at both hubs as West Texas Intermediate (WTI) crude prices trade above $103 per barrel (/bbl) as prices are supported by the Russia-Ukraine standoff. It is likely that WTI crude prices have plateaued and will decrease going forward as there is a growing glut of domestically produced

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NGL PRICES & FRAC SPREAD | Week in Review

supplies. However, gasoline demand continues to climb and could further increase this summer, according to Barclays Capital's *Energy Market Outlook* for April 11.

"Although severe weather kept January and February gasoline demand unchanged year-on-year, the last five months of weekly statistical showing a rebound to around 4.3% year-on-year… This summer, gasoline demand may exceed expectations as increasing fuel efficiency is offset by: a) retail prices staying largely on par versus last year, which would encourage discretionary highway travel; and b) higher non-farm payroll figures,which are one of several tentative signs of a rebound in U.S. economic activity," the report said.

Such dichotomies between domestic crude prices trending on the low end while gasoline trends higher is a reflection of the interconnected relationships experienced by energy commodities. Unfortunately for domestic producers the U.S. ban on crude exports makes it extremely difficult to rectify the supply overhang or benefit from higher international prices the way that NGL producers can with LPG exports and soon LNG exports.

Isobutane and C_{5+} prices experienced the biggest upticks of the heavy NGL. Mont Belvieu C_{5+} increased 3% to $2.29/gal, its highest price since it was $2.32/gal the week of Feb. 20, 2013. The Conway price rose 2% to $2.31/gal, the third straight week that the Midcontinent price outperformed its Gulf Coast counterpart. This was the hub's second-highest price in more than two years.

KEY NORTH AMERICAN HUB PRICES	
2:30 PM CST / April 17, 2014	
Gas Hub Name	Current Price
Carthage,TX	4.44
Katy Hub, TX	4.52
Waha Hub, TX	4.41
Henry Hub, LA	4.57
Perryville, LA	4.47
Houston Ship Channel	4.51
Opal Hub, Wyo.	4.37
Blance Hub, NM	4.37
Cheyenne Hub, Wyo.	4.34
Chicago Hub	4.61
Ellisburg NE Hub	3.74
New York Hub	3.69
AECO , Alberta	4.38

Source: Bloomberg

Conway isobutane experienced a 4% increase to $1.64/gal as alkylation units are impacted by refinery turnarounds. This was the highest price at the hub since it was the same level the week of Oct. 16, 2013. The Mont Belvieu price rose at a slower pace of 2% to $1.31/gal, its highest price since the end of February.

Overall the theoretical NGL bbl. price improved 2% at both hubs with the Mont Belvieu price increasing to $43.44/bbl with a 3% increase in margin to $26.67/bbl. The Conway price rose to $43.94/bbl. with a 2% gain in margin to $27.61/bbl.

RESIN PRICES – MARKET UPDATE – APRIL 17, 2014					
TOTAL OFFERS: 25,155,620 lbs		SPOT		CONTRACT	
Resin	Total lbs	Low	High	Bid	Offer
HDPE - Inj	7,818,812	0.7	0.76	0.69	0.73
LDPE - Film	4,317,188	0.735	0.85	0.74	0.78
PP Homopolymer - Inj	3,621,980	0.78	0.82	0.76	0.8
HDPE - Blow Mold	3,098,876	0.73	0.77	0.69	0.73
PP Copolymer - Inj	2,432,416	0.725	0.81	0.77	0.81
LLDPE - Film	1,627,220	0.74	0.79	0.7	0.74
HMWPE - Film	973,656	0.7	0.815	0.72	0.76
LLDPE - Inj	899,104	0.77	0.81	0.705	0.745
LDPE - Inj	366,368	0.735	0.79	0.725	0.765

Source: Plastics Exchange – www.theplasticsexchange.com

The most profitable NGL to make at both hubs was C_{5+} at $1.81/gal at Conway and $1.79/gal at Mont Belvieu. This was followed, in order, by isobutane at $1.19/gal at Conway and 86 cents/gal at Mont Belvieu; butane at 76 cents/gal at Conway and 77 cents/gal at Mont Belvieu; propane at 72 cents/gal at Conway and 69 cents/gal at Mont Belvieu; and ethane at negative 5 cents/gal at Conway and negative 1 cent/gal at Mont Belvieu.

