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Potential Gas Committee

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POTENTIAL GAS COMMITTEE REPORTS SUBSTANTIAL INCREASE IN MAGNITUDE OF U.S. NATURAL GAS RESOURCE BASE

GOLDEN, COLORADO — The Potential Gas Committee (PGC) today released the results of its latest biennial assessment of the nation's natural gas resources, which indicates that the United States possesses a total resource base of 1,898 trillion cubic feet (Tcf) as of year-end 2010. This is the highest resource evaluation in the Committee's 46-year history, exceeding the previous record-high assessment by 61 Tcf. Most of the increase arose from reevaluation of shale-gas plays in the Gulf Coast, Mid-Continent and Rocky Mountain areas.

These changes have been assessed in addition to the 44 Tcf of domestic marketed-gas production recorded during the two-year period since the Committee's previous report.

"The PGC's year-end 2010 assessment reaffirms the Committee's conviction that abundant, recoverable natural gas resources exist within our borders, both onshore and offshore, and in all types of reservoirs—from conventional, 'tight' and shales, to coals," said Dr. John B. Curtis, Professor of Geology and Geological Engineering at the Colorado School of Mines and Director of the Potential Gas Agency there, which provides guidance and technical assistance to the Potential Gas Committee.

Dr. Curtis cautioned, however, that the current assessment assumes neither a time schedule nor a specific market price for the discovery and production of future gas supply. "Assessments of the Potential Gas Committee are 'base-line estimates' in that they attempt to provide a reasonable appraisal of what we consider to be the 'technically recoverable' gas resource potential of the United States," he explained.

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The Committee's year-end 2010 assessment of 1,898 Tcf (statistically aggregated mean value, rounded) includes 1,739 Tcf of gas attributable to "traditional" reservoirs (conventional, tight sands and carbonates, and shales) and 159 Tcf in coalbed reservoirs. Compared to year-end 2008, traditional resources increased by nearly 67 Tcf (4%), while coalbed gas resources declined by 4 Tcf (2.7%), resulting in a net increase in total potential resources of 61.4 Tcf (3.3%). (See accompanying Table 1.)

When the PGC's results are combined with the U.S. Department of Energy's latest available determination of proved dry-gas reserves, 273 Tcf as of year-end 2009, the United States has a total available *future supply* of 2,170 Tcf, an increase of 89 Tcf over the previous evaluation.

As Dr. Curtis observed, "Our knowledge of the geological endowment of technically recoverable gas continues to improve with each assessment. Furthermore, new and advanced exploration, well drilling, completion and stimulation technologies are allowing us increasingly better access to domestic gas resources—especially 'unconventional' gas—which, not all that long ago, were considered impractical or uneconomical to pursue."

"Consequently, our present assessment, strengthened by robust domestic production levels and a growing base of proved reserves, demonstrates an exceptionally strong and optimistic gas supply picture for the nation."

Overall, the Gulf Coast, including the Gulf of Mexico outer continental shelf, slope and deepwater, remains the country's richest resource area (29 percent of total traditional resources), followed by the Atlantic, Rocky Mountain and Mid-Continent areas, which altogether account for 85% of the assessed total traditional resource. (See accompanying Table 2.) Changes in the assessments from 2008 to 2010 arose primarily from analyses of new geological, drilling, well-test and production data from these same four regions. The largest volumetric and/or percentage increases in individual resource categories (Probable, Possible and Speculative) resulted mainly from reassessments of active and newly developing shale-gas plays in the Gulf Coast Area (La.-Miss.-Ala. Salt Basins, East Texas and Texas Gulf Coast Basins), as well as the Anadarko Basin (Mid-Continent Area), Piceance Basin (Rocky Mountain Area), Appalachian Basin (Atlantic Area) and Michigan Basin (North Central Area).

The growing importance of shale gas is substantiated by the fact that, of the 1,898 Tcf of total potential resources, shale gas accounts for 687 Tcf ("most likely" value), or approximately 36%. PGC has again prepared a separate tabulation of shale-gas resources but has not computed an aggregated mean value inasmuch as shale gas is considered part of PGC's traditional resources.

Again this year, PGC is releasing an *Advance Summary* of its assessment results. This concise document will provide those who preorder the Committee's full-content printed report with all of the national, area- and province-level assessment tabulations and accompanying graphics for immediate analysis and critique.

