US shale oil/gas and implications on Europe

Elzbieta Rabalska, Managing Editor
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Agenda

• Growth of shale gas production in the US
• What are the impacts on gas prices and flows?
• How has shale oil impacted oil prices and flows?
• Unlocking the export potential: Evaluating the implications on global markets
US natural gas production

Natural gas production

Bcf/d

Federal Offshore  Louisiana  New Mexico  Oklahoma  Texas  Wyoming  Other States  Alaska

Gulf of Mexico

EIA 914 data
Historical flows and the new normal

- Rampant shale production intensifying gas-on-gas competition, changing historical flow patterns ...
The effects on NYMEX gas futures

- ushering in a sustained period of depressed prices
Effects on regional basis markets

... and price relationships

PG&E cg
-29.29 cents (summer ‘08)
+ 20.43 cents (summer ‘13)

SoCal
-78.68 cents (summer ‘08)
+ 7.59 cents (summer ‘13)

Tetco M3
+ 20.25 cents (Winter ‘10)
+ 26 cents (Winter ‘13)

Rockies
-2.81 (summer ‘08)
+ 19.54 cents (summer ‘13)

Dom Sth
-59.25 cents (Winter ‘13)

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Platts-ICE forward curve data
Weekly US natural gas storage stockpiles

- Eastern Consuming Region
- Western Consuming Region
- Producing Region

EIA data
US gas imports

Effects of US gas production on imports

EIA data

Effects of US gas production on LNG imports by country
Effects of US gas production on exports

EIA data

Effects of US gas production on LNG exports
Sources of demand: Mexican exports

Map of major proposed natural gas pipeline projects for exports to Mexico:
- Sierrita lateral, capacity: 210 MMcf/d, expected ISD: 9/2014
- Norte crossing project, capacity: 366 MMcf/d, expected ISD: 7/2013
- Willcox lateral 2013 expansion project, capacity: 185 MMcf/d, expected ISD: 7/2013
- Samalayuca lateral, capacity: 238 MMcf/d, expected ISD: 7/2013
- Eagle Ford Shale pipeline system expansion, capacity: 2,100 MMcf/d, expected ISD: 12/2014
- South Texas expansion project, capacity: 300 MMcf/d, expected ISD: 6/2014

Legend:
- ★ natural gas export projects less than 50 miles
- natural gas export projects greater than 50 miles
- natural gas export points of exit
- existing natural gas pipelines
- ISD = in-service date

Source: U.S. Energy Information Administration
Sources of demand: LNG exports

![LNG prices chart](chart.png)
### Sources of demand: LNG exports

#### US LNG
- Cove Point
- Elba Island
- Sabine Pass
- Cambridge Energy
- Cameron LNG
- Corpus Christi
- Freeport LNG
- Gulf Coast LNG
- Golden Pass
- Gulf LNG Clean Energy
- Magnolia LNG
- Maine Pass
- South Texas Liquefaction
- Trunkline Lake Charles
- Waller LNG
- Kenai LNG
- Alaska Export
- Jordan Cove
- Lefthand Bay
- Oregon LNG

#### Canadian LNG
- BC LNG
- Kitimat LNG
- LNG Canada
  - BC Export
  - Goldboro LNG
  - Kitimat Floating Project
- Nexen LNG
- Prince Rupert Port Export
- Petronas BC Export
- Woodside
- SK E&S
- ExxonMobil

#### Australian LNG
- Curtis LNG
- Gladstone LNG
- Greater Gorgon
- Ichthys LNG
- Prelude LNG
- Wheatstone
- Arrow LNG
- Eastern Star
- Fisherman’s Landing
- Origin
- AC/PR1
- Browse
- Caltex Australia
- Meo Australia
- Petronet
- PTEEP Australia FLNG
- Scarborough LNG
- Crux Floating LNG
- Southern Cross
- Sun Project
Sources of demand: LNG exports

26 existing/proposed terminals in Australia: 13 Bcf/d, 1 already online; China targeting 0.6 Bcf/d shale production by 2015
High IRRs in wet/oily plays lure drillers

Bentek Energy data
NGL raw mix production

NGL raw mix production

Mb/d


PADD I PADD II PADD III PADD IV PADD V Canada

Bentek data
Effects on ethane frac spreads

Platts prices
Propane price impacts

Propane/propylene stocks' impact on price

- Weekly US Stocks of Propane and Propylene (Thousand Barrels)
- Propane non-LST Mt Belvieu pipe

EIA data, Platts prices
US crude oil production

US oil production

Bentek Energy data
Bakken Production Forecast

Source: Bentek Energy
Bakken Crude Oil Flows Across North America

PADD I
Current Refining Capacity: 1.293 million b/d

PADD II
Current Refining Capacity: 3.723 million b/d

PADD III
Current Refining Capacity: 8.715 million b/d

PADD IV
Current Refining Capacity: 3.032 million b/d

PADD V
Current Refining Capacity: 625,000 b/d

PADD I
Current Refining Capacity: 1.293 million b/d
Cushing becoming a “way station” for crude
Cushing Stocks Stabilizing, Edging Down

Cushing Crude Stocks
(Thousand Barrels)

Source: EIA
Impact on crude prices

Prompt Brent /WTI spread

Platts prices
Houston emerges as a crude oil market center

MAP OF HOUSTON CRUDE OIL STORAGE AND DISTRIBUTION

From Cushing, OK
850,000 b/d
Q2 2014

225,000 b/d
Q3 2013

300,000 b/d
Q2 2014

Oil tanking partners
Oil Tanking Houston Terminal
(OTH) 12 million barrels

Magellan Channelview
120,000 barrels, could add 1.4 million barrels

PORT ARTHUR / NEDERLAND

375,000 b/d by early 2014

EAST HOUSTON TERMINAL
3.5 million barrels could be expanded to 4.5 mil

Further West
JONES CREEK TERMINAL
(2.6 million barrels)

Seaway Galena Park
1.1 million barrels but will be expanded to 1.8 million barrels

Magellan
SPEED JUNCTION

Combined crude pipeline
Volume flowing into Houston:
1.725 million b/d by Q2 2014

Combined refining capacity:
2.2 million b/d

Combined storage capacity:
31 million barrels

Source: Platts

Platts
McGraw Hill Financial
Production and effects on imports, exports

Weekly Imports & Exports

Source: U.S. Energy Information Administration
US Inching Towards Crude Exports

- **Statoil** exports US Bakken crude to Canada
- **Valero** received a one-year permit to export Eagle Ford to Eastern Canada
- **BP** received a permit summer 2012
- **Shell** applied for a permit
Thank you

Samantha Santa Maria
Managing Editor
Tel: 713-658-3271
Email: samantha.santamaria@platts.com