Natural gas storage injections remain well below average for this time of year as the U.S. Energy Information Administration reported just a 24 billion cubic feet (Bcf) injection for the week of April 11, the most recent data available. This brought storage levels to 850 Bcf compared to 826 Bcf posted the prior week. Compared to last year at the same time, storage levels are 50% below the 1.7 trillion cubic feet (Tcf) posted then and 54% below the five-year average of 1.86 Tcf. It is likely that injection levels will have further struggled the week of April 14 as an Arctic chill swept the Midwest and Northeast, which brought on an unexpected period of spring heating demand for a few days. Should injection levels continue to falter throughout the rest of the spring and summer, utilities and end-users will either pay higher premiums in the winter or be forced to bid up prices to encourage production and limit LPG and LNG exports.

The National Weather Service's forecast for the week of April 22 anticipates warmer-than- normal temperatures throughout much of the country. This should put even more pressure on the industry's ability to reload storage levels as cooling demand should be greater than normal.

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Sage Midstream Plans West Coast LPG Terminal

Sage Midstream LLC launched a project to build an LPG export terminal at the Port of Longview in Washington State, through its subsidiary Haven Energy Terminals LLC.

Haven Energy will construct a unit-train accessible, rail unloading facility, storage tanks and ship loading area at the port with the capability of loading marine vessels with up to an approximate capacity of 550,000 barrels (bbl). The terminal will have a capacity of 47,000 bbl. per day and is expected to be operational by the fourth quarter of 2016.

"Haven Energy will provide the growing North American propane and butane supplies a direct route to the highest growth demand market for these products in Asia and in other Pacific destinations," said Greg Bowles, president of Sage and Haven Energy. "The terminal will be strategically located at the intersection of Class 1 mainline rail and a deep-water draft port on the West Coast to ensure these products unparalleled access to our terminal and, ultimately, to the waterborne markets."

Haven Energy will also invest in state-of-the-art safety features at the terminal, including the first full-containment propane and butane storage tanks to be constructed in the U.S. "The economic benefits to the local community and an unsurpassed investment in safety will make this project the gold standard of propane and butane export terminals in the U.S.," said Bowles.

Encana Sells US-Based LNG Unit

BY **EMILY MOSER** | HART ENERGY

Encana Corp. is clearing out more U.S. gas assets with the sale of the LNG business run by Encana Natural Gas Inc. (ENGI) of Denver to Beaumont, Texas-based Stabilis Energy. Terms of the transaction were not disclosed. Stabilis has an LNG facility under construction that will be able to produce about 100,000 LNG gallons per day when complete.

The divestment and Encana's announced $1.8 billion sale in March of Wyoming natural gas properties in the Jonah Field follow the company's transition strategy to forgo gas for liquids growth.

Calgary's Encana launched a transition strategy in 2014 to grow liquids production by 90%—or 30% of total production growth. The company said in December it would invest about 75% of its 2014 capital into five high-return oil and liquids-rich plays: the Montney, Duvernay, D-J Basin, San Juan Basin and Tuscaloosa Marine Shale.

ENGI, a subsidiary of Encana, is a leading distributor of LNG fuel to domestic high horsepower engine operators in the oilfield, mining, rail, marine, over the road transportation and industrial sectors. In addition to adding ENGI's staff, Stabilis agreed to purchase its fleet of cryogenic rolling stock assets including storage and regasification trailers, mobile fueling units and other related equipment. Stabilis will fulfill ENGI's entire existing customer obligations including its existing contracts, subject to customer consent.

After the transaction closes, Stabilis will operate one of the largest cryogenic rolling stock fleets in North America across 20 states and multiple end markets, including oilfield, mining, rail, marine and general industrial.

Stabilis plans to open its first LNG production facility in George West, Texas, in January 2015 to service oilfield customers in the Eagle Ford Shale. The facility is being built as part of a previously announced venture with Flint Hills Resources LLC, a leading refining, chemical and biofuels company and a subsidiary of Koch Industries, to build up to five LNG production facilities that target oilfield customers.

"Encana is pleased that Stabilis Energy will carry on the outstanding LNG business that our natural gas team has worked hard to build over the past several years," David Hill, executive vice president of Encana Corp., said in a release. "Encana believes that natural gas has a bright future as a domestic fuel source for high horsepower engines and that LNG will be an important part of this value chain."

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Encana will remain a customer of Stabilis for LNG, and senior management ENGI teams will assume leadership positions with Stabilis. The transaction is set to close on April 30.

LNG To Take 35% Of Locomotive Diesel Market By 2040 - EIA

BY **JACK PECKHAM** | HART ENERGY

The U.S. Energy Information Administration (EIA) on April 14 unveiled a portion of its Annual Energy Outlook (AEO) 2014 forecast indicating that liquefied natural gas (LNG) would take a 35% share of the U.S. locomotive fuel market (currently nearly 100% diesel) by 2040.

"In the reference [AEO baseline forecast] case, LNG fuel use increases from just over 1 trillion Btu [British thermal units] in 2017 to 148 trillion Btu in 2040, or 35% of total freight rail energy consumption," according to the EIA.

