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

For
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By
Adam Sieminski, Administrator
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

trillion cubic feet

Source: EIA, Annual Energy Outlook 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>
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<tr>
<th>History</th>
<th>Projections</th>
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<tbody>
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<td></td>
<td>*Includes combined heat-and-power and lease and plant fuel.</td>
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<td>**Includes pipeline fuel.</td>
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- **2005**
  - Electric power: 19%
  - Industrial: 33%
  - Gas to liquids: 3%
  - Transportation: 13%
  - Commercial: 6%
  - Residential: 14%

- **2011**
  - Electric power: 31%
  - Industrial: 33%
  - Gas to liquids: 3%
  - Transportation: 13%
  - Commercial: 12%
  - Residential: 14%

- **2020**
  - Electric power: 32%
  - Industrial: 33%
  - Gas to liquids: 2%
  - Transportation: 12%
  - Commercial: 6%
  - Residential: 14%

- **2025**
  - Electric power: 32%
  - Industrial: 33%
  - Gas to liquids: 2%
  - Transportation: 12%
  - Commercial: 6%
  - Residential: 14%

- **2030**
  - Electric power: 32%
  - Industrial: 33%
  - Gas to liquids: 2%
  - Transportation: 12%
  - Commercial: 6%
  - Residential: 14%

- **2035**
  - Electric power: 32%
  - Industrial: 33%
  - Gas to liquids: 2%
  - Transportation: 12%
  - Commercial: 6%
  - Residential: 14%

- **2040**
  - Electric power: 32%
  - Industrial: 33%
  - Gas to liquids: 2%
  - Transportation: 12%
  - Commercial: 6%
  - Residential: 14%

Source: EIA, Annual Energy Outlook 2013

Adam Sieminski, B of A/Merrill Lynch, April 20, 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
U.S. natural gas imports and exports

Reference case

High resource case

trillion cubic feet

Source: EIA, Annual Energy Outlook 2013
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 December 2012.

Source: Adam Sieminski, B of A/Merrill Lynch, April 20, 2013.
U.S. tight oil production leads growth in domestic production

Reference case

High resource case

Tight oil

Other lower 48 states onshore

Lower 48 states offshore

Alaska

STEO April 2013 U.S. crude oil projection

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

Adam Sieminski, B of A/Merrill Lynch, April 20, 2013
U.S. and Saudi Arabian crude oil and petroleum liquids production

million barrels per day

Note: Volumes for 2012 and 2013 are projected. Refinery gain for Saudi Arabia is estimated as one half of U.S. refinery gain on a percentage basis.

Source: EIA, This Week in Petroleum, Dec 19, 2012
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
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Chairman, President and CEO
Southern Company

Aldo Flores-Quiroga
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