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September 5, 2008

Submitted Via E-Mail
Secretary
Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549-1090
rule-comments@sec.gov

Re: File Number S7-15-08: Comments to Proposed Rule on Modernization of the Oil and Gas Reporting Requirements

The American Clean Skies Foundation ("ACSF") is pleased to submit these comments to the Securities and Exchange Commission's Proposed Rule re Modernization of the Oil and Gas Reporting Requirements, File Number S7-29-07 (the "Proposed Rule"). ACSF is a 501(c)(3) non-profit educational foundation committed to informing the public about energy efficiency, natural gas, and the benefits that come from its use in the form of clean American skies. ACSF supports the Commission's proposed changes to its oil and gas reporting requirements as set forth in the Proposed Rule. ACSF's comments to specific portions of the Proposed Rule are set forth below.

I. The Benefits of Natural Gas and the Importance of Unconventional Natural Gas Sources.

Natural gas is an important source of energy in U.S. markets, representing 22% of total U.S. energy consumption in 2006. It is a major energy source for all end-use sectors, providing 19% of total U.S. power generation and 41% of all energy used by industry. And 90% of all new megawatts of power generation capacity added since 1995 are gas-fired.

There are a number of distinct advantages associated with natural gas. Natural gas is the cleanest burning fossil fuel, with less than half of the carbon content of coal and about two-thirds that of oil, providing a low carbon emission option.[1] Natural gas generating facilities also provide fast-ramping and adaptable energy sources that are well-suited to meeting electrical demand changes.

[1] Energy Information Agency, U.S. Dep't of Energy, *Natural Gas: Issue and Trends*, 49-53 (1998) (available at: http: //www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/natural_gas_1998_issues_and_trends/it98.html).

For this reason, natural gas is an excellent source of firming power for renewable energy sources such as wind and solar that produce power only on an intermittent basis.

Natural gas supplies are also secure. The United States currently imports the majority of the oil it uses. By comparison, natural gas is a domestically stable source of energy, with 81% of gas coming from within the United States, and an additional 18% coming from Canada. The majority of natural gas resources are produced by the roughly 5,000 independent producers who develop virtually all domestic onshore gas.[2]

Finally, natural gas is abundant. In response to growing worldwide demand for natural gas, companies have invested substantial sums to develop unconventional gas sources. This investment in technology has allowed access to, and economic production of, a vastly greater resource base. As discussed below, improved hydraulic fracturing techniques and greatly improved horizontal drilling have allowed tight, geographically diffuse reserves to be developed in large volumes.[3]

The potential supply of natural gas from these sources is immense. A recent study performed by Navigant Consulting, Inc. (see attached) concluded that most public sources of natural gas supply information – and in particular the U.S. Energy Information Administration (EIA) – have substantially understated the contribution and potential of unconventional resources because their emergence has been too rapid for the underlying models to capture this information accurately.[4] EIA forecasts of unconventional gas production in each Annual Energy Outlook from 1998 forward have been significantly outstripped by actual production.[5] In fact, production from unconventional natural gas sources has increased almost 65% over the last decade, from 5.4 trillion cubic feet (Tcf)/year in 1998 to 8.9 Tcf in 2007.[6] Unconventional production constituted 47% of total U.S. natural gas production in 2007, as compared to only 28% in 1998.[7]

A conservative estimate of the total U.S. domestic proved reserves and ultimately recoverable domestic resource base, adjusted from a 2006 Potential Gas Committee (PGS) study, is 1,680 Tcf, or approximately 88 years of U.S. production at 2007 production levels.[8] When estimates of available reserves from gas shales alone are added to this figure, total reserve amounts increase to more than 2,247 Tcf, or 118 years at 2007 production levels.[9] This is because there are at least 21 shale basins located in over 20 states in the U.S.[10] Currently, producing areas include Antrim, Barnett, Devonian, Fayetteville and Woodford, and emerging plans include Haynesville and Marcellus.[11] Production from just these "big seven" shale plays are expected to reach a range of

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[2] Multi-national oil and gas companies produce almost exclusively offshore. Independent Petroleum Association of America, The Costs of Oil & Natural Gas, http://www.ipaa.org/news/oil_gas_prices/.
[3] North American Natural Gas Supply Assessment, Navigant Consulting, Inc. (the "July 2008 Navigant Study") (July 4, 2008) at 10 (available at www.cleanskies.org and attached hereto).
[4] *See generally* July 2008 Navigant Study
[5] *Id.* at 5.
[6] *Id.* at 8.
[7] *Id.*
[8] *Id.* at 14
[9] *Id.*
[10] *Id.* at 12.
[11] *Id.*

27 to 39 Bcf/day over the next 10 to 15 years.[12] And as extraction technology further develops, shale gas and other unconventional gas sources will constitute an even more important component of the U.S. gas supply.

II. The Changes in the Proposed Rule Support the Development of Unconventional Gas Sources.

While the potential supply for unconventional sources of natural gas is enormous, companies are not currently allowed to account for these unconventional sources when reporting their reserves, as the SEC's Proposed Rule recognizes. Indeed, unconventional natural gas sources – including tight sands gas, shale gas, and coalbed methane – are excluded from the SEC's current definition of oil and gas producing activities.[13] ACSF supports a number of the changes outlined in the Proposed Rule because they, in combination, allow companies to include estimates of unconventional natural gas sources in their estimates of proved reserves in certain circumstances. These proposed changes are discussed below.

a. Proposed definition of "oil and gas producing activities."

