

## Annual Midstream Rankings: DCP Midstream Tops Both Charts

### Enterprise Products Partners close second in NGL producer, gas processor rankings

BY **FRANK NIETO** | EDITOR, MIDSTREAM MONITOR, MIDSTREAMBUSINESS.COM

Consolidation has played a key role in the midstream the past year and is reflected in *Midstream Monitor's* annual rankings of the top natural gas processors and natural gas liquid (NGL) producers for 2012. This holds true as two previously ranked companies—Southern Union and Energy Transfer Partners (ETP)—now fall under the same general partner: Energy Transfer Equity (ETE). For the purposes of our rankings, Energy Transfer officials asked that we refer to this combined entity as Energy Transfer Enterprise.

ETE acquired Southern Union in early 2012, which combined with the acquisition of Regency Energy Partner's general partner and Sunoco Logistics Partners, has given the combined entities an equity value of more than \$50 billion. ETE's diverse operations include more than 69,000 miles of pipeline, 51 natural gas processing plants, two fractionators and 2 billion cubic feet per day of liquefied natural gas (LNG) import capacity along with 4,900 Sunoco gasoline retail locations.



Astute observers will notice that the production and processing figures for the combined Energy Transfer entity are lower in the rankings than the companies held separately last year. The reason for this discrepancy is that ETE officials removed some double counting in previous figures as well as adhered to our criteria more closely.

The standards used to compile our rankings remain the same as last year when we asked owners of processing plants and fractionators to submit their full processing and production totals at their facilities for 2012. In years prior to 2011, we based our rankings on

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## HIGHLIGHTS FROM TODAY'S EDITION



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Demand has been increasing for NGLs as winter approaches.

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### Western Expansion

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### Shales Increasing U.S. Global Power

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Production growth out of shale plays isn't benefitting all facets of the petchem industry.

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China is expected to surpass the U.S. as the largest importer of crude oil worldwide

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## NGL PRICES & FRAC SPREAD | Week in Review

### NGL Prices Benefitting From Increased Demand

BY **FRANK NIETO** | EDITOR, MIDSTREAM MONITOR, MIDSTREAMBUSINESS.COM

The unexpected outages of six ethane crackers didn't seem to have much of an impact on prices as both Mont Belvieu and Conway were up last week. It appears that the market decided that the outages would not have a tangible, long-term impact on demand. As we noted in last week's issue, it was expected that the outages would be repaired within two weeks.

While increased propane demand has helped to support ethane, it seems this support is starting to weaken based on the lack of E-P mix trading in Texas. Mont Belvieu E-P mix volatil-

CURRENT FRAC SPREAD (CENTS/GAL)				
August 26, 2013	Conway	Change from Start of Week	Mont Belvieu	Last Week
Ethane	21.84		25.28	
Shrink	22.87		23.21	
<b>Margin</b>	-1.03	23.35%	2.08	52.30%
Propane	110.08		112.08	
Shrink	31.60		32.06	
<b>Margin</b>	78.48	8.24%	80.02	7.44%
Normal Butane	135.78		139.72	
Shrink	35.78		36.30	
<b>Margin</b>	100.00	2.89%	103.43	3.63%
Isobutane	140.78		140.18	
Shrink	34.36		34.86	
<b>Margin</b>	106.42	-0.11%	105.32	4.05%
Pentane+	217.04		224.86	
Shrink	38.26		38.82	
<b>Margin</b>	178.78	2.53%	186.05	3.94%
NGL \$/Bbl	42.30	3.31%	43.57	3.50%
Shrink	12.60		12.79	
<b>Margin</b>	29.70	4.25%	30.79	5.29%
Gas (\$/mmBtu)	3.45	1.17%	3.50	-0.57%
Gross Bbl Margin (in cents/gal)	67.94	4.54%	70.92	5.49%
Gross Bbl Margin (in cents/gal)				
Ethane	1.20	2.73%	1.39	2.35%
Propane	3.82	6.11%	3.89	5.02%
Normal Butane	1.47	2.43%	1.51	2.51%
Isobutane	0.88	0.20%	0.87	2.86%
Pentane+	2.80	2.29%	2.90	3.13%
Total Barrel Value in \$/mmbtu	10.17	3.58%	10.56	3.60%
<b>Margin</b>	6.72	4.86%	7.06	5.80%