PGC's complete printed report will include detailed area- and province-level resource assessments, summaries of recent E&P activities, and updated editions of its popular value-added features:

- *PGC and the Ultimately Recoverable Resource*—explains in simplified terms, with annotated graphics, the time-dynamic nature of gas resource assessment, the relationship between proved reserves and the PGC's categories of resources, and how these quantities lead to determination of the ultimately recoverable gas resource.
- *Historical Trends I*—Analyses of annual trends in U.S. crude oil, natural gas and gas liquids production for 1980-2010, together with the basics of 'vintaged' production graphs, production profiles, well and rig statistics, prices, revenues and other useful parameters, as well as forecasts of production trends to 2035. Accompanying detailed text describes each plotted trend, which is keyed to a graphical folio for the U.S. containing more than 90 charts that are rarely, if at all, seen in print elsewhere.
- *Historical Trends II*—Monthly gas production and well-count histories for all Lower 48 States' onshore and offshore provinces, allowing the reader to compare and contrast basins with rising, falling or stable production trends.
- *Historical Trends III*—Gas-well permitting and spudding histories for all producing provinces, a measure of overall health of the industry from basin to basin.
- *Historical Trends IV*—"Top-ten" rankings of gas producers and well production trends and performance, arranged by PGC province.
- *North American Perspectives I-II*—Overviews of natural gas resources, production and recent E&P activities in Canada and Mexico.
- *Frontier Gas Resources I-III*—Latest domestic and international developments in natural gas hydrates and liquefied natural gas (LNG); and U.S. shale gas resources and play characteristics.
- *From Reservoir to Burner Tip*—PGC's natural gas "primer," a less technical discussion of how and where natural gas occurs and how it is produced, stored, transported, delivered to and beneficially used by consumers.

In addition to the Advance Summary and complete printed report, the PGC will release the fifth edition of its information-packed DVD product, *PGC Trove 2011*. This disc will include digital

versions of the report, both in its entirety and as amply bookmarked individual chapters. The trove will again feature the comprehensive *Folio of Historical Production Trends and Forecast for the United States*, consisting of more than 3,400 historical-trend plots covering separately the entire U.S. and Lower 48 States, as well as each petroleum-producing region and each onshore and offshore producing province.

With these offerings, the Potential Gas Committee presents a more complete picture of present gas supply and productive capacity of the North American natural gas industry than it has compiled previously.

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Details of the Potential Gas Committee's Natural Gas Resource Assessment

(as of December 31, 2010)

The Potential Gas Committee (PGC) reports its gas resource assessments biennially in three categories of decreasing geological certainty—*Probable, Possible* and *Speculative*. For each, a *minimum, most likely* and *maximum* volume is assessed in each of 90 provinces in the Lower 48 States and Alaska. The *mean* values shown in Table 1 below were calculated by statistical aggregation of the minimum, most likely and maximum value ranges for each category. Mean values for total traditional resources and total coalbed gas resources are aggregated separately. This procedure imparts greater statistical validity to the results and allows for more direct comparison of PGC's assessments with those made by other organizations.

The PGC's assessments are not static. Each year, based on new exploration results, drilling and production information and various other data that become available, PGC members may reclassify resources at the province level from one category to another and to proved reserves.

Table 1.

Resource Category	Mean Values, Tcf 2010	2008	Change Tcf (%)
Traditional Gas Resources:			
Probable resources (current fields)	536.6	441.4	
Possible resources (new fields)	687.7	736.9	
Speculative resources (frontiers)	518.3	500.7	
Total Traditional Gas Resources*	1,739.2	1,673.4	+66.7 (3.9%)
Coalbed Gas Resources:			
Probable resources	13.4	14.2	
Possible resources	48.1	49.8	
Speculative resources	96.2	98.9	
Total Coalbed Gas Resources*	158.6	163.0	–4.4 (–2.7%)
Grand Total Potential Resources**	**1,897.8**	**1,836.4**	+61.4 (3.3%)
Proved dry-gas reserves (DOE/EIA)	272.5†	244.7	
U.S. Future Gas Supply	**2,170.3**	**2,081.1**	+89.2 (4.3%)

* Mean values for Probable, Possible and Speculative resources are *not* arithmetically additive in deriving Total Traditional Gas Resources or Total Coalbed Gas Resources.

** Mean values for Total Traditional Resources and Total Coalbed Gas Resources are arithmetically additive in deriving Grand Total Potential Resources.

† Latest available figure is for year-end 2009.

Note: Totals are subject to rounding and differences due to statistical aggregation of distributions.