First, ACSF supports the SEC's proposed revision of the definition of "oil and gas producing activities"[14] to include the extraction of non-traditional resources. Under the current rule, "oil and gas producing activities do not include . . . [t]he extraction of hydrocarbons from shale, tar sands, or coal." 17 C.F.R. 210.4-10(a)(1)(ii)(D). "Thus, regardless of a company's ability to feasibly and economically extract natural gas or oil from tar sands and oil shales, the current rules prevents the company from including these amounts in its estimates of proved reserves." 17 C.F.R. 210.4-10(a)(1)(iii)(D).

The Proposed Rule revises the current definition of "oil and gas producing activities" to include the extraction of marketable hydrocarbons, in the solid, liquid, or gaseous state, from oil sands, shale, coal beds, or other nonrenewable natural resources which can be upgraded into natural or synthetic oil or gas, and activities undertaken with a view to such extraction.[15]

ACSF supports this change. Unconventional gas sources are of tremendous importance in providing a clean, secure and abundant source of energy, as detailed above. Current technology makes these unconventional resources available and predictable. These technologies include FMI logs which allows detection of conduits of gas flow of natural fractures within rock fractures, and sophisticated petrophysical algorithms that improve estimations of gas saturations. Over time, these new tools have been redesigned to enable the sensors to operate in deeper, hotter and higher pressure environments. Additionally, three dimensional seismic attributes, also known as "bright spot" technology, has dramatically improved the identification of pockets of trapped gas. Unconventional gas detection and extraction has also benefited from improved wireline log suites, high strength proppants used in fracture stimulations, and corrosion resistant alloys for wellbore tubulars. Finally, the development of shale gas resources has been propelled

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[12] *Id.* at 15.
[13] 17 C.F.R. 210.4(a)(1)(ii)(D).
[14] Proposed Rule 4-10(a)(16).
[15] Proposed Rule 4-10(a)(16)(i)(D).

by the development of horizontal wells and multiple, large, slick water fracture stimulation treatments that minimize formation damage.

All of these technological advances make reporting of unconventional resources not only feasible and accurate, but also necessary to fully reflect natural gas potential in the United States. ACSF supports the SEC's efforts in the Proposed Rule to recognize these previously unreported resources.

b. Proposed definition of "proved developed oil and gas reserves."

ACSF also supports the SEC's proposed changes to current definitions related to what may constitute a "proved oil and gas reserves." Proved reserves are currently defined as reserves that are "the estimated quantities of crude oil, natural gas, and natural gas liquids which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions." 17 C.F.R. 210.4-10(a)(2). The SEC proposes a number of changes, all of which are aimed at broadening the technologies which may be used to established proved reserves.

First, while the current rule relies primarily upon actual production of flow tests to meet the "reasonable certainty" standard, the new definition of "reliable technology" in the Proposed Rule permits broader use of new technologies to establish the proper classification for reserves, so long as these technologies are: (1) "widely accepted within the oil and gas industry," (2) have been field tested, and (3) have "demonstrated consistency and repeatability in the formation being evaluated or in an analogous formation."[16] Additionally, the Proposed Rule expands the definition of "proved developed oil and gas reserves" to include extraction of resources using technologies other than wellbores "through installed extraction technology operational at the time of the reserves estimate."[17]

ACSF supports each of these proposed changes. Broadening the technologies that may meet the "reasonable certainty" standard is essential given the rapid evolution of technologies used to explore for and extract unconventional gas resources.

ACSF also believes the SEC should permit the use of technologies that do not provide direct information on fluid contacts to establish reservoir fluid contacts, provided that such technology meets the definition of "reliable technology" as proposed. Unconventional gas resources are held in shales, sandstones, and coals by stratigraphic traps with gradational boundaries, rather than in structurally defined reservoirs with distinct fluid contacts. It has been repeatedly proven that establishing the boundaries of commercially-recoverable unconventional resources can be reliably accomplished by a combination of core tests, seismic, and wireline logs, as discussed above. The Proposed Rule recognizes this well-established fact.

c. Proposed definition of "proved undeveloped reserves."

The SEC proposes to amend the definition of "proved undeveloped reserves" by replacing the requirement that productivity be "certain" for reserves in drilling units beyond the immediately

[16] Proposed Rule 4-10(a)(27).
[17] *Id.*

adjacent drilling units with a "reasonably certain" requirement.[18] The proposed revisions would also permit a company to claim proved reserves in either a conventional or a continuous accumulation beyond immediately offset drilling units if the company can establish with reasonable certainty that the hydrocarbons are economically producible. The Proposed Rule also includes provisions for establishing levels of lowest known hydrocarbons through reliable technology other than well penetrations.

ACSF supports the SEC's proposed adoption of a new definition for "continuous accumulations" in the Proposed Rule that explicitly recognizes natural bitumen (oil sands), gas hydrates, and self-sourced accumulations such as coalbed methane, tight formation gas, shale gas, and oil shale deposits.[19] Shale, coal, and other unconventional reservoirs, all critical components of U.S. gas supply, are by nature continuous accumulations and would benefit from a more rigorous definition of this term. Moreover, unconventional reservoirs, such as shale, coal, and oil sands, can cover large areas and are usually not amenable to an absolute "certainty" standard.

Additionally, due to the fact that tight gas sand and gas shale reservoirs have extremely low permeability, the past SEC requirement requiring pressure communication is not practical. Permeability of unconventional reservoirs is often a thousand times lower than the permeability of conventional reservoirs. Thus, assuming other relevant properties are equal, this low permeability makes pressure communication between wells in these formations a thousand times slower. If pressure communication is observed between two wells completed in a conventional formation in a single day, pressure communication between similarly spaced wells in an unconventional formation would require a thousand days or more. For example, a test started in August 2008 could expect to see pressure communication at the offset well in May of 2011. For this reason, ACSF supports the Proposed Rule provision establishing levels of lowest known hydrocarbons through reliable technology other than well penetrations.