"In the 'high rail LNG' case, LNG fuel consumption increases to 392 trillion Btu in 2040, or 95% of freight rail energy consumption.

"LNG consumption in the 'low rail LNG' case increases to just 64 trillion Btu, or 16% of total freight energy consumption.

"Even under the 'high rail LNG' case, overall demand for natural gas as a result of a switch to LNG would increase overall demand for natural gas by less than 1%, resulting in a minimal effect on natural gas prices," according to the EIA.

The seven major U.S. freight railroads in 2012 consumed more than 3.6 billion gallons of diesel fuel, or 7% of all diesel fuel consumed in the U.S., the EIA noted.

Those railroads spent more than $11 billion on diesel fuel in 2012, which accounted for 23% of their total operating expenses, according to the EIA.

"Given [the EIA's] expected price difference between LNG and diesel fuel, future fuel savings are expected to more than offset the approximately $1 million incremental cost associated with an LNG locomotive and its tender," compared to a conventional diesel-electric locomotive, according to the EIA.

"However, in addition to the risk surrounding future fuel prices, other factors including operational, financial, regulatory and mechanical challenges also affect fuel choices by railroads.

"Some major railroad operators view the potential of LNG-fueled trains as similar to the switch from steam propulsion to diesel in the 1940s and 1950s, a revolution in freight rail known as dieselization.

"Others have responded with more caution, likening the potential switch to the more evolutionary advance from using direct current motors to alternating current (AC) motors, which allows fewer locomotives to pull the same load. The change towards AC motors has been ongoing since the early 1990s."

Gap Between Buyers And Sellers Stalls Deals

BY **DARREN BARBEE** | HART ENERGY

The acquisitions and divestitures (A&D) market is saturated with companies; acreage is sitting still; and the capital for companies to keep growing will be tough to find with many exploration and production companies outspending cash flow.

Welcome to a buyers' market.

In the first quarter of 2014, North America remained the most targeted region for energy, mining and utilities deals with $29.3 billion compared to $50.6 billion in the first quarter of 2013, according to Mergermarket.

However, the broader 40% decline in value is another indicator that many U.S. oil and gas companies are largely content with the assets they have.

Stockpiles of inventory have made them pickier about what they're willing to acquire in 2014. With a focus on efficiencies and cost-cutting, any potential deal has to be for a superior asset.

For sellers, "I think the market may be a little bit strained. Independents aren't quite culling off as many properties as they used to," said Bruce Cox, managing director and head of energy A&D at Credit

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Suisse LLC. Cox and other panelists spoke at the Mergermarket Energy Forum on April 9.

Who will come to the rescue? The possibilities include MLPs, private-equity and patience.

MLPs are likely to emerge as massive aggregators of acreage, but only after more data about resource play longevity emerges. Private equity will also play a role with $60 billion or more available to invest. And as growth in shale plays drops over the next few years, companies may begin consolidating.

One other driver may speed up mergers: the brutal competition for rigs and talent in shale plays. Putting two companies together and ceasing hostilities just might make sense.

In 2013, operators achieved strong valuations, with many launching successful IPOs. For the first time in many years, oil industry companies are capitalized in the tens of billions of dollars.

Since then, they've promised growth of 20% or more.

"These are all very profitable companies," said Ben Lett, managing director of global mergers and acquisitions (M&A) at Bank of America Merrill Lynch. "The question is, when does that growth dissipate? When do those basins roll over and when do you run into basin problems?"

Until company values drop, majors and large independents don't want to spend the money required to take down smaller companies trading at high multiples.

"We expect in the next few years you're going to see growth plateau," Lett said. The plateau could begin perhaps as early as 2016.

The A&D downturn in 2013 is still being sifted through, although it was clear by mid-year that sellers had to spend more time and money to make their acreage appealing.

After last year's drop of $5 billion to $7 billion in A&D deal values, it's apparent some market dynamics have upended. The average deal size fell to $200 million from about $400 million, more in line with historical averages. The number of deals was dramatically up, Cox said.

But a standout element of 2013 was that many of the properties that hit the market weren't transacted on at all, Cox said.

"The main takeaway is what emerged was a buyer/seller divide, particularly along the lines of valuation," he said. "In 2013, the market became a lot more efficient, and some would argue, much more balanced."

Corporate-to-corporate M&A tanked especially hard. For the year, $6 billion worth of such deals were done in 2013. The historical average is $35 billion to $40 billion, Cox said.

Another barrier for deals was that large oil and gas companies are engaged in projects of an enormous scale.

"LNG is taking up a tremendous amount of capital," Lett said. "Frankly, they're not producing cash flow. It will in the next few years and that will change things."

