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Shale Oil & Gas – You Ain’t Seen Nothing Yet!
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Disclaimer

The views, opinions, and conclusions expressed today are those of the presenter and do not necessarily reflect those of Kinder Morgan Energy Partners.
Kinder Morgan System Map

3rd largest energy company in North America with combined enterprise value of approximately $110 billion

Largest natural gas network in U.S. Own an interest in / operate almost 70,000 miles of natural gas pipeline
Connected to every important U.S. natural gas resource play, including: Eagle Ford, Marcellus, Utica, Uinta, Haynesville, Fayetteville and Barnett

Largest independent transporter of petroleum products in U.S. Transport ~1.9 MMBbl/d

Largest transporter of CO2 in U.S. Transport ~1.3 Bcf/d of CO2

Largest independent terminal operator in U.S. Own an interest in or operate ~180 liquids / dry bulk terminals ~112 MMBbls domestic liquids capacity
Handle ~106 MMtons of dry bulk products

Only Oilsands pipe serving West Coast TMPL transports ~300 MBbl/d to Vancouver / Washington State; expansion under way increasing capacity to 890 MBbl/d
Kinder Morgan Terminals Core Principles

- Safety will not be compromised.
- Environmentally compliant and responsible operator
- Ethics and Integrity
- Commitment to employees and resources
- Customer service and fiscal responsibility
- Quality focus

Providing a culture of continuous improvement; we are focusing efforts on the front line to ensure that employees are equipped and trained to Do The Right Thing Every Day
Kinder Morgan Terminal Network

- Largest Terminal Operating Company in North America
- Approximately 180 terminals in 32 states and in Canada
- Serving all major cities and ports
- Wide scope of commodity expertise
- Strong alignment with transportation operators and ports

Legend
- Liquid Locations
- Dry and/or Break Bulk Locations
- Product Pipelines Locations
- Transload Operations
Shale Plays in the US
Quick Primer on Shale

- In conventional drilling, vertical wells are drilled in an attempt to tap underground pockets of oil and gas. In shale plays, companies use horizontal drilling and hydraulic fracturing technology to unlock natural gas and oil trapped in the pores of dense rock formations.

- This does come at a cost: conventional gas wells typically run $500,000 to $1 million, while an unconventional well could range from $3 million to $10 million.

- Shale oil included; Oil shale something totally different
How Things Used To Be
(Or at least that’s what we thought)
“Facts” since the 1970s

- Traditional Oil Fields (TX, LA, Gulf Coast Offshore) had declining production
- Big Oil dominated the market
- USA would continue to import more and more (and more) oil
- Regulatory oversight started in earnest (EPA established in 1970)
Where the Oil Industry is Now
(Or at least we think it is)
Current Picture

- US imports more than 100 types of crude oil
- Most of the North American “shale” oil is “light” or “sweet”; most existing refineries are designed for “heavy” or “sour”
- New oil and gas fields sometimes not in “traditional” areas of exploration
- Canadian Bitumen resources coming online
- More Regulation
Current trends, challenges and opportunities in the oil and gas industry and related segments

- Consolidation in the industry (KM is one example)
- Shifts in supply chains (crude by rail, refined products exports)
- Significant Price differentials (WTI, Cushing, Brent crude)
- Bottlenecks = Opportunities
- Condensate (KMCC to Explorer to Cochin to Canada)
- Canadian Crude (Keystone, etc)
- New Products, new issues; SCC (ethanol); Aggressive Corrosion (Biodiesel). What’s next?
- Shale Plays
US Total Oil Production

- 5.5 million barrels per day in 2010
- Somewhere between 5.5 and 7.8 million barrels per day in 2035
- About 7% of world production now and in the future
- Bakken – Estimated to have up to 4.3 billion bbls of oil
- Eagleford – Estimated to have between 7 to 10 billion bbls of oil
- Cline – Estimated to be have up to 30 billion bbls of oil
Recent Headlines