NGL PRICES						
Mont Belvieu	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
Aug. 21- Aug. 27, '13	25.28	112.08	139.72	140.18	224.86	\$43.57
Aug. 14- Aug. 20, '13	24.70	106.72	136.30	136.28	218.03	\$42.10
Aug. 7- Aug. 13, '13	24.26	101.11	126.08	133.00	212.72	\$40.38
July 31 - Aug. 6, '13	24.97	95.74	131.30	133.35	212.65	\$40.13
July '13	24.73	91.89	126.67	130.93	209.15	\$39.09
June '13	24.81	86.20	116.29	117.82	201.62	\$37.02
2nd Qtr '13	27.12	91.38	124.01	127.46	204.12	\$38.82
1st Qtr '13	25.68	86.42	157.72	166.41	222.63	\$42.07
4th Qtr '12	26.59	88.74	162.76	181.71	215.67	\$42.69
3rd Qtr '12	32.34	89.27	142.76	161.88	200.54	\$41.03
August 22 - 28, '12	31.27	84.28	151.90	169.76	217.47	\$42.11
Conway, Group 140	Eth	Pro	Norm	Iso	Pen+	NGL Bbl
Aug. 21- Aug. 27, '13	21.84	110.08	135.78	140.78	217.04	\$42.30
Aug. 14- Aug. 20, '13	21.26	103.74	132.56	140.50	212.18	\$40.95
Aug. 7 - Aug. 13, '13	20.46	98.54	129.22	141.33	209.50	\$39.86
July 31 - Aug. 6, '13	21.54	91.14	127.56	141.33	209.50	\$39.07
July '13	20.54	87.20	123.28	150.40	207.71	\$38.34
June '13	18.83	81.18	109.78	124.94	196.00	\$35.16
2nd Qtr '13	20.71	85.37	116.50	123.91	204.86	\$36.89
1st Qtr '13	23.94	81.81	153.43	160.39	222.63	\$41.11
4th Qtr '12	18.45	79.24	164.46	174.39	209.16	\$39.94
3rd Qtr '12	14.60	70.25	124.35	165.61	195.68	\$34.99
August 22 - 28, '12	19.04	75.88	144.24	196.45	209.46	\$39.19
August 15 - 21, '12	20.20	81.26	140.30	185.85	203.78	\$39.15

(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.

ity was very limited, especially compared to the heavy volatility experienced by propane prices. E-P mix had a 2¢ per gallon (gal) greater price differential at the hub.

Mont Belvieu ethane prices rose 2% to 25¢ per gal, which is roughly the same level it has been at for the past 10 weeks. Conway was a bit stronger, rising 3% to 22¢ per gal, its highest price in five weeks.

Despite these improved prices, ethane margins remained challenged at both hubs as the Conway margin was negative even after

## NGL PRICES & FRAC SPREAD | Week in Review

it improved 23%, and the Mont Belvieu margin was only slightly positive after a 52% increase.

Propane had the largest price gains at both hubs as it rose 5% to \$1.12 per gal at Mont Belvieu and 6% to \$1.10 per gal at Conway. The Texas price was the highest it has been since it reached \$1.16 per gal the week of April 25, 2012 while the Kansas price was the highest it has been since it was \$1.12 per gal the week of March 7, 2012. These improvements come as inventory levels are approaching their five-year average for the first time this year.

West Texas Intermediate (WTI) crude prices hit their two-year high this week as they rose above \$110 per barrel after concerns about security supplies related to tensions in Syria and Libya. Prices were further supported after the U.S. Energy Information Administration (EIA) reported that stocks at the Cushing, Oklahoma, hub fell for the eighth-straight week.

These improvements helped drive up heavy natural gas liquid prices at both hubs. Pentanes-plus ( $C_{5+}$ ) experienced a 3% gain at Mont Belvieu, pushing the price to \$2.25 per gal, the highest it has been since it was \$2.32 per gal the week of Feb.20. The Conway

KEY NORTH AMERICAN HUB PRICES	
2:30 PM CST / August 29, 2013	
Gas Hub Name	Current Price
Carthage, TX	3.50
Katy Hub, TX	3.57
Waha Hub, TX	3.52
Henry Hub, LA	3.59
Perryville, LA	3.52
Houston Ship Channel	3.58
Agua Dulce, TX	3.59
Opal Hub, Wyo.	3.48
Blance Hub, NM	3.48
Cheyenne Hub, Wyo.	3.50
Chicago Hub	3.72
Ellisburg NE Hub	3.38
New York Hub	3.51
AECO, Alberta	2.34

Source: Bloomberg

price rose 2% to \$2.17 per gal, its highest price since April 17 when it was the same price. In addition to improved WTI prices,  $C_{5+}$  demand also improved as producers switch to winter-grade gasoline, which uses  $C_{5+}$  in its blend. Isobutane and butane also benefited from the switch to winter-grade gasoline, though isobutane's gains have been slowing as the Conway market continues to normalize as isomerization units are returning to service. The price at the hub for isobutane rose by a very slight margin as the price essentially remained unchanged at \$1.41 per gal. The Mont Belvieu price rose 3% to \$1.40 per gal, its highest level since it was \$1.47 per gal the week of March 27. This was the smallest the price differential has been between the two hubs since

RESIN PRICES – MARKET UPDATE – AUGUST 29, 2013					
TOTAL OFFERS: 15,284,352 lbs		SPOT		CONTRACT	
Resin	Total lbs	Low	High	Bid	Offer
LLDPE - Film	3,332,484	0.67	0.77	0.65	0.69
LDPE - Film	2,959,312	0.67	0.825	0.74	0.78
HDPE - Inj	2,543,404	0.695	0.76	0.67	0.71
HDPE - Blow Mold	1,939,772	0.68	0.77	0.65	0.69
LDPE - Inj	1,096,000	0.725	0.76	0.69	0.73
PP Copolymer - Inj	874,000	0.805	0.89	0.8	0.84
GPSS	760,000	0.86	0.93	0.86	0.91
HIPS	570,000	1.015	1.025	0.98	1.03
LLDPE - Inj	510,184	0.67	0.75	0.66	0.7
HMWPE - Film	396,828	0.75	0.77	0.71	0.75
PP Homopolymer - Inj	302,368	0.77	0.8	0.79	0.83

Source: Plastics Exchange – [www.theplasticsexchange.com](http://www.theplasticsexchange.com)

the week of June 12, when it was also 1¢ per gal in favor of Conway. While the Midcontinent remained the more valuable of the two hubs for isobutane, by the close of the week the Mont Belvieu price had surpassed the Conway price.