The majors also have vast portfolios and are divesting where they can. And they view independents and shale plays as being overvalued by the public markets, Cox said.

Extremely high valuations of smaller companies are a deal killer for the majors, Lett said.

"It's difficult for them to pay the price needed to do an M&A to take some of these companies out," he said.

The smaller independents aren't yet ready to join in with others in particular basins, particularly as they continue to grow.

"They weren't inclined to do big M&A to combine companies in basins," Cox said, "Although I think that's logically where a lot of these basins need to take themselves, particularly the more mature ones."

In time acquisitions will pick back up, especially as upstream MLPs buy assets, Lett said.

"I would argue that, as these basins mature and the shale plays come off hyperbolic declines and stabilize, MLPs will become massive aggregators," Lett said. "We're already seeing them dip their toes in the market."

In March, for instance, MLP Memorial Production Partners LP announced it would buy oil and gas interests in the Eagle Ford from Alta Mesa Holdings LP for $173 million.

One way companies may be pushed more swiftly toward consolidation is the war for talent and rigs in the basins.

"You're not going to have the cash to continue to grow that fast," Lett said.

Without skilled workers, "you can't run the rigs and get the people to take advantage of the resources unless you garner a new resource base," Lett said. "Those resources walk out the elevator every day and have a better opportunity down the street."

Oryx Midstream Enters Permian Basin

Oryx Midstream Services LLC received an equity commitment totaling up to $300 million from Quantum Energy Partners, Post Oak Energy Capital, Wells Fargo Energy Capital, Oryx management and other private investors. Oryx will pursue midstream opportunities in the Permian Basin, focusing initially on the Delaware Basin in Texas and

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New Mexico. The company expects to leverage its deep energy industry experience and build on strong relationships with oil and gas producers in the region to provide a full suite of midstream services.

Oryx signed long-term, fee-based contracts with three exploration and production companies—one large, publicly traded independent company and two private Midland-based companies—to support its active drilling programs in the northern Delaware Basin. The three companies have dedicated to Oryx production from wells drilled within an area encompassing approximately 340,000 acres in Lea County, N.M.

To accommodate production from the dedicated acreage, Oryx plans to initially construct up to 60 miles of rich gas gathering pipeline and up to 80 miles of crude oil gathering pipeline. Construction is expected to begin in April and will be conducted in phases based on customer needs. The pipeline systems will provide customers with an integrated gathering service and will serve production from multiple formations including the Second Bone Spring, Third Bone Spring, Avalon/Leonard and Wolfcamp shales. Oryx also plans to pursue third-party volumes inside the acreage dedication area and more broadly across the basin.

Houston Fills With Crude Oil That Can't Be Shipped Out

BLOOMBERG

Houston and the rest of the U.S. Gulf Coast have more crude oil than the region can handle.

Stockpiles in the region centered on Houston and stretching to New Mexico in the west and Alabama in the east rose to 202 million barrels in the week ended April 4, the most on record, Energy Information Administration (EIA) data released on April 9 show.

Storage tanks are filling as new pipelines carry light, sweet oil found in shale formations to the coast and U.S. law keeps companies from moving it out. Most crude exports are banned, and the 13 ships that can legally move oil between U.S. ports are booked solid. The Jones Act restricts domestic seaborne trade to vessels owned, flagged and built in the U.S. and crewed by citizens.

"You can't get all that light, sweet crude out, it's all kind of piling up," said Jeff McGee, the founder of Makai Marine Advisors LLC in Dallas, who previously led research at two shipbrokers and worked as a refinery planner. "You couldn't find a spot Jones Act ship to save your life right now."

The glut will make prices of benchmark West Texas Intermediate oil $13 a barrel cheaper later this year than Brent, the international benchmark, according to Bank of America Corp. forecasts. The EIA forecasts the average gap for 2014 will be about $9.

Companies including TransCanada Corp. and Enterprise Products Partners LP built and reversed pipelines that helped carry a record amount of oil to the Gulf Coast from the Midwest last year. Total U.S. production reached 8.23 million barrels per day last week, the highest level since May 1988.

Pipeline Penalties Hit All-Time High; Incident Count At All-Time Low

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) proposed more than $9.7 million in civil penalties in 2013 against pipeline operators who violate safety regulations. The figure is the highest yearly amount of proposed penalties in the agency's history.

"The Department remains committed to ensuring America's 2.6 million-mile pipeline network is capable of safely delivering America's vital energy needs," said U.S. Transportation Secretary Anthony Foxx in a statement. "The proposed fines send the powerful message that we are holding non-compliant pipeline operators accountable for their actions and will be using our higher civil penalty authority to the max whenever necessary."