- U.S. oil production for August hit its highest level since 1989 as output from shale plays such as South Texas’ Eagle Ford slashed foreign fuel consumption.
- Estimated oil production for August hit 7.6 million barrels per day, the highest monthly output since May 1989, according to numbers released recently by the U.S. Energy Information Administration (EIA).
- EIA recently revised upward its 2013 projection for crude output by 70,000 barrels per day. It also boosted its 2014 projection by 190,000 barrels per day.
- Driven by hydraulic fracturing, or fracking, which opens up crude supplies in previously unworkable plays such as the Eagle Ford, domestic oil production now will average 7.5 million barrels per day in 2013, according to EIA data.
- Shell announced 12 billion GTL plant site in LA. (9/24/13)
- Sasol announced 21 billion facility earlier this year.
From U.S. Chamber President and CEO Tom Donohue recently

- In Louisiana alone, unconventional oil and gas plays, shale formations, directly or indirectly supported around 80,000 jobs, helped generate $10.7 billion in economic activity and $1.2 billion in state and local taxes, said Donohue.

- Cheap and plentiful natural gas from shale formations has revolutionized the nation’s manufacturing, giving the U.S. petrochemical industry in particular a big advantage over foreign competitors.
  “I would tell you there are probably 50 European companies right now walking around this part of the United States, looking for places to put a factory,” Donohue said.

- Despite this, the United States is missing out on an enormous opportunity: developing offshore oil and gas resources. Roughly 87 percent of the offshore areas are off limits to drilling and exploration, he said. And the federal government is not being particularly helpful in furthering the energy revolution being driven by private industry.

- The recoverable oil off the U.S. coast is greater than that in Asia and Europe combined. And the amounts are probably even higher because the estimates of those reserves are 30 years old. The federal government will not allow companies to take new estimates using state-of-the-art technology.

- But the shale developments have shown the United States is sitting on a 200-year supply of oil and more than 100 years of natural gas.

- What’s needed, he said, is a faster permitting process for drilling and a predictable and fair regulatory environment.
The shale revolution has already caused waves in the upstream oil and gas industry, but according to a new study from IHS Inc. (NYSE: IHS), the effect of shale oil and gas production on the entire U.S. economy will be extremely profound.

The study revealed “the best is yet to come” in terms of manufacturing, trade and gross domestic product growth, said John Larson, a vice president for IHS’s economics division and a co-author of the study.

IHS’s economic models found that shale oil and gas production in the U.S. will not only continue to help the upstream — or exploration and production — sector of the energy industry, but it will also have significant effects on the energy-related transportation, storage and chemical industries.

Beyond specifically energy-related industries, lower natural gas prices will also help the overall U.S. economy. For example, manufacturers that need large amounts of power will benefit from lower energy prices, and even the majority of U.S. households will see lower electricity costs.

In Houston, there already are new chemical plants coming on line to take advantage of the shale revolution, and trade statistics show Houston-area exports are growing faster than those in any other area of the nation.
Some of IHS’s findings include:

- Midstream and downstream energy companies and energy-related chemical companies will invest about $346 million in the U.S. between 2012 and 2025.
- U.S. industrial production is expected to increase by 3.5 percent by the end of the decade due to shale-related resources, and by 2020 U.S. manufacturing output is expected to increase by $258 million.
- The average American household in 2012 saved more than $1,200 as a result of shale oil and gas resources, which are lowering electricity prices. Also, the amount saved is only expected to go up in the coming years.
- By 2020, more than 3.3 million jobs are expected to be created as a direct result from upstream, midstream, downstream and energy-related chemical activity.
- Oil and gas from shale plays as well as energy-related chemicals are expected to add 2 percent to 3.2 percent to the value of all goods and services produced in the U.S. by 2016.

It can be assumed that Houston will be one of the cities that reaps the most benefit from shale activity. Not only is Houston the energy capital of the world with an abundance of upstream energy companies taking advantage of shale plays, but it also has strong manufacturing and trade sectors that are directly tied to the energy industry.

