Potential Supply of Natural Gas in the United States

Report of the Potential Gas Committee (December 31, 2018)
Potential Gas Committee (PGC):
- Group of ~80 volunteer geoscientists and engineers.
- Biennial assessments of technically recoverable U.S. natural gas endowment since 1964.

Assessment as of year-end 2018 (mean values):
- 3,374 Tcf of total U.S. technically recoverable gas resources:
  - 557 Tcf or 20% increase over the previous year-end 2016 assessment.
  - Shale gas resources (2,107 Tcf) account for 62% of total gas resources.
- Total U.S. future gas supply (reserves+resources) stands at record 3,838 Tcf.
Potential Gas Committee (PGC)

~80 volunteers

Ronald J. Kelley
President/General Chairman

Natalie H. Reagan
Chairman of the Board

- Recruits personnel and supervises work
- Develops assessment policy and procedures
- Directs and manages studies of gas resources
- Prepares reports on natural gas resources

Potential Gas Agency (PGA)
Colorado School of Mines

Supported by industry

Dr. Alexei V. Milkov
Director

- Approves criteria and methods
- Ensures maintenance of standards and objectivity
- Reviews and evaluates reports
- Publishes final assessments of gas resources
PGC assesses future supply of natural gas

Total Gas
- Recoverable Gas
  - Discovered
    - Confirmed
    - Unconfirmed
  - Cumulative Production
    - Proved Reserves
    - Probable Resources
- Unrecoverable Gas
  - Undiscovered
    - Possible Resources
    - Speculative Resources

Future Supply of Natural Gas

www.potentialgas.org
7 PGC work areas and 90 geologic provinces

- Settings:
  - Onshore
  - Offshore

- Depth intervals:
  - Shallow (0-15,000 ft.)
  - Deep (15,000-30,000 ft.)

- Reservoir types:
  - Traditional:
    - Conventional and tight
    - Shale gas
    - Coalbed gas (CBM)
PGC resource assessment methodology

- Province-level assessments:
  - Publicly-available data.
  - Individual expert judgement by practicing geoscientists and engineers.
  - Group discussions and peer-reviews.
  - Minimum – Most Likely – Maximum resource values for each province.

- Area-level assessments:
  - Statistical aggregation of province-level assessments to calculate Mean resources values.

- National-level assessment:
  - Statistical aggregation of area-level assessments to calculate mean Grand Total resources for the U.S.
  - Mean values for different types of reservoirs and different resource categories.
  - Addition of EIA’s latest published proved reserves (year-end 2017) to calculate future gas supply.
### Year-end 2018 assessment results

<table>
<thead>
<tr>
<th>Mean Technically Recoverable Volumes (trillion cubic feet or Tcf) (rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional gas resources</strong> (conventional, tight and shale reservoirs)</td>
</tr>
<tr>
<td><strong>Coalbed gas resources</strong></td>
</tr>
<tr>
<td><strong>Total gas resources</strong></td>
</tr>
<tr>
<td><strong>Proved gas reserves (EIA, year-end 2017)</strong></td>
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<tr>
<td><strong>Future gas supply in the U.S.</strong></td>
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</tbody>
</table>
PGC gas resource assessments, 1964-2018

- PGC is the only organization tracking U.S. gas resources continuously since 1964.
- Rapid increase of gas resources since 2006 – era of gas abundance.
- Scarcity
- Abundance

Summed most likely values for all types of reservoirs and resources.
Shale gas assessed but not reported separately

- Continuous growth of gas resources.
- Shale gas is responsible for recent increase in gas resources.
Change in gas resources relative to 2016:
Reservoir types

- Significant increase in gas resources in conventional and tight sand/carbonate reservoirs (340 Tcf or 39%).
- Significant increase in shale gas resources (220 Tcf or 12%).
- Slight decrease in coalbed (CBM) resources (2 Tcf or 1%).
- Total mean potential gas resources increase of 557 Tcf or 20%.
Change in gas resources relative to 2016: Resource categories

- Resources increased in all categories.
- Possible resources increased most significantly, reflecting continuous development of established plays.

![Bar chart showing changes in gas resources from 2016 to 2018 for different resource categories.](chart.png)
Change in Traditional gas resources from 2016: Onshore vs Offshore

- Traditional resources:
  - Conventional and tight reservoirs
  - Shale reservoirs
- Significant increase in Onshore gas resources (559 Tcf or 23%).
- No change in Offshore gas resources.
2018 gas resource assessment for Areas

Red values – Total Traditional resources (conventional, tight, shale reservoirs) (mean values, Tcf)

Black values – Coalbed gas resources (mean values, Tcf)
Comparison of gas resources in Areas

- Atlantic area has most gas resources.
- The majority of gas resources are in onshore shale reservoirs.
Areas ranked based on total gas resources (includes traditional and coal gas)

<table>
<thead>
<tr>
<th>PGC Assessment Area</th>
<th>Mean Technically Recoverable Volumes (trillion cubic feet or Tcf, rounded)</th>
<th>Proportion (% rounded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantic</td>
<td>1328</td>
<td>39</td>
</tr>
<tr>
<td>Mid-Continent</td>
<td>623</td>
<td>19</td>
</tr>
<tr>
<td>Rocky Mountain</td>
<td>565</td>
<td>17</td>
</tr>
<tr>
<td>Gulf Coast (incl. Gulf of Mexico)</td>
<td>519</td>
<td>15</td>
</tr>
<tr>
<td>Alaska</td>
<td>243</td>
<td>7</td>
</tr>
<tr>
<td>Pacific</td>
<td>57</td>
<td>2</td>
</tr>
<tr>
<td>North Central</td>
<td>31</td>
<td>1</td>
</tr>
</tbody>
</table>
Summary of PGC year-end 2018 assessment

- 3,374 Tcf of total U.S. gas resources (mean value).
- 557 Tcf or 20% increase over the previous year-end 2016 assessment.
- Atlantic area dominates with 39% of total U.S. gas resources.
- Shale gas accounts for 62% of total U.S. gas resources.
- Total U.S. future gas supply (reserves+resources) stands at record 3,838 Tcf. This is an increase of 697 Tcf or 22% over the previous year-end 2016 assessment.
Additional information

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