Lastly, the SEC seeks comments on whether it is appropriate to prohibit a company from assigning proved status to undrilled locations if the locations are not scheduled to be drilled for more than five years.[20] We strongly oppose any proposed time limitation. Limitation of proven undeveloped reserves to a five-year life, or any other specific timeframe, is entirely arbitrary and without any technical foundation. Bringing a natural gas play from concept to commercial reality often takes years to establish. And even once commercial development has been established, many gas fields take decades to completely exploit. This is especially true for unconventional resources found in continuous accumulations, like tight gas sands and shale gas, for which it take a long time to drill all the undeveloped locations. Accordingly, ACSF believes that the current proved undeveloped definitions in the Canadian Oil and Gas Evaluation Handbook (COGEH) should be utilized as an industry standard – that is, no time constraints are employed against proved undeveloped reserves.

In sum, the SEC's reserve disclosure regime is based upon technology prevalent in the industry during the late 1970s and was adequate at the time but is now outdated for assessing unconventional gas resources. ACSF applauds the SEC's Proposed Rule to reflect the significant

[18] Proposed Rule 4-10(a)(25); 73 Fed. Reg. 39535.
[19] Proposed Rule 4-10(a)(4).
[20] *See* 73 Fed. Reg. 39526, 39535.

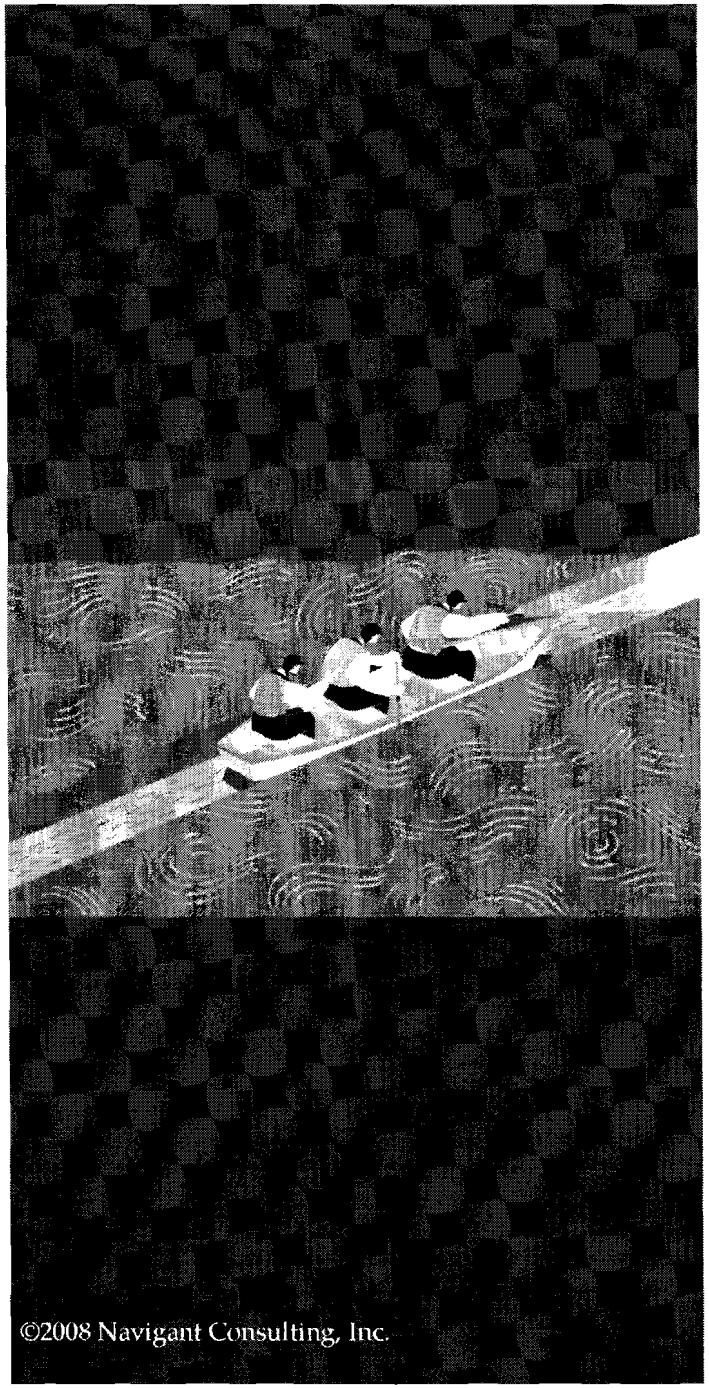
changes in the gas industry during the past 30 years, as it has endeavored to identify, quantify, and exploit unconventional natural gas sources. With these changes, companies will improve reserves reporting, particularly with respect to unconventional sources, and will provide more accurate reserves reports to the financial community and investing public.

Thank you for considering our views.