Mont Belvieu butane rose 3% to \$1.40 per gal, its highest price since it was \$1.41 per gal the week of March 27. The Conway price for butane rose 2% to \$1.36 per gal, the highest it has been since the week of February 27 when it was \$1.41 per gal.

Natural gas prices were largely unchanged this week as they were down 1% at Mont Belvieu to \$3.50 per million Btu (MMBtu) and up 1% to \$3.45 per MMBtu at Conway. Prices should benefit in the near-term based off forecasts anticipating warmer-than-normal temperatures in the Midwest and Northeast and a bullish storage inventory report.

According to the most recent data from the EIA, natural gas in storage levels rose by 67 billion cubic feet to 3.13 trillion cubic feet (Tcf) the week of August 23 from 3.063 Tcf the previous week. This was 7% below the 3.365 Tcf figure posted last year at the same time and 2% greater than the five-year average of 3.085 Tcf.

Longer-term gains may be more difficult to sustain, according to Hart Energy's *Commodities Report* for August 29. "[S]ome technical traders said the market was approaching the top end of the recent range, and more bullish fundamentals were likely needed to support higher prices," the report said.

"Despite recent gains, many investors remained skeptical of further upside, with storage comfortable, production flowing at or near a record peak and no sustained heat on the horizon."

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## ONEOK To Acquire Powder River Processing, Gathering Assets

ONEOK Partners LP will invest approximately \$440 million in the natural gas liquids (NGL) rich area in the Powder River basin in Wyoming. This will include purchasing the 50 million cubic feet (MMcf) per-day Sage Creek natural gas processing facility and related natural gas gathering and NGL infrastructure in western Converse and Campbell counties, Wyoming, for \$305 million from an undisclosed seller; and investing \$135 million to upgrade and construct natural gas gathering and processing related infrastructure, NGL gathering pipelines and well connections.

“The Sage Creek plant gives ONEOK Partners additional natural gas gathering and processing capacity in a region where producers are actively drilling that has significant long-term growth potential,” Terry K. Spencer, ONEOK Partners’ president, said in a release.

“This acquisition will add assets located in and around our operating footprint that can be integrated into our system and used as a platform for future growth opportunities,” Spencer added. “The acquisition further positions the partnership as a full-service mid-stream provider for area producers.”

The partnership expects to close the transaction during the third quarter and complete the related infrastructure projects in the second half of 2014. Financing for this transaction will come from available cash and short-term borrowings.

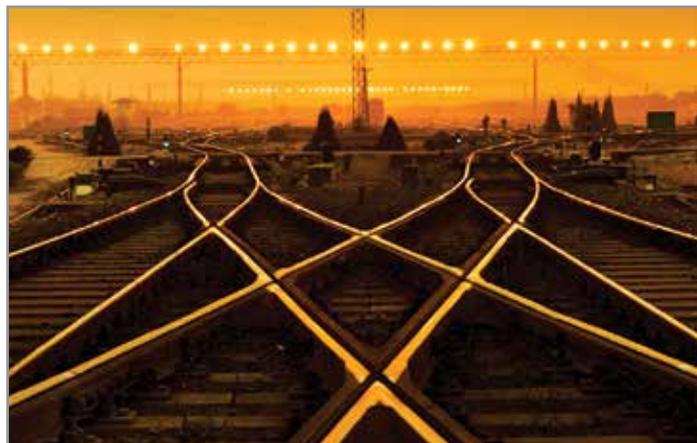
As part of the acquisition, ONEOK Partners will receive long-term acreage dedications and fee-based and percent-of-proceeds agreements with producers. Total partnership annual EBITDA from this acquisition and the related investments is expected to increase by \$40 million to \$60 million between 2015 and 2018.

In addition to the Bakken NGL pipeline, ONEOK Partners operates approximately 1,000 miles of natural gas gathering pipelines in the Powder River and Wind River basins in Wyoming.

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## Shale Fuels Growth In Rail Sector

BY VELDA ADDISON | HART ENERGY



**The Statistics |** The percentage of crude oil transported by rail instead of pipeline rose from 6% to 69% since 2010.

The shale renaissance has helped push up shipment of petroleum products via rail, with U.S. Class I railroads originating 256% more carloads of crude in 2012 compared with the previous year.

The statistic, shared by BNSF Railway Co. Chief Executive Matthew Rose during the Summer North America Prospect Expo luncheon in Houston, was among the ways that shale plays are impacting the rail industry. Total unconventional oil production has increased 67% in the last three years, while Bakken production is up 80%, Rose said. “These numbers are certainly staggering and reflect what we are seeing on the railroad as well.”