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Since 2009, PHMSA has proposed more than $33 million in civil penalties against pipeline operators, $10 million more than the amount proposed in the previous five years combined. It has also issued 544 enforcement orders over the past five years, constituting more than half of all orders issued by the agency since 2002. PHMSA also reports 45% fewer serious pipeline incidents, those resulting in fatalities or major injuries, since 2009. The count has declined each year since 2009.

In 2013, PHMSA initiated 266 enforcement cases against pipeline operators for problems involving their integrity management programs, risk assessments, failure prevention and mitigation programs, and several other possible regulatory violations identified during failure investigations and routine inspections. In addition to proposing penalties for each federal violation, enforcement orders also include case-specific safety instructions to ensure all issues have been resolved.

Tougher enforcement is a result of PHMSA's internal improvements to its pipeline inspection and tracking procedures. Recognizing that expediting its enforcement process is important to ensure prompt compliance, PHMSA has substantially improved its enforcement efficiency. From 2009 to 2013, for those enforcement cases involving civil penalties or proposed compliance actions, PHMSA reduced its average time to initiate and fully close an enforcement case by 65%.

Approximately $1.4 Million Per Day Of Bakken Gas Being Flared

BLOOMBERG

Twice as much natural gas is wasted through flaring as in 2012 amid an energy boom that's propelled North Dakota's torrid economic growth. The state's employment expansion has been the fastest in the U.S. for four years. In the rush to exploit the Bakken shale formation, which holds the nation's second-largest oil supply, companies from Statoil ASA to Whiting Petroleum Co. are stepping in to try to capture more of what's lost.

Natural gas burned in flaring is a byproduct of crude oil. Without enough pipelines to transport the gas, or the refinery capacity to process it, about one-third of what's released each day, worth $1.4 million, goes up in smoke. Tribal members say as much as 70% of gas from wells on the reservation is flared.

"We're confessing that we are flaring a tremendous amount of gas right now," Gov. Jack Dalrymple said in February. "Everybody feels it's a huge waste, to say nothing of the environmental impact."

Arizona County May Seek Damages From Kinder Morgan

The government body of an Arizona county may demand $12 million from Kinder Morgan Energy Partners to pay for potential long-term environmental damage from a proposed natural gas pipeline, the *Arizona Daily Star* newspaper reports.

The Tucson, Ariz., paper said that County Administrator Chuck Huckelberry will ask the Pima board of supervisors to request $7 million from Kinder for a mitigation fund for the Sierrita pipeline as well as funds to subsidize law enforcement, destroyed habitat area and annual costs. The pipeline is planned to extend 60 miles from Tucson to Sasabe, Ariz.

County officials have voiced opposition to the pipeline and area ranchers have raised doubts about the adequacy of Kinder Morgan's plan to replant native vegetation along the pipeline route. They also claim that tax revenue from the project will not meet the county's expected $16 million in expenses for increased law enforcement patrols, road maintenance and other obligations.

ONEOK Partners Subsidiary Applies For FERC Pre-Filing

ONEOK Partners L.P.'s subsidiary, Midwestern Gas Transmission Co., filed an application with the Federal Energy Regulatory Commission (FERC) to enter into the pre-filing process for the proposed development of an approximately 15-mile natural gas pipeline lateral in Ohio and Muhlenberg counties in Kentucky.

The proposed natural gas pipeline lateral would connect Midwestern Gas Transmission's existing natural gas transmission pipeline to a new, high-efficiency, natural gas-fired electric-power generation plant being constructed by the Tennessee Valley Authority (TVA) at its Paradise plant site in Muhlenberg County, Ky., that has an estimated maximum natural gas flow of 227,000 dekatherms per day.

Subject to FERC approval of the pre-filing application, ONEOK Partners will conduct stakeholder outreach for the proposed natural gas pipeline lateral, including a public open house in Ohio County, Ky., in May 2014. The construction schedule for the proposed natural gas pipeline lateral could include:

- Filing applicable permits with regulatory agencies in October 2014;
- Beginning construction in September 2015, pending regulatory approvals; and

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- Placing the lateral in service September 2016.

The proposed natural gas pipeline lateral is subject to the execution of a precedent agreement with the TVA. Construction of the natural gas pipeline lateral is subject to FERC jurisdiction and would require the completion of an environmental assessment.

Midwestern Gas Transmission is an approximately 400-mile natural gas pipeline that provides bidirectional natural gas services to markets in Tennessee, Kentucky, Indiana, southern Illinois and the Chicago market hub.

