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

For
American Petroleum Institute
April 04, 2013 | Washington, DC

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

shale gas production (dry)
billion cubic feet per day

Sources: 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.

Adam Sieminski, API, April 04, 2013
Shale gas leads growth in total gas production through 2040

U.S. dry natural gas production
tillion cubic feet

History 2011 Projections


Shale gas

Tight gas

Non-associated offshore

Coalbed methane

Associated with oil

Non-associated onshore

Source: EIA, Annual Energy Outlook 2013 Early Release

Adam Sieminski, API, April 04, 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

**Source:** EIA, Annual Energy Outlook 2013 Early Release

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

--

Adam Sieminski, API,
April 04, 2013
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></th>
<th>History</th>
<th>2011</th>
<th>Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>95%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td>38%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>28%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Gas to liquids includes heat, power, and losses.
Source: EIA, Annual Energy Outlook 2013 Early Release

Adam Sieminski, API, April 04, 2013
The U.S. is projected to be both an exporter and importer of natural gas

U.S. natural gas imports and exports
trillion cubic feet

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

U.S. dry gas (trillion cubic feet)

History | 2011 | Projections
--- | --- | ---
Consumption
Domestic supply
Net imports

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

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

History

2011

Projections

STEIO March 2013 U.S. crude oil projection

Tight oil

Other lower 48 onshore

Lower 48 offshore

Alaska

Source: EIA, Annual Energy Outlook 2013 Early Release and Short-Term Energy Outlook, March 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 and Short-Term Energy Outlook, March 2013
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

Increasing demand for current market analysis from EIA

- Gas markets – LNG exports and impact on domestic prices over time
- Oil and gas production data (federal lands vs. rest), forecasts, and reserves
- Crude and product markets, refining and midstream changes
  - Types of refining capacity in different regions (crude preferences)
  - Rail transportation
  - Jones Act tanker availability
  - Refinery availability and outage analysis including regional price impacts
  - Exports of refined products and impact on domestic prices
  - Disposition of increased domestic tight light crude production
- Renewable Fuels Standard / RINS / cellulosic ethanol
- Growth of natural gas use in transportation
- International disruptions and ongoing sanctions-related analyses
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