Rose anticipates BNSF crude rail shipments could reach 800,000 barrels (bbl.) per day by the end of the year, up from about 600,000 bbl. per day.

“Crude isn’t the only place where we are feeling the impact of the boom,” Rose said. The rail industry also is experiencing growth brought on by items needed at drill sites, such as sand, pipe and cement. “Each horizontal drilling rig requires around 40 inbound carloads of products.”

Using production from the Williston basin as an example, Rose pointed out how rail has become the leading transport of choice for crude oil production. In 2010, 74% of crude oil was transported

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via pipeline from the Williston basin, while only 6% was transported via rail and 20% other. In 2013, rail was up to 69%, while transport via pipeline fell to 23%. Despite the growth seen in the Williston, pipelines haven't lost their position as a key competitor to BNSF and the rail industry.

"We know that rail on the surface is without a doubt the most efficient and the lowest price, but when we start to compete against pipelines, "we know we are the higher cost but we can offer some flexibility," Rose said.

Other forms of transport don't have the network in place to move the crude where it needs to go, Rose said, noting BNSF's networks are spread across the country. Currently, the company serves 17 origin facilities across the western shale plays, and 10 more are being developed. BNSF expects to have 50 destination facilities by year-end 2014.

And fuel costs are significant for BNSF, which burns just more than 1.4 billion gallons of crude per year to run its locomotives. Fuel costs make up about 30% of the company's overall cost, which is why the company will start testing liquefied natural gas (LNG) as a fuel source for its fleet, Rose said.

The concept is not new, as BNSF pointed out in a news release that the former Burlington Northern used natural gas locomotives in the 1980s and 1990s, and BNSF tested LNG switch locomotives in Los Angeles.

"Improved economics and technology make the use of natural gas in long-haul service more operationally feasible today," the company said in the release. "The BNSF pilot will be a first step to consider how the technology could be implemented. However, even though natural gas in long-haul service has enormous potential, several significant regulatory challenges need to be addressed."

Working with GE and Caterpillar subsidiary EMD, BNSF is developing natural gas engine technology for use in the pilot. Rose is confident that the technology is there. But regulatory hurdles remain with three agencies, including the U.S. Environmental Protection Agency and Federal Railroad Administration. "All three have a say-so on whether we can actually make this conversion."

BNSF will operate under a waiver initially. The tests on natural gas engine technology will begin this fall.

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## DCP Midstream Processing Plant Now Operating In Permian

DCP Midstream's new Rawhide Plant, a 75 million cubic feet per day, deep-cut, cryogenic natural gas processing plant in Glasscock County, Texas, and its associated low-pressure gathering and compression systems are now in commercial operation.

The plant has been part of DCP's expansion program for the liquids-rich Permian basin. The program includes the Sand Hills Pipeline, a new natural gas liquids pipeline that began providing take-away service from the Permian to fractionation facilities along the Gulf Coast and the Mont Belvieu market hub earlier this summer.

According to a company release, DCP is working to expand its high-pressure gathering system, linking the Goldsmith/Fullerton system with the Triad system for increased reliability and flexibility in the Permian Basin. The company also continues to scope new plants and build out assets for additional processing capacity and increased reliability in the Permian.

## Shale-Derived NGLs Offer Few Benefits For Aromatics Producers

BY **NICOLE JOHNSON** | HART ENERGY

Those in the U.S. petrochemicals industry that rely on aromatics have seen minimal benefits from surging North American shale-gas and tight-oil production.

In fact, aromatics output could become structurally short on the back of the switch to ethane feedstock for ethylene production, despite current price stability, according to Brian Ames, president of Dow Chemical's olefins, aromatics and alternatives division.

The U.S. is typically net-short aromatics, such as toluene and benzene—chemical feedstocks for end-products along the styrenics chain like foam cups; phenol, a known feedstock of bisphenol A; and acetone. Aromatics can also be used as an octane-booster in gasoline blending.

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**Unfortunate** | While unconventional liquids production has boosted ethane-based petrochemical producers, those focused on aromatics are not experiencing the same impacts according to Dow Chemical.

“What we’ve found is that because the U.S. is a net importer [of aromatics], the price structure here needs to be high enough to attract the imports from other parts of the world. We see that continuing, but there are a lot of dynamics here,” Ames told Hart Energy.

Aromatics and olefins are the basic building blocks of petrochemicals. Benzene, toluene and xylenes are commonly referred to as aromatics, which are unsaturated cyclic hydrocarbons containing one or more rings. Aromatics, methanol and olefins — also known as the primary petrochemicals—are the chemical starting point for electronic materials, fertilizers, pharmaceuticals and plastics.

And since shale gas is rich in natural gas liquids (NGLs), such as butane, ethane, methane and propane, those markets have been among the greatest benefactors of North America’s unconventional-energy development. For example, ethane is converted to ethylene, so any ethylene-derived chemical like ethylene oxide and polyethylene stand to profit as well.

“Benzene and the aromatics are supplied equally from both oil refineries, as well as from ethylene crackers, so we have to be cognizant of what’s going on with the refining industry as well in the case of aromatics,” Ames said. “And what we’re finding is that there is potential for reduced production of aromatics from ethane crackers, as well as reduced production of aromatics from the refineries because of some of the changes going on with the crude and refinery feedslates.”