Sincerely,

Denise A. Bode

Denise Bode
Chief Executive Officer
American Clean Skies Foundation



North American Natural Gas Supply Assessment

Prepared for:
American Clean Skies Foundation

Report Date: July 4, 2008

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July 4, 2008

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1 Executive Summary

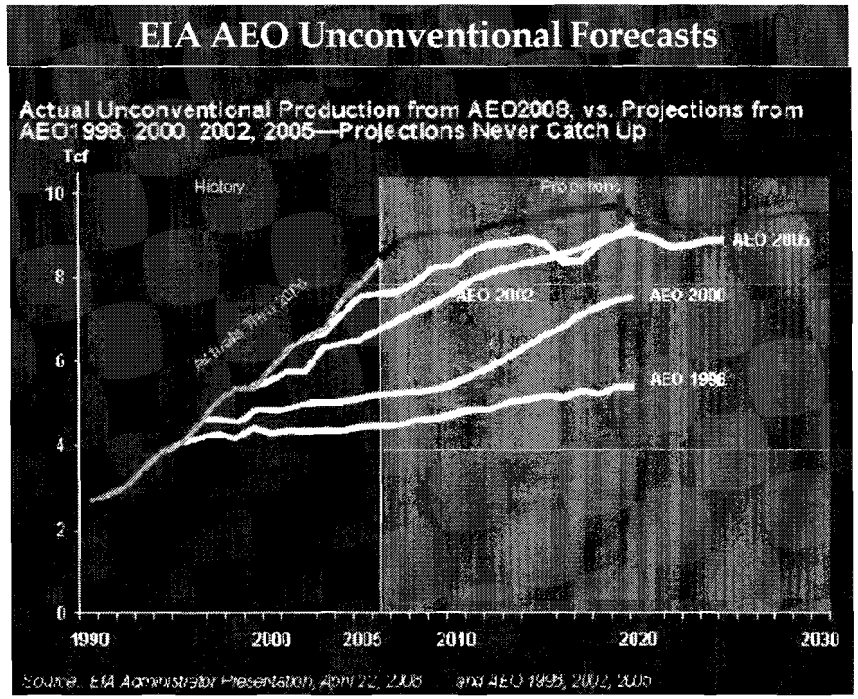
Introduction

Updating the State of North American Natural Gas Supply

- NCI was engaged to develop an accurate current assessment of North American natural gas production and recoverable reserves, with particular emphasis on the rapid, ongoing development of unconventional gas resources.
- Of the unconventional resources to be emphasized in NCI's review, shale gas is particularly important.
- Among other things, NCI was to test the premise that most public sources of gas-supply information, in particular the U.S. Energy Information Administration (EIA) have understated the contribution and potential of unconventional resources because their emergence has been too rapid for the underlying models to capture it accurately.
- This required obtaining or developing production and reserve data by basin and by type of gas on as current a basis as possible, reflecting actual conditions in the current year through the first quarter.
- Because such current data was often not directly obtainable in any organized format, NCI used a variety of approaches, including research through producer analyst presentations, reports in the trade press, and extensive direct outreach to producers and certain production-state officials.

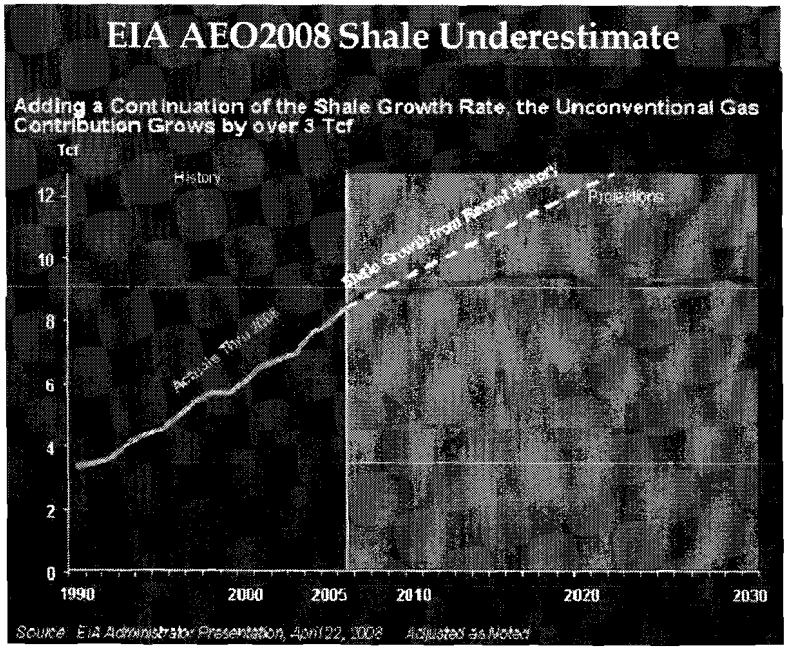
EIA Understatement of Resource Base and Development Appears Chronic

- EIA forecasts of unconventional gas production in each Annual Energy Outlook (AEO) from 1998 forward have been significantly outstripped by actual behavior.



Much of EIA's Underestimate in Recent Years is in Shale Gas

- Measuring the rapidly increasing growth in shale production, then projecting it if the resource base can support it, yields an unconventional gas contribution well in excess of EIA's most recent forecast.
- The questions to answer are :
  1) Is the rate of growth continuing; and
  2) Can the resource base support it?