Also, IHS isn't the only organization to proclaim the benefits of shale development. The American Chemistry Council released a study in May about the effect of $71.7 billion in new U.S. chemical expansions that plan to use shale gas as feedstock.
Wood MacKenzie View

The U.S. shale revolution opened up leagues of new resources over the past half-decade, but North America’s discovered reserves add up to just 7.6 percent of the world’s untapped potential, according to a Wood MacKenzie report released recently.

In all, undeveloped discoveries across the globe hold 1.4 trillion barrels of oil equivalent – and currently, only 22 percent of that amount is on the radar for development.

“Over half of these discoveries which we classify as ‘good technicals,’ are potentially economic under our current price assumptions,” said David Highton, principal analyst of upstream research at Wood Mackenzie, in a written statement.

At current prices, those global undeveloped conventional oil and gas reserves are worth $760 billion – $132 billion of which is in North America. The Middle East holds the most valuable portfolio at $185 billion, followed by Latin America at $149 billion and North America, according to Wood Mackenzie.

North America has 107 billion barrels of oil equivalent, and about 102 billion of those barrels are estimated to be potentially economic, the Houston research firm reported.
Canadian oil output projected to double by 2030

Two Black Star Petroleum wells in the Nebraska Panhandle could contain millions of barrels of oil, the company said. The wells could produce 4.3 million to 23.3 million barrels of oil, according to estimates from two independent consultants. "Black Star is extremely encouraged by initial sample testing from both the Niobrara and Codell formations.

U.S. oil production for the first time since 1997 topped crude oil imports in the seven days that ended May 31, according to a report from the Energy Information Administration. Production rose to 7.3 million barrels per day last week, compared with imports that totaled 7.27 million barrels per day, EIA data showed. Technological advancements in drilling have helped producers tap hard-to-reach shale formations, which in turn has contributed to the surge in production.

Capital and maintenance project spending in the North American Oil & Gas Terminals Industry is up sharply over last year, and a trend toward increased project spending looks like it will continue for the next 12 months. Through April, construction started on about $1.2 billion of Terminals projects in the U.S. and Canada, about 42% more than the value of the industry's construction starts for the comparable January-April 2012 period. Over the next 12 months, capital and maintenance spending related to Terminals is scheduled to reach about $7.4 billion across all of North America, according to Industrial Info's North American Oil, Gas & Chemical Terminals Database.
More Shale Data

- U.S. shale oil could reach 5 million barrels per day by 2017. Oil production from shale wells will continue to increase and could reach 5 million barrels per day by 2017.
- Texas already ranks 15th in the world among oil producing countries. Yes, countries.
- Leonardo Maugeri, a former oil industry executive from Italy, estimates there could be more than 100,000 working wells in North Dakota and Texas by 2030. There are about 10,000 now.
- Nationwide, production of all oil could shoot up from 11.3 million to 16 million barrels per day by 2017.
- That's much higher than the best scenario projected by the Energy Information Administration, which showed 10 million barrels per day between 2020 and 2040. The EIA reported production of all crude oil has already gone up from 5 million barrels per day in 2008 to 6.5 million barrels per day in 2012.
- For some perspective on just how proficient domestic drilling has become, the U.S. completed 45,468 oil and gas wells and put 28,354 of them into production. The rest of the world drilled 3,921 wells.
- Drillers are punching 90 new wells a month into the Bakken Shale to maintain production of 770,000 barrels per day. Shale wells reach peak production shortly after being brought online and decline from there.
- "According to the Maugeri, the U.S. will still need to import oil and when the price drops, the cheapest oil will come from the Middle East. The EIA estimates oil imports will drop to 34 percent by 2019."
Assessments Find Greater Potential In Bakken, Three Forks

WASHINGTON — The United States Geological Survey (USGS) recently released an updated oil and gas resource assessment for the Bakken Formation and a new assessment for the Three Forks Formation in North Dakota, South Dakota and Montana. They found the formations contain an estimated mean of 7.4 billion barrels (BBO) of undiscovered, technically recoverable oil — a twofold increase over what was previously thought.