Dow, for one, has announced several projects in accordance with its strategy to capture key feedstocks like ethylene and propylene by reinvesting in the U.S. petrochemical industry.

Current key investments for the company include:

- Restart ethane cracker at Dow Chemical’s St. Charles operations near Hahnville, Louisiana, by the end of 2012. The cracker successfully started last December;
- Improve ethane-feedstock flexibility for an ethylene cracker at the company’s operations in Plaquemine, Louisiana, in 2015;
- Construct a new, world-scale ethylene-production plant on the Gulf Coast for start-up in 2017;
- Construct a new, world-scale, on-purpose propylene-production facility at Dow Texas site, for start-up in 2015; and
- Construct several new, specialty-material production units on the Gulf Coast, aligned to the company’s high-value Performance Plastics franchise.

Most petrochemical projects announced in 2011 with the advent of shale gas are expected to be online around the 2017-2018 time frame.

Tight-oil feedslates also yield fewer aromatics. The U.S. currently imports aromatics primarily from Asia and Europe to meet demand.

“So far we haven’t seen a big impact [on the U.S. aromatics market], because the price structure here has been set up high enough to attract imports from other parts of the world and so we’d expect that would continue,” Ames said.

Ultimately, there may be more aromatics imports, “but the effect on the economics is not that significant,” he added.

In contrast, since the U.S. exports aromatics and olefin derivative styrene—with a chemical composition of 30% ethylene and 70% benzene—even that market would benefit from lower ethylene prices, according to Ames.

“I think they [styrenics] will become more advantaged, because the ethylene portion will be cheaper for integrated producers,” he said. “The benzene cost is likely to remain pretty similar to the way it has been the last decade because the price structure here is set up in a way to attract those imports. So I think it’s net-favorable.”

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## NEWS &amp; TRENDS | Up To Date

## NuDevco Midstream Enters Into Purchase, Sale Agreement

NuDevco Midstream Development LLC (NMD), sponsor of Marlin Midstream Partners LP, entered into an agreement to purchase a 28-acre industrial site near Albuquerque, New Mexico, that includes rail access and room for crude oil storage tanks and multiple transloaders.

Located in Bernalillo County, the site targets the San Juan basin encompassing approximately 4,600 square miles across northwestern New Mexico, southwest Colorado and parts of Arizona and Utah. NMD owns eight transloaders ready to be deployed.

According to a company release, it is expected that once fully developed and commercially viable, the transloading and storage facilities will eventually be available to be dropped down to Marlin.

The transaction is expected to close during the fourth-quarter.

## IMT: U.S. Natural Gas Infrastructure Spurs Transportation Transformation

About 30,000 natural gas fueling stations will be operating worldwide by 2020, highlighting the increasing potential for natural gas as a transportation fuel in the U.S. and globally, according to a new study by Navigant Research. However, a study this year by the National Academy of Sciences (NAS) identified a “lack of refueling infrastructure” as one of the chief barriers to development of natural gas vehicle (NGV) transportation.

Such infrastructure—getting natural gas from pipeline to fuel tank—“is in its early stage of development and requires massive expansion,” NAS maintains. In the meantime, “regional, clustered development will remain the preferred model.”

The current boom in shale gas production and resultant low prices are driving the market penetration of natural gas as a transportation fuel. NGVs can be fueled by gas in two basic forms: compressed natural gas (CNG) or liquefied natural gas (LNG). LNG is currently used primarily for heavy-duty trucks. Prices fluctuate, but CNG tends to be \$1 or \$2 cheaper than an equivalent

gallon of gasoline, according to a recent Industrial Market Trends (IMT) report.

The U.S. Energy Information Administration (EIA) estimates yearly world consumption of natural gas at 117 trillion cubic feet (Tcf) in 2013 and projects that this will grow to 131.5 Tcf by 2020. U.S. consumption stands at 25.3 Tcf for 2013, set to grow to 26.3 Tcf by 2020. The agency says that about 3% of transportation energy in the U.S. comes from natural gas, as opposed to 93% from petroleum. In turn, transportation uses about 3% of the natural gas energy consumed in the U.S. High-oil-price scenarios could drive that to 4% by 2020 and to more than 10% by 2040.

The number of NGVs on the road is hard to pin down. The industry group Natural Gas Vehicles for America estimates 120,000 NGVs in the U.S. and 15.2 million worldwide. However, researchers at GE last year came up with a figure of more than 250,000 in the U.S. The NGV Journal estimates more than 17.6 million NGVs worldwide.

Most NGVs on U.S. roads are fleet vehicles, such as buses and delivery trucks, but increasing numbers of CNG-capable passenger vehicles have come on the market in recent years, the IMT report said.

The core natural gas infrastructure in the U.S. consists of a 305,000-mile network of pipelines owned by pipeline companies. The EIA said that transfer of natural gas is provided by means of “more than 11,000 delivery points, 5,000 receipt points and 1,400 interconnection points.”

NGV Journal says 21,660 NGV refueling stations are now operating globally, with 1,564 under development.