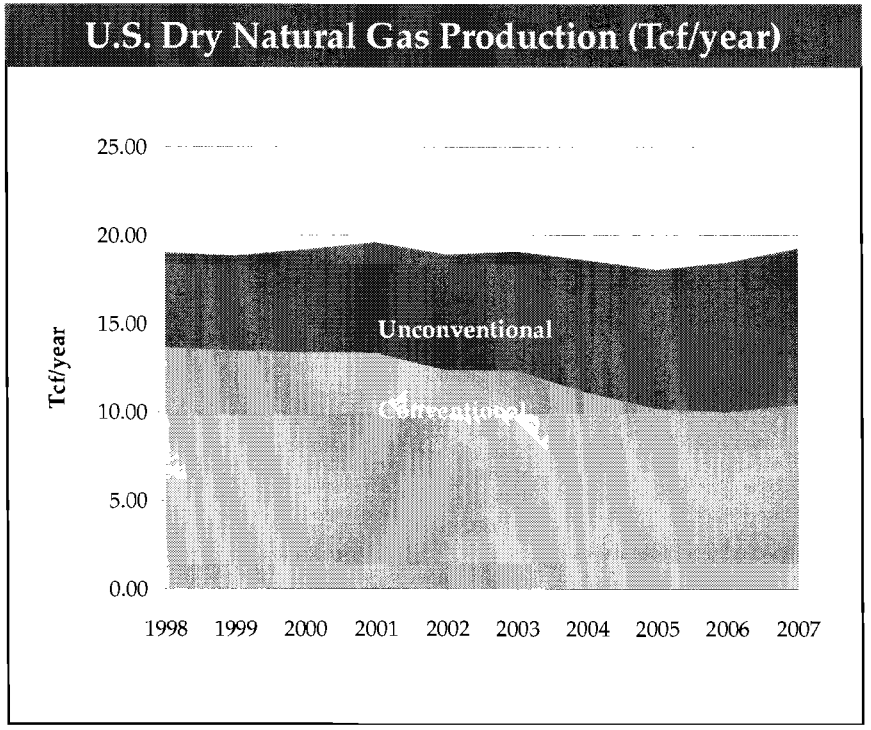


1 Executive Summary

NCI Conclusions

Production has Increased Over the Last Few Years, Largely due to a Decade of Increased Unconventional Production

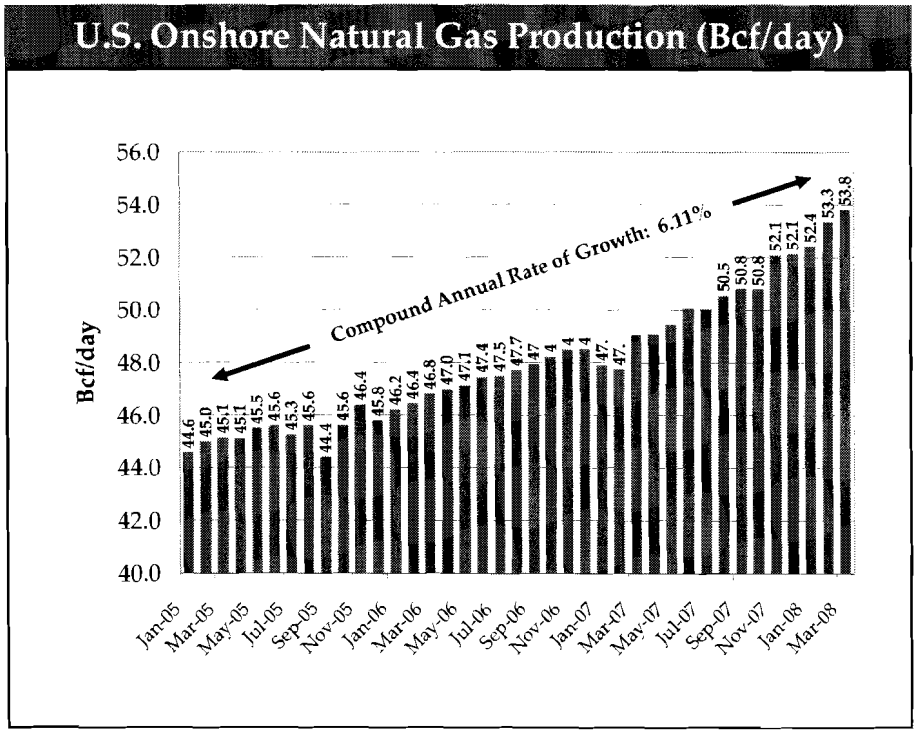
- Total U.S. production reached 19.3 Tcf/year (52.9 Bcf/day) by the end of 2007, a 4.3% increase over the 18.5 Tcf/year (50.7 Bcf/day) level at the end of 2006.
- Over the last decade, production from unconventional sources has increased almost 65%, from 5.4 Tcf/year (14.8 Bcf/day) in 1998 to 8.9 Tcf/year (24.4 Bcf/day) in 2007.
- Unconventional production has increased from 28% of total production in 1998 to 46% in 2007.



Source: EIA – Natural Gas Production Reports, EIA AEO2008 unconventional production, NCI calculations. See Appendix for supporting table.

Significant Growth in Onshore Production, Driven by Unconventional

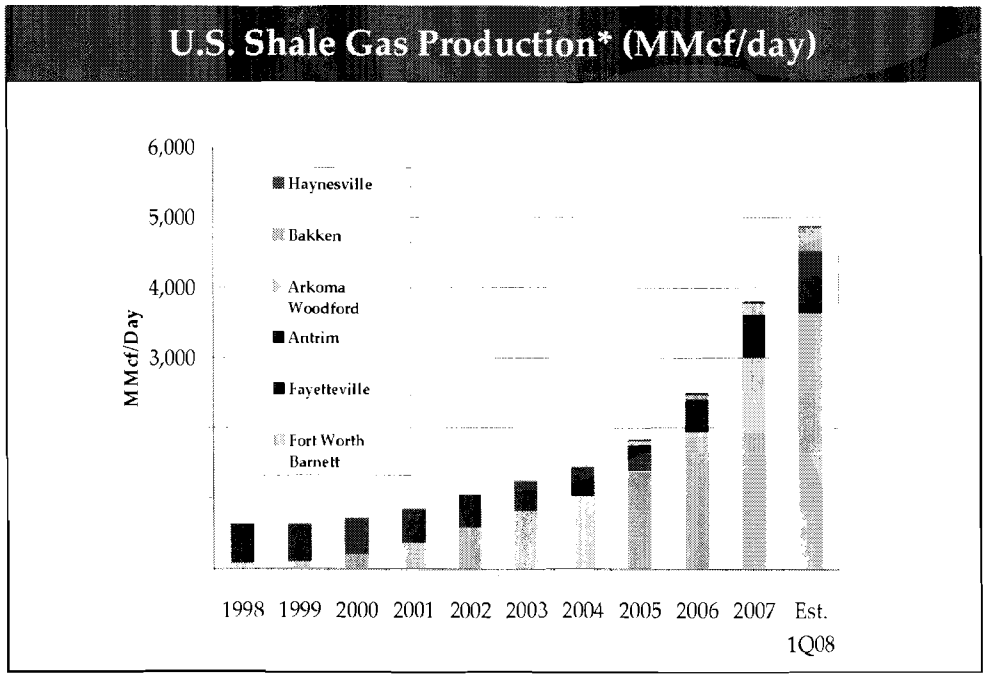
- Year-end 2007 onshore production was at 52.1 Bcf/day, up 7.4% over year-end 2006 levels of 48.5 Bcf/day, according to EIA Form 914 data.
- Average onshore production for 2007 exceeded 2006 by 5.32%.
- Conversely, EIA's 2008 Annual Energy Outlook estimates 2006 – 2007 growth of less than half that, 2.39 %.
- First quarter 2008 growth is even more pronounced, exceeding the same quarter in 2007 by 11.49%.
- This accelerating growth is consistent with the upward curve in unconventional gas production.