Minnesota Agency Backs Expansion Of Enbridge Pipeline

Enbridge Energy gained an endorsement from the Minnesota Commerce Department to expand capacity of its Alberta Clipper crude oil pipeline by 40% to 800,000 barrels per day, the Minneapolis *Star Tribune* newspaper reported.

Enbridge seeks $160 million in new or expanded pumping stations. This would be the second expansion of 1,000-mile Line 67, which begins in Hardisty, Alberta, and runs through 285 miles of Minnesota to Superior, Wis. The company warned that Minnesota's two oil refineries face shortages if the line's improvements are not approved.

Gas Pipeline Systems Vulnerable To Heartbleed Virus

Many critical pieces of industrial infrastructure, including natural gas pipeline systems, connect to monitoring systems using encrypted software called OpenSSL, which researchers have determined is vulnerable to security breaches from the Heartbleed bug.

The Puget *Sound Business Journal* reports that reliance on legacy systems, such as old versions of Microsoft Windows, makes the infrastructure networks vulnerable, especially if they cannot be updated to new operating systems and software.

Bloomberg reported that most large websites have already implemented a fix. Two-thirds of the world's Internet sites use the open-source software. However, *Bloomberg*'s Jordan Robertson expressed concern about the length of time that the virus has been active.

"The fact that this flaw has been around for two years raises some really interesting questions about who knew about it before," he said. The likelihood that intelligence agencies, such as the National Security Agency, were unaware of the bug, is small, he said.

In his blog, Steve Rosenbush of the *Wall Street Journal* quoted security expert Bruce Schneier describing Heartbleed as "catastrophic." Said Schneier: "At this point, the odds are close to one that every target has had its private keys extracted by multiple intelligence agencies."

Putin Expected To Sign China Gas Deal As Crisis Forces Hand

BLOOMBERG

Vladimir Putin is more likely to sign a 30-year deal to supply pipeline gas to China next month after more than a decade of false starts because the crisis in Ukraine is forcing Russia to look for markets outside Europe.

While Putin and President Xi Jinping will make the final decision in Beijing next month, Russia's need for new customers means it's pushing to complete a deal first mooted in 1997, a manager at gas-export monopoly OAO Gazprom and a government official said, asking not to be named because talks are ongoing. In China, Russia's deputy prime minister said he "hoped" a deal would be signed in May.

The crisis in Ukraine has increased the importance of Russia's relationship with China, its largest trade partner outside the European Union and the only country in the United Nations Security Council not to censure its actions in Crimea. Until a China pipeline is built, Russia has few export markets for gas outside Europe, leaving it vulnerable to sanctions and competition from U.S. exports of shale gas.

British Columbia First Nations Sign LNG Agreements

In a deal that could be worth as much as CA$15 million (US$13.76 million), two north coast First Nations signed revenue-sharing agreements with British Columbia's government related to the development of a proposed LNG export terminal on traditional territories near Prince Rupert, the *Canadian Press* has reported.

Premier Christy Clark said pacts signal the government's goals of including nations like the Metlakatla and Lax Kw'alaams in development of the province's LNG, which she described as an opportunity that will rival Alberta's oil sands.

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While most of the First Nations opposed the proposed Northern Gateway pipeline that would move Alberta oil products to the British Columbia coast for export to Asia, the news agency reported that the leaders of these two nations indicated that some aboriginal groups are willing to embrace some forms of resource development.

Antero Receives Pipeline Capacity For Broad Run Project

Antero Resources (AR), an independent oil and natural gas company based in Denver, Colo., was awarded 100% of the capacity offered in Tennessee Gas Pipeline Co.'s (TGP) open season. The open season amounted to 790,000 dekatherms per day (Dth/d) for long-term firm capacity for 15 years on West Virginia's Broad Run lateral and on TGP's 100 and 500 mainlines. The agreement between AR and TGP consists of the Broad Run Flexibility Project and the Broad Run Expansion Project.

The Broad Run Flexibility Project, expected to begin service on Nov. 1, 2015, provides 590,000 Dth/d of firm transportation capacity from TGP's Broad Run Lateral in TGP Zone 3 to delivery points in TGP Zone 1. The Broad Run Expansion Project provides 200,000 Dth/d of firm transportation capacity on the same capacity path, and is anticipated to begin service on Nov. 1, 2017.

TGP is owned by Kinder Morgan Energy Partners L.P. Of the agreement, Kinder Morgan East Region Natural Gas Pipeline President Kimberly S. Watson said, "The results of the Broad Run open season demonstrate that demand for clean, efficient natural gas is continuing to drive production growth in the Marcellus, Utica and other shale resource plays, and that our assets are well positioned to serve those plays. The capacity subscribed in this open season also underscores continued growth in Gulf Coast consumption markets and the need for more supply for processing, fractionation and liquefaction, and other end uses in the area."