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## IHS Strategist: N. America Shale Production Has Altered Global Energy Scene

BY **VELDA ADDISON** | HART ENERGY

The shale renaissance unfolding in the U.S. is altering the dynamics of the world's energy scene.

Natural gas production has risen from about 56.1 billion cubic feet (Bcf) per day in July 2008 to 166 Bcf per day in July 2013, thanks to technological breakthroughs in shale plays, which have shifted the focus from gas to natural gas liquids (NGLs) and tight oil, according to Bob Fryklund, chief upstream strategist for IHS.

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Speaking at a University of Colorado Denver-sponsored (UC Denver) event on August 13, Fryklund said U.S. liquids production has reversed four decades of declines and could overtake its 1970 peak—11.5 million barrels of oil equivalent (MMboe) per day—by 2020. The growth is driven solely by wet gas and tight-oil plays, with tight-oil production set to reach 4.2 MMboe per day by 2020.

Fryklund was featured as part of the UC Denver Business School Global Energy Management (GEM) Houston Speaker Series.

In the U.S., oil and NGL production could reach nearly 20 MMboe per day by 2020, and the nation will remain among the three countries in the world—others being Saudi Arabia and Russia—that produce more than 10 MMboe per day, according to Fryklund. Undoubtedly, the bountiful supply has enabled the U.S. to be more flexible.

“With the Iran sanctions, we never would’ve come out as well as we did if we didn’t have this extra oil,” he said. “We also have dropped our imports. That has given us financial flexibility to weather the recession better than any other place in the world. It’s allowed the U.S. to start pushing more products into the market to increase our exports.”

The bright outlook comes in addition to an inventory of liquefied natural gas (LNG) that could potentially surpass 160 million tons per year, based on volumes in applications for export permits submitted to the U.S. government. That could push the U.S. ahead of Australia, Canada and Qatar in terms of potential LNG inventory, although it is unknown whether proposed projects will be developed. To-date, the Federal Energy Regulatory Commission has approved three LNG-export terminals.

“The markets are getting re-organized again because of what has happened in the U.S.,” Fryklund told attendees. “The LNG that was coming from Trinidad now goes to South America and Europe. ... The U.S. is now setting another benchmark for LNG prices.”

While LNG prices in Asia, where demand is the highest, is generally trading between \$12 per million British thermal units (MMBtu) and \$16 per MMBtu, LNG is priced from \$8 per MMBtu to \$10 per MMBtu in Europe and between \$6 per MMBtu and \$8 per MMBtu in the U.S., he said.

“What’s good for us is bad for [those] elsewhere,” Fryklund said. “The U.S. is becoming more competitive than many of the places that we’ve done business with, particularly Europe.”

The North American shale boom has created an oversupply of natural gas in the U.S., which is using less LNG and less coal. The latter is being shipped to Europe, where more coal is burned for power generation than natural gas.

“And the Russians are taking it on the chin, because they are not using as much of their gas anymore,” Fryklund added. “Guess who

has been funding one of the big lobbies against the shale revolution—the Russians.”

But others countries have jumped in on the action. According to a report last April from the U.S. Energy Information Administration, more than \$26 billion has been invested since 2008 by 21 foreign companies in tight-oil and shale-gas plays in joint ventures (JVs) with U.S. acreage holders and operations.

Among the deals inked this year to-date: China-based Sinochem’s \$1.7-billion JV with Pioneer Natural Resources for part of the West Texas’ Wolfcamp shale play and Tokyo Gas subsidiary TG Barnett Resources’ \$485-million deal for a 25% interest in Quick-silver Resources’ Barnett shale-oil and gas assets.

However, overseas investment is not as high as what it once was, Fryklund said. “They are not even a third of what they were last year.”

Citing five major oil and gas companies as examples, Fryklund showed where some non-U.S. and U.S. companies are targeting their portfolios—based on proven and non-proven resources.

In Europe, BP and Total have centered mostly on conventional oil and gas at 60% and 50%, respectively. But Shell’s proven and nonproven resource base isn’t as heavy on conventional oil and gas. Instead, about 60% of Shell’s portfolio is made up of heavy oil and oil sands, and conventional oil and gas.

Unconventional oil and gas plus heavy oil and oil sands make up more than 50% of ExxonMobil’s resource base, while Chevron is mostly gas-driven, Fryklund said. LNG represented 34% of Chevron’s resource base, with conventional and unconventional oil and gas at 26% and 22%, respectively.

Companies in the next peer group—such as Anadarko and Marathon—are focused on tight rock.

“That’s why right now we are seeing the biggest portfolio shift in my lifetime in the business,” he said, noting that some companies can’t afford to play tight rocks, deepwater and international all at once.

Moreover, losses brought on by low natural gas prices in the U.S. are starting to catch up with companies.

“Consolidation is coming. ... Companies are going to take these write-offs. They’re going to take (them) to the market and start selling things,” Fryklund said. “Some companies are having to shrink to survive. Some companies are shrinking to grow, and there is a fine line between the two.”

According to Fryklund, one thing to consider is: “How are we going to replace this big renaissance?”

“Exploration is a long-term game.”

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## SNAPSHOT | Industry Insight

# China On Track To Become World's Largest Oil Importer

BY **VELDA ADDISON** | HART ENERGY

China is on track to become the world's largest net oil importer, but when that will happen remains to be seen.