Source: EIA – Production Survey 914

Gas Shales have Experienced Tremendous Growth in Recent Years with Barnett Leading the way and Signs of Early Followers

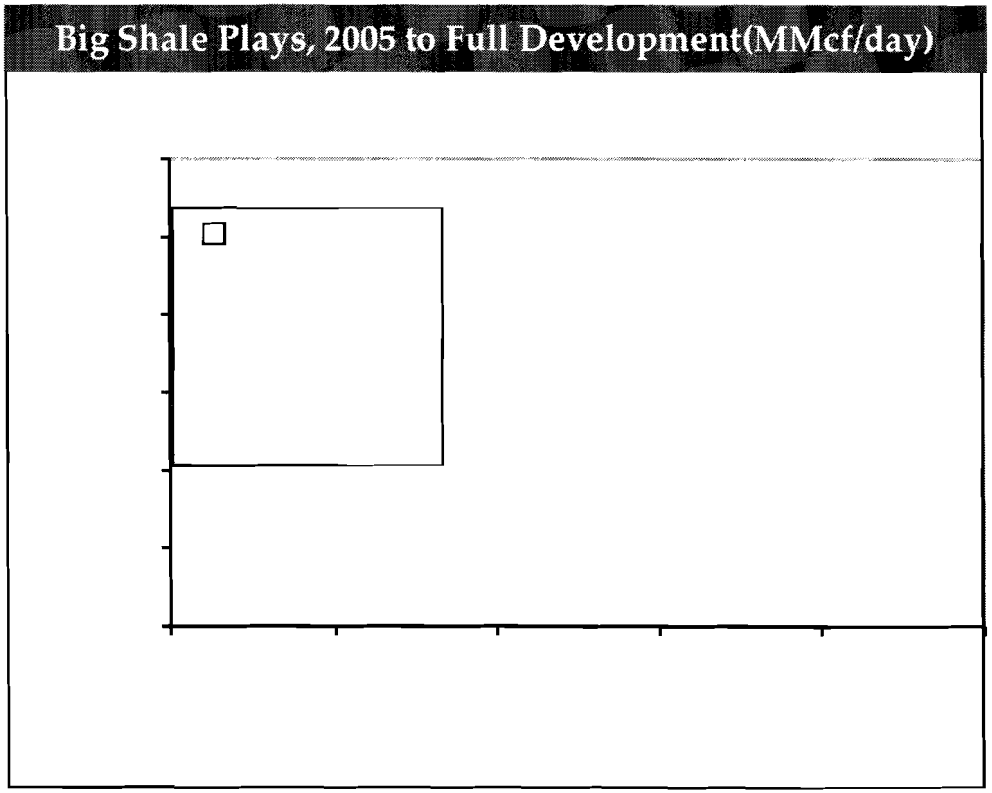
- Barnett has grown from 94 MMcf/day production levels in 1998 to 3,014 MMcf/day in 2007; an increase of more than 3000%.
- Based on NCI estimates, Fayetteville, Haynesville and Woodford are all showing similar signs of ramping production. Marcellus will be next.
- Technology has allowed access to and economic production of a vastly greater resource base. Specifically, improved hydraulic fracturing techniques and greatly improved horizontal drilling have allowed tight, geographically diffuse reserves to be developed in large volumes. Today's natural gas prices have enabled this use of enhanced technology to develop this resource.



Sources: Lippman Consulting, Inc. Production Database, Michigan Public Service Commission, Arkansas Oil and Gas Commission and NCI Calculations.

Producer Estimates Show Continuation of Accelerating Growth

- Just for the six shale plays depicted, plus Marcellus, conservative estimate of ultimate sustainable production is at least 27 Bcf per day.
- That is approximately one half of current total-U.S. Lower 48 production.
- With no adjustment, the deliverability from these seven plays would exceed 30 Bcf/day, some estimates being as high as 39 Bcf/day.
- Timing of development over the next decade will depend on rate of market growth.



