Status and outlook for shale gas and tight oil development in the U.S. for CERAWEek 2013, North American Energy March 06, 2013 | Houston, TX

by
Adam Sieminski, Administrator
U.S. Shale Gas
An average well in shale gas and other continuous resource plays can also have steep decline curves, which require continued drilling to grow production.

Source: EIA, Annual Energy Outlook 2012
For example: Oil production by monthly vintage of wells in the Williston Basin

Source: DrillingInfo history through August 2012, EIA Short-Term Energy Outlook, February 2013 forecast
Domestic production of shale gas has grown dramatically over the past few years

Source: LCI Energy Insight gross withdrawal estimates as of January 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

U.S. dry natural gas production
trillion cubic feet

Source: EIA, Annual Energy Outlook 2013 Early Release

Adam Sieminski, CERAWEek, March 06, 2013
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></th>
<th>History</th>
<th>Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2005</td>
<td>2011</td>
</tr>
<tr>
<td>Electric power</td>
<td>33%</td>
<td>31%</td>
</tr>
<tr>
<td>Industrial*</td>
<td>19%</td>
<td>13%</td>
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<tr>
<td>Gas to liquids</td>
<td>14%</td>
<td>6%</td>
</tr>
<tr>
<td>Transportation**</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>Commercial</td>
<td>14%</td>
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</tr>
<tr>
<td>Residential</td>
<td>13%</td>
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*Includes combined heat-and-power and lease and plant fuel.
**Includes pipeline fuel.

Source: EIA, Annual Energy Outlook 2013 Early Release
Growth of natural gas in transportation led by heavy duty trucks (LNG) and gas to liquids (diesel)… marine and rail to come?

U.S. natural gas consumption
quadrillion Btu

<table>
<thead>
<tr>
<th>Year</th>
<th>History</th>
<th>2011</th>
<th>Projections</th>
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<tbody>
<tr>
<td>1995</td>
<td>95%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2000</td>
<td>3%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>2005</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2010</td>
<td>3%</td>
<td></td>
<td>1%</td>
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<tr>
<td>2011</td>
<td>95%</td>
<td></td>
<td>31%</td>
</tr>
<tr>
<td>2015</td>
<td>3%</td>
<td></td>
<td>31%</td>
</tr>
<tr>
<td>2020</td>
<td>1%</td>
<td></td>
<td>31%</td>
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<tr>
<td>2025</td>
<td>1%</td>
<td></td>
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<td>2030</td>
<td>1%</td>
<td></td>
<td>28%</td>
</tr>
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<td>2035</td>
<td>1%</td>
<td></td>
<td>28%</td>
</tr>
<tr>
<td>2040</td>
<td>28%</td>
<td></td>
<td>28%</td>
</tr>
</tbody>
</table>

Note: Gas to liquids includes heat, power, and losses.
Source: EIA, Annual Energy Outlook 2013 Early Release
Total natural gas exports nearly quadruple by 2040 in the *AEO2013 Reference case*

U.S. natural gas exports
trillion cubic feet

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Source: EIA, Annual Energy Outlook 2013 Early Release

Adam Sieminski, CERAWEek, March 06, 2013
Domestic natural gas production grows faster than consumption and the U.S. becomes a net exporter of natural gas around 2020

Source: EIA, Annual Energy Outlook 2013 Early Release
U.S. Tight Oil
Domestic production of tight oil has grown dramatically over the past few years.

Tight oil production for select plays

- Million barrels per day

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

Adam Sieminski, CERAWEek, March 06, 2013
U.S. tight oil production leads a growth in domestic production of 2.6 million barrels per day between 2008 and 2019

U.S. crude oil production
million barrels per day

Source: EIA, Annual Energy Outlook 2013 Early Release and Short-Term Energy Outlook, February 2013
U.S. petroleum product exports exceeded imports in 2011 for first time in over six decades

annual U.S. net exports of total petroleum products, 1949 – 2011
million barrels per day

Source: EIA, Petroleum Supply Monthly
U.S. dependence on imported liquids depends on both supply and demand

U.S. liquid fuel supply
million barrels per day

Source: EIA, Annual Energy Outlook 2013 Early Release

Consumption
Net imports
Domestic supply

Source: EIA, Annual Energy Outlook 2013 Early Release
Light-duty vehicle liquids consumption is lower primarily due to more stringent CAFE standards

Source: EIA, Annual Energy Outlook 2013 Early Release
Global tight oil production comparisons

IEO2013 DRAFT

BP Energy Outlook 2030

million barrels per day


Adam Sieminski, CERAWEek, March 06, 2013
For more information


Annual Energy Outlook | www.eia.gov/forecasts/aeo

Short-Term Energy Outlook | www.eia.gov/forecasts/steo

International Energy Outlook | www.eia.gov/forecasts/ieo

Today In Energy | www.eia.gov/todayinenergy

Monthly Energy Review | www.eia.gov/totalenergy/data/monthly

Annual Energy Review | www.eia.gov/totalenergy/data/annual