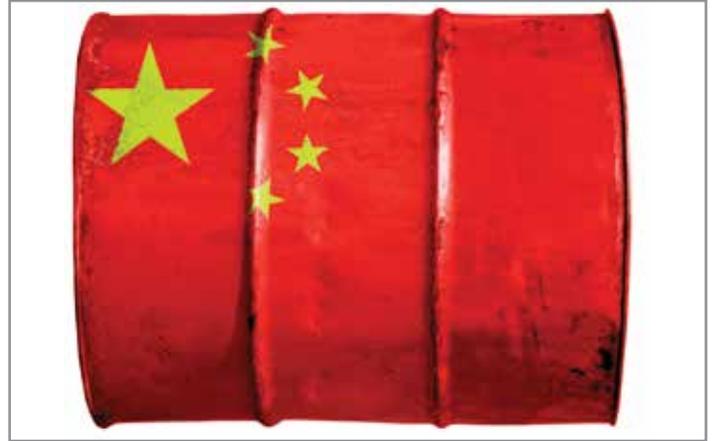
The U.S. Energy Information Administration (EIA) predicts China's monthly net oil imports will surpass the U.S. in October as it nears 7 million barrels (bbl.) per day, pushed by growing demand. The forecast shows China's annual oil imports will eclipse those of the U.S. by 2014. The surge comes as oil production increases amid flat demand in the U.S.

"U.S. total annual oil production is expected to rise by 28% between 2011 and 2014 to nearly 13 million bbl. per day, primarily from shale oil, tight oil, and Gulf of Mexico deepwater plays. In the meantime, Chinese production increases at a much lower rate (6% over this period) and is forecast to be just a third of U.S. production in 2014," the EIA said. "On the demand side, China's liquid fuels use is expected to grow by 13% between 2011 and 2014 to more than 11 million bbl. per day while U.S. demand hovers close to 18.7 million bbl. per day, well below the peak U.S. consumption level of 20.8 million bbl. per day in 2005."

A recent report by Wood Mackenzie forecasts Chinese crude oil imports will exceed those of the U.S. by 2017. The research consulting company predicted the country's oil imports could reach 9.2 million bbl. per day by 2020, up from 2.5 million bbl. per day in 2005, compared to 6.8 million bbl. per day, down from 10.1 million bbl. per day, for the U.S. "This translates to a 360% increase in China crude oil imports and a 32% decline for U.S."

Steering China's rising demand for oil is the need for more gasoline as the number of people with vehicles increases. About 160 million vehicles are predicted to be on China's roads by 2020, according to Harold York, principal oils markets analyst for Wood Mackenzie. The number of vehicles is about eight times more than in 2005.

To meet the growing demand for crude oil, China will have to spend about \$500 billion by 2020, according to Wood Mackenzie.



**Growing** | Chinese oil imports are expected to increase by as much as 360% by 2020.

The increased spend will come as U.S. spend is set to fall from its peak of \$335 billion to \$160 billion, given the rise in domestic supply coupled with lower demand.

"It is important to note these opposing trends as it means the U.S. is becoming more North America-centric for its supply needs and China more dependent on Middle East and OPEC crude," William Durbin, Wood Mackenzie's Beijing-based president of global markets, said in a news release. "We will therefore see OPEC suppliers, who traditionally focused on the U.S. for crude sales, compelled to shift their focus towards China."

The shift is expected to result in OPEC gaining a larger share of Chinese imports, possibly jumping from 52% in 2005 to 66% by 2020. The analysis also showed that the percentage of OPEC crudes for the U.S. will drop to 33%.

"The high cost to China for crude oil imports is compounded by the fact that China will pay a higher price for the imports relative to the U.S. as the average price is based on a differential to Brent," York said in the release. "China's import crude price tends to be closer to Brent than the U.S. because of growing North America supply options. Also, the quality of the Chinese import barrels of medium crude is rising relative to the U.S. North American production from tight oil plays is skewed towards light sweet crudes, leaving heavy-sour crudes a growing share of its imports, thus providing North American buyers greater discounts for imports."

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## LEAD STORY | From The Front

Continued from  
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first-party processing and production volumes, which wasn't indicative of the largest midstream companies.

However, this year we further worked with companies to hone in on how to properly account for these figures. This has led to some changes in the rankings for both 2012 and 2011, reflected in the tables below. Primarily these changes were related to reflect U.S.-only production and processing totals rather than North American totals. The companies with the largest impact in these figures were Encana and Chevron.

These are the most representative figures of the top midstream operators that we have ever compiled and published. There were no estimates or double counting of figures and the companies better understood our methodology and criteria. This was most reflected in the change in ONEOK Inc.'s figures from 2011 when they were estimated. As it turns out these figures were estimated too high as they included double-counted volumes.

In our updated rankings, the combined Energy Transfer Enterprise entities remained in a retroactive eleventh place in the natural gas processor rankings and moved up one slot from sixth to fifth in the top NGL producers' rankings.

However, the company's volumes grew greatly in both cases through this combination as the processing totals rose 18% from 884 million cubic feet (MMcf) per day in 2011 to 1.045 MMcf per day in 2012 while the NGL production totals rose from 68,300 barrels (bbl.) per day.