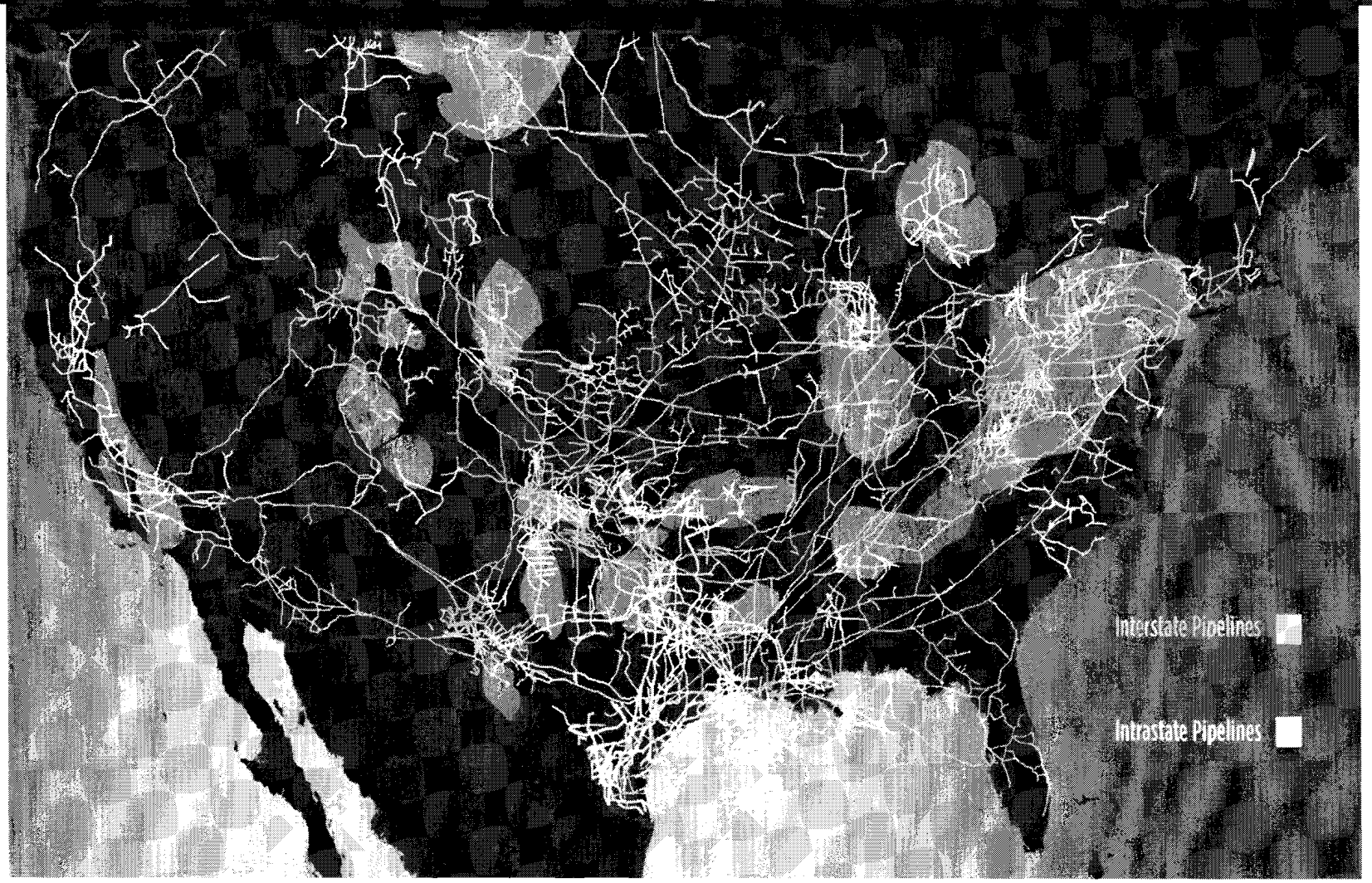
Sources: Producer interviews, analyst estimates, NCI calculations.

Major Shale Basins are Located Across the Entire U.S.

- There are at least 21 shale basins located in over 20 states in the U.S.
- Producing areas include Antrim, Barnett, Devonian, Fayetteville, and Woodford.
- Emerging plays include Haynesville and Marcellus.
- The following slides highlight these major plays:
  - Barnett
  - Fayetteville
  - Haynesville
  - Marcellus
  - Woodford

NAVIGANT CONSULTING

U.S. Natural Gas Shale Basins Align with Pipeline Grid

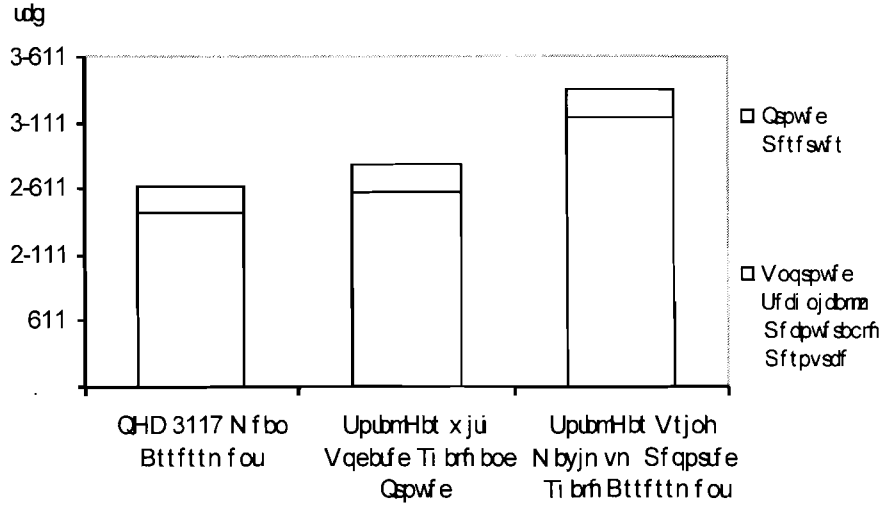


Sources: EIA, US Natural Gas Pipeline Network

Proved Reserves Plus Assessed Resources—Life of the Gas Resource

- The 2006 PGC Report's total P3 Resource estimate was reported at 1,530 Tcf, inclusive of 204 Tcf of Proved Reserves. At that year's U.S. Production Rate, this is 82 years' worth of gas supply.
- The mean NCI estimate for Shale Gas is 274 Tcf, approximately 143 Tcf higher than the Shale Gas reserves subsumed in the PGC estimate. Adjusting for this difference, and for higher proved reserves (211 Tcf) as of year-end 2007, the total resource becomes 1,680 Tcf, 88 years' worth of supply at 2007 production levels.
- The maximum reported assessment for shale, according to producer reports collected by NCI, is 842 Tcf. Using this estimate, the total would increase to 2,247 Tcf, 118 years of production at 2007 levels.

