Outlook for shale gas and tight oil development in the U.S.

For
Deloitte Energy Conference
May 21, 2013 | Washington, DC

By
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U.S. Shale Gas
Domestic production of shale gas has grown dramatically over the past few years

shale gas production (dry)
billion cubic feet per day

Sources: LCI Energy Insight gross withdrawal estimates as of March 2013 and converted to dry production estimates with EIA-calculated average gross-to-dry shrinkage factors by state and/or shale play.
Shale gas leads growth in total gas production through 2040 to reach half of U.S. output

U.S. dry natural gas production

Source: EIA, Annual Energy Outlook 2013

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Natural gas consumption is quite dispersed with electric power, industrial, and transportation use driving future demand growth.

U.S. dry gas consumption
trillion cubic feet

<table>
<thead>
<tr>
<th>Year</th>
<th>History</th>
<th>Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>19%</td>
<td>13%</td>
</tr>
<tr>
<td>2011</td>
<td>13%</td>
<td>33%</td>
</tr>
<tr>
<td>2020</td>
<td>3%</td>
<td>31%</td>
</tr>
<tr>
<td>2025</td>
<td>3%</td>
<td>32%</td>
</tr>
<tr>
<td>2030</td>
<td>6%</td>
<td>32%</td>
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<tr>
<td>2035</td>
<td>12%</td>
<td>32%</td>
</tr>
<tr>
<td>2040</td>
<td>14%</td>
<td>32%</td>
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</tbody>
</table>

*Includes combined heat-and-power and lease and plant fuel.
**Includes pipeline fuel.

Source: EIA, Annual Energy Outlook 2013
Domestic natural gas production grows faster than consumption and the U.S. becomes a net exporter of natural gas around 2020.
U.S. natural gas imports and exports

Reference case

High resource case

trillion cubic feet

Exports to Mexico
Exports to Canada
Lower 48 states
LNG exports
Alaska LNG exports
Imports from Canada
LNG imports

Source: EIA, Annual Energy Outlook 2013
Uncertainties that could slow global growth of shale gas and tight oil

• Resource quantities and distribution
• Surface vs. mineral rights
• Risk appetite of industry participants
• Infrastructure and technology
• Environmental constraints
U.S. Tight Oil
Domestic production of tight oil has grown dramatically over the past few years.

![Chart showing tight oil production for select plays]

- Eagleford (TX)
- Bakken (ND & MT)
- Spraberry (TX Permian)
- Wolfcamp (TX Permian)
- Bonespring (TX Permian)
- Yeso (TX Permian)
- Glorieta (TX Permian)
- Niobrara_Codell (CO, WY)
- Monterey (CA)
- Granite Wash (TX & OK)
- Woodford (OK)
- Austin Chalk (TX & LA)
- Barnett (TX)

Source: Drilling Info (formerly HPDI), Texas RRC, North Dakota department of mineral resources, and EIA, through December 2012.

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U.S. tight oil production leads growth in domestic production

Reference case

Historical, 2011, and projections for U.S. crude oil production from 1990 to 2040. Tight oil production is projected to lead growth in domestic production.

High resource case

Historical, 2011, and projections for U.S. crude oil production from 1990 to 2040. Tight oil production is projected to lead growth in domestic production.

Source: EIA, Annual Energy Outlook 2013 and Short-Term Energy Outlook, May 2013
U.S. dependence on imported liquids depends on both supply and demand

U.S. liquid fuel supply
Million barrels per day

<table>
<thead>
<tr>
<th></th>
<th>History</th>
<th>2012</th>
<th>2014</th>
<th>Projections</th>
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<tbody>
<tr>
<td>Consumption</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>32% STEO forecast for 2014</td>
</tr>
<tr>
<td>Net imports</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>-8%</td>
</tr>
<tr>
<td>Petroleum Exports</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>37%</td>
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<tr>
<td>Domestic supply</td>
<td>15</td>
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</tr>
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</table>

Source: EIA, Annual Energy Outlook 2013 and Short-Term Energy Outlook, April 2013
Keynote Speakers

Thomas Fanning
Chairman, President and CEO
Southern Company

Aldo Flores-Quiroga
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International Energy Forum

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