Shortened Objection Period For Pipe Abandonment Denied

American Midstream Partners' request for a shortened 10-day objection period related to its proposed abandonment of the Midla Pipeline was rejected by the Federal Energy Regulatory Commission (FERC) on April 11. FERC instead authorized a 22-day objection period that will end May 2.

Earlier this month, the company filed a request to abandon the 90-year-old, 370-mile pipeline that runs from Monroe to Baton Rouge, La., due to safety concerns. It is estimated that the pipeline is 50 years beyond its predicted lifespan. However, the move has been opposed by local and state officials who argue the abandonment could lead to increased utility rates for residents now served by the pipeline.

"While we are aware of no imminent danger, we cannot be sure the Midla pipeline is safe to operate," Steve Bergstrom, American Midstream executive chairman, president and CEO, said in a statement related to the filing to abandon the system. "The fact that the pipeline is still in service five decades beyond its predicted useful life is a testament to Midla's maintenance program. Like an old car, however, there is only so much maintenance that can be done before the frame gives way and the car must be replaced. Midla's mainline has clearly reached that point, and needs to be shut down and a replacement pipeline or alternate form of service installed and commissioned."

The company previously held an open season in 2013 seeking to rebuild the pipeline, but it failed to secure enough interest to warrant development.

DCP Midstream Promotes Loving To Controller

DCP Midstream Partners, LP and DCP Midstream LLC promoted Richard A. Loving, currently senior director of marketing and fixed asset accounting, to vice president and controller of DCP Midstream and DCP Midstream GP LLC.

Loving is currently responsible for corporate, gathering processing and marketing accounting as well as Securities and Exchange Commission (SEC) reporting. He has served in roles of increasing responsibility with DCP Midstream including senior director of both corporate accounting and marketing and fixed asset accounting since joining DCP Midstream in 2009. Prior to this, Loving served as director of technical accounting and SEC reporting for DISH Network. Loving is a licensed certified public accountant in Pennsylvania.

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Global Investments Underpin US Chemical Industry's Rebirth

BY **NICOLE JOHNSON** | HART ENERGY

A myriad of petrochemical projects are under way around the world as the sector becomes increasingly globalized in terms of technology transfer, feedstock sourcing and market access.

The implications of any strategic commitment can be substantial because of the amount of investment involved.

For much of its 75-year history, the key drivers of the U.S. petrochemicals industry—namely proximity to demand, access to feedstock, access to talent and technology and favorable regulatory policies—remained static.

But recent advances in oil and gas-extraction techniques have made the exploitation of unconventional gas resources such as shale gas, coal-bed methane and tight gas economically feasible. While the dynamics of these drivers has essentially rescued the petrochemical industry from stagnation, participants have had to adapt their operating models.

It appears they have, too.

The American Chemistry Council (ACC) in February announced a major industry milestone: The value of announced capital investment planned by U.S. chemical companies had surpassed $100 billion. The projects—148 in all—have been propelled by the flood of cost-advanced natural gas and natural gas liquids, according to the ACC. Most are expected to enter service in 2017, give or take a year.

Earlier this month, Chevron Phillips Chemical held a groundbreaking ceremony at its Cedar Bayou plant in Baytown, Texas, as part of the company's U.S. Gulf Coast Petrochemicals Project.

The project includes a 1.5 million-metric-ton-per-year (mtpy) (3.3 billion-pound-per-year [bppy]) ethane cracker and two 500,000-mtpy (1.1-bppy) polyethylene (PE) units in Old Ocean, Texas, according to a company announcement. The project is expected to be completed in 2017.

"The project will support 400 long-term direct jobs and 10,000 engineering and construction jobs," the Chevron Phillips statement noted.

Engineering, procurement and construction (EPC) services for the ethane cracker will be conducted via a joint venture between JGC (USA) and Fluor Enterprises Inc.

EPC services for the two PE units, which are scheduled for groundbreaking on June 17, will be executed through a "partnership" between Technip USA Inc. and Zachry Industrial Inc., Chevron Phillips said.

But the promise of low-cost petrochemical feedstocks derived from shale reserves has grabbed the attention of other world markets.

Malaysia's Petroliam Nasional Berhad (Petronas) has approved a $16 billion final investment decision (FID) to continue developing its Pengerang Integrated Complex in Southern Johor, Malaysia, according to an April 3 company statement.

The complex will include a world-scale Refinery and Petrochemical Integrated Development, as well as a "raw-water supply facility, power co-generation plant, LNG regasification terminal and other ancillary facilities," Petronas officials said.