The USGS assessment found the Bakken Formation has an estimated mean oil resource of 3.65 BBO and the Three Forks Formation has an estimated mean resource of 3.73 BBO, for a total of 7.38 BBO, with a range of 4.42 to 11.43 BBO. This assessment of both formations represents a significant increase over the estimated mean resource of 3.65 billion barrels of undiscovered oil in the Bakken Formation that was estimated in the 2008 assessment.

“These world-class formations contain even more energy resource potential than previously understood, which is important information as we continue to reduce our nation’s dependence on foreign sources of oil,” said Secretary of the Interior Sally Jewell. “We must develop our domestic energy resources armed with the best available science, and this unbiased, objective information will help private, nonprofit and government decision makers at all levels make informed decisions about the responsible development of these resources.”

Since the 2008 assessment, more than 4,000 wells have been drilled in the Williston Basin, providing updated subsurface geologic data. Previously, very little data existed on the Three Forks Formation and it was generally thought to be unproductive.

In addition to oil, these two formations are estimated to contain a mean of 6.7 trillion cubic feet of undiscovered, technically recoverable natural gas and 0.53 billion barrels of undiscovered, technically recoverable natural gas liquids.
Marcellus (for example)

- In 2002, USGS estimated Marcellus TRR at 1.9 trillion cubic feet of natural gas
- In 2011, USGS new estimate was 84 trillion cubic feet of natural gas TRR
- In 2011, EIA estimate was 410 trillion cubic feet of natural gas TRR
- Only small portion of basin has been drilled
How big will be the economic impact of shale?

- $5.1 trillion in capital spending and support more than 3.5 million jobs by 2035, according to a new IHS Global Insight study.
- IHS projects that activity supported more than 1.7 million jobs in 2012 and 3 million jobs in 2020. The 2020 jobs figure includes 600,000 directly tied to the oil and gas industry, 900,000 indirectly related, and 1.5 million created or sustained by the spending of direct and indirect employees.
- State governments and federal coffers also can expect to benefit from the activity. IHS projects that unconventional oil and natural gas activity contributed nearly $62 billion in tax receipts in 2012, more than $111 billion a year by 2020, and a total of $2.5 trillion from 2012 to 2035.
- “Unconventional oil and gas is one of the greatest revolutions of our lifetime” – Newt Gingrich at third annual DUG (Developing Unconventional Gas) Oct 2012
Development Takes Time and Money

- It would take 630,000 new wells to fully develop existing shale plays.
- In 2010, about 37,500 total wells were drilled.
- So it will take over 16 years at current rates to drill all existing shale plays; this doesn’t include new shale plays yet to be profiled.
Where the Industry is Going (Future???)
Price of Oil

Figure 18. Average annual world oil prices in three cases, 1980-2035
(2010 dollars per barrel)
Cautionary Words of Wisdom

➢ Or maybe some good news
“The Annual Energy Outlook 1997 (AEO97) projects lower prices for all energy fuels than were projected in AEO96 (Figure 1). Average world crude oil prices in AEO97 are projected to be about $21 a barrel (in 1995 dollars) in 2015, $5 lower than the AEO96 price of $26 a barrel. The lower prices reflect expectations that oil production from the Organization of Petroleum Exporting Countries (OPEC) will expand and that technology advances will sustain non-OPEC production. It is assumed that Iraqi oil production will not resume until 1998 and then will increase gradually to full capacity in 2000.”
Conclusions
No, Seriously

- More Consolidations (not just big eats the small, fast eats the slow)
- More Government Regulation and Oversight (offshore accidents, air emissions, rail incidents, etc.)
- Bottlenecks in Supply Chain will create price differentials, at least in short term; but where?
- Crude by Rail opportunities continue
- Shale Plays, both oil and gas, continue to drive new developments; exactly where or what (or how) remains to be seen
Helpful Links

- www.EIA.gov
- www.ihs.com
Questions?