Potential Supply of Natural Gas in the United States

Report of the Potential Gas Committee
(December 31, 2010)

NARUC Committee on Gas
July 18, 2011
Potential Gas Committee:

100 Volunteer Geoscientists & Petroleum Engineers

Biennial Assessment - since 1964 – of the Technically Recoverable U. S. Natural Gas Endowment

PGC + EIA Proved Reserves = Potential Future Supply
Organization of Potential Gas Studies

Potential Gas Committee

Larry M. Gring
President/General Chairman

Darrell L. Pierce
Chairman, Board of Directors

Develops assessment policy and procedures, directs and manages studies of natural gas resources, recruits personnel and supervises work, prepares reports on natural gas resources.

Potential Gas Agency

Colorado School of Mines
(supported by industry)

Dr. John B. Curtis, Director

Approves criteria and methods, insures maintenance of standards and objectivity, reviews and evaluates reports, publishes final assessments of gas resources.
Proved Reserves vs Resources

- Known gas reservoirs
- Existing economic conditions
- Existing operating conditions

- Discovered
- Undiscovered
- Effects of technology
- Effects of economics
Natural Gas Resource Assessment of the Potential Gas Committee, 2010 (mean values)

- Traditional Gas Resources: 1,739.2 Tcf
- Coalbed Gas Resources: 158.6 Tcf
- Total U.S. Gas Resources: 1,897.8 Tcf
- Proved Reserves (EIA)*: 272.5 Tcf
- Future Gas Supply: 2,170.3 Tcf

* Latest available value (dry gas), year-end 2009
PGC Resource Assessment 2010

Total Traditional Resources (mean values) by category

- Probable (existing fields): 536.6 Tcf
- Possible (new fields): 687.7 Tcf
- Speculative (frontiers): 518.3 Tcf
- Total: 1,739.2 Tcf

Data source: Potential Gas Committee (2011)
Total Coalbed Gas Resources (mean values) by category

Probable (existing fields) 13.4 Tcf
Possible (new fields) 48.1 Tcf
Speculative (frontier) 96.2 Tcf
Total 158.6 Tcf

Data source: Potential Gas Committee (2011)
PGC Resource Assessments, 1990-2010

Total Potential Gas Resources (Mean Values)

Total Potential Resources (Mean Values, Tcf)

- Coalbed gas resources
- Traditional gas resources (conventional, tight, shale)
- Shale gas, 686.6 Tcf (m.l.)
- Shale gas, 615.9 Tcf (m.l.)
- Shale gas, ~200 Tcf (m.l.)

(shale gas assessed but not reported separately)

Data source: Potential Gas Committee (2011)
## Potential Gas Committee
### Determination of Future Supply of Natural Gas in the United States (TCF)

<table>
<thead>
<tr>
<th>Year</th>
<th>DOE Reserves</th>
<th>Traditional + Resources</th>
<th>Coal + Gas</th>
<th>Future Supply</th>
<th>Cumulative Production</th>
<th>Ultimate Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>169</td>
<td>855</td>
<td>147</td>
<td>1,172</td>
<td>777</td>
<td>1,949</td>
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<tr>
<td>1992</td>
<td>165</td>
<td>854</td>
<td>147</td>
<td>1,166</td>
<td>815</td>
<td>1,981</td>
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<tr>
<td>1994</td>
<td>164</td>
<td>881</td>
<td>147</td>
<td>1,192</td>
<td>853</td>
<td>2,045</td>
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<tr>
<td>1996</td>
<td>166</td>
<td>921</td>
<td>146</td>
<td>1,234</td>
<td>893</td>
<td>2,127</td>
</tr>
<tr>
<td>1998</td>
<td>164</td>
<td>896</td>
<td>141</td>
<td>1,202</td>
<td>933</td>
<td>2,134</td>
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<tr>
<td>2000</td>
<td>177</td>
<td>936</td>
<td>155</td>
<td>1,268</td>
<td>973</td>
<td>2,241</td>
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<tr>
<td>2002</td>
<td>187</td>
<td>958</td>
<td>169</td>
<td>1,314</td>
<td>1,013</td>
<td>2,327</td>
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<tr>
<td>2004</td>
<td>193</td>
<td>950</td>
<td>169</td>
<td>1,312</td>
<td>1,053</td>
<td>2,364</td>
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<tr>
<td>2006</td>
<td>211</td>
<td>1,155</td>
<td>166</td>
<td>1,532</td>
<td>1,091</td>
<td>2,623</td>
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<tr>
<td>2008</td>
<td>238</td>
<td>1,673</td>
<td>163</td>
<td>2,074</td>
<td>1,132</td>
<td>3,206</td>
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<tr>
<td>2010</td>
<td>273</td>
<td>1,739</td>
<td>159</td>
<td>2,170</td>
<td>1,176</td>
<td>3,347</td>
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</tbody>
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Regional Resource Assessment

Data source: Potential Gas Committee (2011)

Traditional: 1,739.2 Tcf
Coalbed: 158.6 Tcf
Total U.S: 1,897.8 Tcf
# Regional Resource Assessment

## Summary

Data source: Potential Gas Committee (2011)

<table>
<thead>
<tr>
<th>PGC Area</th>
<th>Traditional Gas Resources (Mean, Tcf)</th>
<th>Coalbed Gas Resources (M.L., Tcf)</th>
<th>Total Pot. Resources (Tcf, rounded)</th>
<th>Traditional Proportion of Total US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf Coast</td>
<td>506.0</td>
<td>3.4</td>
<td>509.3</td>
<td>29.0%</td>
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<tr>
<td>Atlantic</td>
<td>353.6</td>
<td>17.3</td>
<td>370.9</td>
<td>20.3%</td>
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<tr>
<td>Rocky Mountain</td>
<td>344.0</td>
<td>51.9</td>
<td>395.9</td>
<td>19.7%</td>
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<tr>
<td>Mid-Continent</td>
<td>272.2</td>
<td>7.5</td>
<td>279.8</td>
<td>15.6%</td>
</tr>
<tr>
<td>Pacific</td>
<td>54.0</td>
<td>2.6</td>
<td>56.6</td>
<td>3.1%</td>
</tr>
<tr>
<td>North Central</td>
<td>21.6</td>
<td>11.6</td>
<td>33.3</td>
<td>1.2%</td>
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<tr>
<td><strong>Total Lower 48</strong></td>
<td><strong>1,551.2</strong></td>
<td><strong>94.3</strong></td>
<td><strong>1,739.2</strong></td>
<td></td>
</tr>
<tr>
<td>Alaska</td>
<td>193.8</td>
<td>57.0</td>
<td>250.8</td>
<td>11.1%</td>
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<td><strong>Total U.S. (means)</strong></td>
<td><strong>1,739.2</strong></td>
<td><strong>158.6</strong></td>
<td><strong>1,897.8</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Separately aggregated totals, not arithmetically additive.
Natural Gas Supply Sources
(January 1-July 5, 2011)

Thank You!

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