As impressive as this growth was, the company has even bigger plans. While speaking at Hart Energy's Marcellus-Utica Midstream conference earlier this year, Rick Cargile, ETP's president of midstream, said that by 2015, ETE will be the largest NGL producer in the U.S. with 450,000 bbl. per day.

2012 Midstream Rankings - NGL Producers				
Rank	Company	2012 NGL Produced (bbls. per day)	2011 NGL Produced (bbls. per day)	Difference From 2011 to 2012
1	<b>DCP Midstream</b>	401,914	383,021	5%
2	<b>Enterprise Product Partners</b>	343,600	303,000	13%
3	<b>Williams Companies</b>	206,000	189,000	9%
4	<b>Targa Resources</b>	128,700	123,900	4%
5	<b>Energy Transfer Enterprise</b>	94,600	68,300	39%
6	<b>Devon Energy</b>	73,200	71,407	3%
7	<b>Copano Energy</b>	65,446	46,234	42%
8	<b>ONEOK Partners</b>	61,000	48,000	27%
9	<b>MarkWest Energy Partners</b>	42,400	32,100	32%
10	<b>Crosstex Energy Services</b>	27,813	22,697	23%

*Energy Transfer Enterprise includes Energy Transfer Partners, Southern Union and Regency Energy Partners (Source: Company data, submissions compiled by Frank Nieto)*

This goal will be fueled by building critical mass as it organically builds liquids-focused assets in the Marcellus and Utica, the Eagle Ford, Barnett and Permian.

While ETE is eyeing the top spot in the future, DCP Midstream remained the largest NGL producer for the fifth-straight year and surpassed Enterprise Products Partners as the largest natural gas processor. This was the first time that any company held the top position in both rankings.

DCP Midstream experienced a slight increase in its gas processing figures in 2012 as they rose to 6.1 MMcf per day from 6.079 MMcf per day in 2011. The company's liquids production growth was much greater as it rose 5% from 383,021 bbl. per day in 2011 to 401,914 bbl. per day in 2012.

Interestingly, DCP Midstream's ascent to the top of both rankings follows a similar path to the way in which ETE is now growing. The company can trace its history back more than 80 years ago, but it really began to make its mark when DCP Midstream Partners was formed in 2005 by Duke Energy Field Services, a joint venture between partners Duke Energy and ConocoPhillips.

This new master limited partnership (MLP) led to the formation of what company officials now call their "super-systems,"

**LEAD STORY** | From The Front**2012 Midstream Rankings - Natural Gas Processors**

Rank	Company	2012 Gas Processed (MMcf/d)	2011 Gas Processed (MMcf/d)	Diference From 2011 To 2012
1	<b>DCP Midstream</b>	6,100	6,079	0%
2	<b>Enterprise Product Partners</b>	6,052	6,131	-1%
3	<b>Targa Resources</b>	2,098	2,162	-3%
4	<b>MarkWest Energy Partners</b>	1,674	1,147	46%
5	<b>Encana</b>	1,622	1,879	-16%
6	<b>Williams</b>	1,600	1,556	3%
7	<b>Crosstex Energy Services</b>	1,350	1,335	1%
8	<b>Western Gas Partners</b>	1,187	962	23%
9	<b>Shell Oil Company</b>	1,062	961	11%
10	<b>Devon Energy</b>	1,047	968	8%
11	<b>Energy Transfer Enterprise</b>	1,045	884	18%

*Energy Transfer Enterprise includes Energy Transfer Partners, Southern Union and Regency Energy Partners (Source: Company data, submissions compiled by Frank Nieto)*

which are its bread and butter. These legacy assets were tied together so that they operated in tandem with a large footprint in various regions throughout the country rather than independently to create flexibility and reliability.

“We think it’s a competitive advantage for us as it enables us to reroute volumes in a region if one facility goes down,” Wouter van Kempen, chairman, president and chief executive of DCP Midstream Partners told *Midstream Monitor*. The company’s super-systems are located in the Midcontinent, DJ and Permian basins and the Eagle Ford shale. We will have much more on DCP Midstream in next week’s feature.

While Enterprise Products Partners may have slipped in our natural gas processor rankings, their numbers were largely unchanged from the previous year, and it was a close call at the top between them and DCP Midstream. In addition, their NGL production grew at a larger rate than DCP Midstream.

For 2012, Enterprise experienced a 1% drop in processing volumes from 6.131 MMcf per day in 2011 to 6.052 MMcf per day for 2012 and saw its NGL production climb 13% to 343,600 bbl. per day in 2012 from 303,000 bbl. per day in 2011.

While speaking at the National Association of Publicly Traded Partnership’s (NAPTP) annual MLP investor conference earlier in May, the company’s Chief Executive Mike Creel said growth has been focused on liquids as its NGL services and pipeline division is its largest division with its crude oil segment growing at an even faster rate.

This growth has been achieved, in part, because of its first-mover status in the Rockies, and it is also a first-mover in another area: liquefied petroleum gas (LPG) exports. In 2012, Enterprise loaded 46 million bbl. of LPG from its export terminals and expects to load approximately 62 million bbl. this year.

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