The 6,242-acre site also will include a 300,000 barrel-per-day refinery and 7.7 million-tonne-per-annum petrochemical units that will produce synthetic rubber, high-grade polymers and specialty chemicals.

"The FID is a critical stage gate in our decision-making process," Petronas' president and group CEO Tan Sri Dato' Shamsul Azhar Abbas said. "Petronas undertook a rigorous review of the project, including independent third-party assessments to ensure it meets our criteria for long-term profitable and sustainable growth.

"This decision is in line with our commitment to capital discipline, and with the board's approval we look forward to progressing the development of the project as planned," he added. "We will continue to work closely with the federal and Johor state governments to ensure the project's smooth implementation."

Petrochemical project announcements during the first half of April also came from Italy's Marie Tecnimont S.p.A. The company's Kinetics Technology subsidiary won two contracts totaling €190 million (US$263.5 million) from Total Olefins Antwerp for a Refinery Off Gas (ROG) project at Total's Antwerp refinery in Belgium.

"Total Raffinaderij Antwerp is one of Total's six major integrated platforms globally and the crucial link in Total's integrated petrochemical complex in Belgium," according to the Maire Tecnimont statement.

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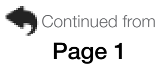
Continued from **Page 1**

because "something weird is going on … the details we do not understand." He acknowledged the climate has varied widely on its own but added he believes human-created greenhouse-gas emissions created a noticeable temperature uptick since 1980.

Chu joined the faculty of Stanford University after leaving Obama's administration last year, and global warming is among the issues he currently studies.

A move toward renewable "better solutions" for energy doesn't rule out some use of hydrocarbon fuels for many years. Chu called natural gas "a genuine transition fuel" for renewables. "We need backup power," he added. He predicted a role for both gas and crude oil well into the middle of the century.

Chu called himself "a big advocate of carbon capture." He suggested CO_2 taken from steel mills and other industrial plant emissions can be used for enhanced oil recovery. Improved technology allows accurate measurement of CO_2 and methane sequestration and provides the ability to find and plug leaks.

Non-biodegradable plastics, oddly, may even have a role in sequestration, he said, pointing out that by burying non-recycled plastics "you've just sequestered some carbon for a couple-hundred years."

Chu commented at length on "the rapidly changing landscape of natural gas" in the U.S. and the world, thanks to shale production. He reviewed forecasts of potential increased gas production from the unconventional shale plays but hedged his observations by quoting baseball-great Yogi Berra, who once observed, "Predictions are hard to make, especially about the future."

Whatever the accuracy of projections for the future tight oil and gas, he pointed out the U.S. will have increased its oil production by around 2 ½ MMbbl/d by the end of this year. "If you sum up that increase, it's actually larger than the total production of countries like Iraq, Iran and Libya," he pointed out, adding "and we may temporarily pass Saudi Arabia" in total output.

Gas production also is rising, refuting studies published as recently as 2008 that projected a rapid drop in U.S. gas output, Chu said. That growing output will feed the new, rapidly growing LNG export business, although he added there is the possibility the U.S. gas business may overbuild if all of the proposed gas liquefaction export plants actually are built.

Chu said there are also substantial new domestic markets for gas, particularly as a transportation fuel. He said the greatest potential use would be by commercial firms making local or short-haul intercity runs, given the limited range of CNG-equipped vehicles.

Texas is an excellent potential gas fuel market because of "a heavy trucking triangle" between Dallas-Ft. Worth, San Antonio and Houston. Trucks can make profitable runs of 250-300 miles, arriving near established CNG refueling stations.

A barrier to CNG or LNG as a transportation fuel is initial cost. Chu said new trucks equipped to burn gas cost nearly 100% more than conventional, diesel-fueled vehicles. The actual cost should be close to 15-20% he said.

"This is only because it's new technology that hasn't been mass-marketed yet," he said, adding will costs will come down in the near future.

Energy Transfer's Warren Receives Top GPA Award

Kelcy Warren, board chairman and CEO of Energy Transfer Partners LP, received a Hanlon Award from the Gas Processors Association (GPA).

Presented at the association's 93rd annual convention in Dallas, the award has been made from time to time by the association to recognize top midstream executives, said Joel Moxley, senior vice president of operations services for Crestwood Midstream Partners LP and current GPA chairman.

Moxley outlined the growth of Energy Transfer under Warren's leadership in his award presentation. He noted the firm now has an enterprise value of $61 billion.

The award is named for the late E.I. Hanlon, a pioneer of the gas processing business. The award recognizes outstanding individual career achievements and/or contributions toward the advancement of the midstream industry.

GPA also presented Dr. William R. Parrish with the Donald L. Katz Award in recognition of outstanding accomplishments in midstream research and technology.

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