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PGC's 90 geological provinces are grouped into seven geographic assessment areas. In similar fashion as above, the minimum, most likely and maximum value ranges for each category of traditional resources in each province within an area are aggregated at the area level to yield mean values for area Probable, Possible and Speculative traditional resources and a separately aggregated area total. Coalbed gas resources are aggregated only at the national level. Table 2 below compares the total mean values for these areas for year-end 2010 and year-end 2008.

Table 2.

Assessment Area	Total Mean Values, Tcf 2010	2008	Change Tcf (%)
Traditional Gas Resources:			
Gulf Coast (including Gulf of Mexico)	506.0	455.2	+50.8 (11.2%)
Atlantic	353.6	353.5	+0.1 (0%)
Rocky Mountain	344.0	374.4	–30.4 (–8.1%)
Mid-Continent	272.2	274.9	–2.6 (–1.0%)
Alaska	193.8	193.8	0 (0%)
Pacific	54.0	51.3	+2.7 (5.3%)
North Central	21.6	24.0	–2.4 (–10%)
Total U.S. Traditional Gas Resources*	1,739.2	1,673.4	+65.7 (3.9%)
Coalbed Gas Resources (all areas)	158.6	163.0	–4.4 (–2.7%)
Grand Total Potential Resources**	**1,897.8**	**1,836.4**	+61.4 (3.3%)
Proved dry-gas reserves (DOE/EIA)	272.5†	244.7	
U.S. Future Gas Supply	**2,170.3**	**2,081.1**	+89.2 (4.3%)

* Mean values of Traditional Resources for the seven areas are *not* arithmetically additive in deriving Total U.S. Traditional Resources.

** Mean values for Total U.S. Traditional Gas Resources and Coalbed Gas Resources are arithmetically additive in deriving Grand Total Potential Resources.

† Latest available figure is for year-end 2009.

Note: Totals are subject to rounding and differences due to statistical aggregation of distributions.

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How to Obtain the Potential Gas Committee 2010 Advance Summary and Report

Prepublication orders for the full-content printed PGC report, *Potential Supply of Natural Gas in the United States (December 31, 2010)* may now be placed with the Potential Gas Agency, Colorado School of Mines, Golden, CO 80401-1887. The cost of the printed report is US$495 (US$515 for foreign shipment), if payment accompanies the order. The printed report with the companion DVD will be available for US$950 (US$970 for foreign shipment). All purchasers will receive the *Advance Summary* immediately and will automatically be sent the full report (or report plus DVD) when the book is published later in 2011.

For additional information about ordering these and previous reports and DVDs, please contact Linda D'Epagnier, Program Assistant, at the Potential Gas Agency, telephone 303-273-3886, fax 303-273-3574, or e-mail: ldepagni@mines.edu.

About the Potential Gas Committee

The Potential Gas Committee, an incorporated, nonprofit organization, consists of knowledgeable and highly experienced volunteer members who work in the natural gas exploration, production and transportation industries and in the field and technical services and consulting sectors. The Committee also benefits from the input of respected technical advisors and various observers from federal and state government agencies, academia, and industry and research organizations in both the United States and Canada. Although the PGC functions independently, the Potential Gas Agency at the Colorado School of Mines provides the Committee with guidance, technical assistance, training and administrative support, and assists in member recruitment and outreach. The Potential Gas Agency receives financial support from prominent E&P and gas pipeline companies and distributors.

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Note to Editors:

Selected illustrations from the press conference slide presentation are available for print use. Contact the Potential Gas Agency and specify desired figure number(s) and preferred file format (e.g., tiff, jpg, eps). Alternatively, one may request all the illustrations in the slide presentation as a Microsoft® PowerPoint® file (ppt).

Slide 5. Potential Gas Committee's assessment of traditional gas resources of the United States, as of December 31, 2010 (mean values, Tcf). Data from Potential Gas Committee (2011).

Slide 6. Potential Gas Committee's assessment of coalbed gas resources of the United States, as of December 31, 2010 (mean values, Tcf). Data from Potential Gas Committee (2011).

Slide 7. Potential Gas Committee's assessment of potential gas resources of the United States, traditional and coalbed, 1990-2010 (mean values, Tcf). Data from Potential Gas Committee (2011).

Slide 9. Map of Potential Gas Committee's assessment areas, annotated with total traditional and coalbed gas resource values for year-end 2010 (mean values, Tcf). Data from Potential Gas Committee (2011).

Slide 10. Comparison of Potential Gas Committee's potential traditional gas resources for the United States, by area, onshore and offshore, including coalbed gas, year-end 2010 ("most likely" values, Bcf). Data from Potential Gas Committee (2011).