U.S. Total Gas Supply (Tcf)



NCI Conclusions

- Unconventional gas, especially shale, has ramped up sharply over the last several years, both in terms of annual production and in terms of economically recoverable reserves. The extent of this ramp-up has not been fully captured by many reserve estimators, in particular the EIA.
- Based upon producer outreach responses, just the "big seven" shale plays are expected to reach a range of 27 to 39 Bcf/day over the next 10 to 15 years, timing that coincides with opportunities for phased expansion of natural gas use.
- Higher prices have significantly expanded the economically recoverable volumes, and are continuing to do so.
- Some producers and analysts have very high estimates of the ultimate recoverable gas, well in excess of U.S. Geological Survey (USGS) or Potential Gas Committee (PGC).
- The rapid escalation of unconventional production observed historically is continuing, and the unconventional resource base appears adequate to support that escalation to allow significantly increased volumes of unconventional production to continue for decades.
- A conservative estimate of the total domestic proved reserves and ultimately recoverable domestic resource base, adjusting from the most recent PGC study, reaches 1,680 Tcf, in excess of 88 years of U.S. production at current levels.
- Estimates by producers active in developing the shale resource are much larger, reaching levels that would imply a further increase to more than 2,247 Tcf, or 118 years at current production levels— <u>This important resource is not constrained</u>.

2 Resource Base

Shale Gas Resource Assessments are Stale, Inconsistent and Incomplete

- Potential Gas Committee (PGC (2006))
  - Limited description of the geology around the shales (Thickness, Extent, TOC, Thermal Maturity, Composition) but little regarding technically recoverable gas.
  - Recognition of recent activity. Expect more complete assessment in 2008 release.
- U.S. Geological Survey (USGS)
  - Good description in various studies of the geology.
  - Updates ongoing. Many of the plays with recent activity have not been updated since 1995
    - Arkoma Basin Shales (Fayetteville, Woodford, Caney) not assessed.
    - Gulf Coast Shale (Haynesville) not assessed.
    - Appalachian Shales (Marcellus, Utica, Huron, etc.) not *recently* assessed, so estimates are low.
    - Antrim Shale assessment is smaller than PGC. PGC report identifies the additional gas as being southwest of current production.
  - What might happen? Barnett Shale assessment increased from under 6 Tcf in 2000 to almost 30 Tcf when re-assessed in 2003. Similar revisions are likely in frontier areas of exploration.
- American Association of Petroleum Geologists (AAPG)
  - Various studies of regions with shale potential. Best descriptions of geology.
  - Very little data on gas in-place or technically recoverable gas.
- Egerton (2007)
  - Focus on Marcellus. Good study that prompted much of the recent activity.

NCI Assessment Compiles Most Recent Available Data

- *NCI Technically Recoverable Gas* estimates are shown below.
- Data compiled for 22 shale plays in the U.S. Lower 48.
  - Sources for ***all*** assessed technically recoverable gas include PGC (2006), USGS (2007), Egerton (2007), AAPG studies (various years), Producer reports (2008), MMS (2006).
- Assessed technically recoverable *unconventional* gas accounts for over 60% of the onshore resource assessment, and almost half of all gas (onshore and offshore) in the Lower 48.
- Shale accounts for about 28% of the technically recoverable estimate.
  - Uncertainty of recent plays suggests this share is likely to grow.
- Reserve appreciation in existing fields is not included in the estimate below.

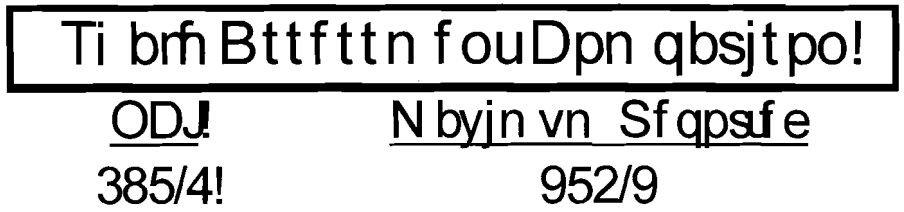
NCI Technically Recoverable Gas Assessment for the Lower 48

		q: 6	q6	Nfbo
Uplbm\/odpowf oujpobr		3: 2/46	7: 5/77	58: /: 4
Uplbm\Ti brfh		275/6	4: 5/9	385/4
Uplbm\Ujhi uHbt		83/8	272/3	228/5
Uplbm\DCN		65/2	249/8	99/4
UplbmDpowf oujpobr		223/94	462/13	3: 4/73
UplbmPggt i psf M59		357/53	44: /77	398/93
M59 Pggt i psf Bddf t t jcrfh		2: 9/24	336/63	321/65
M59 Pggt i psf Op Bddf t t		59/3:	225/25	88/39
Uplbr				: 95/1:

Note: Total does not include "L48 Offshore No Access"

NCI also Collected Producer Assessments

- According to producer reports, estimates of *technically recoverable gas* are substantially higher than those available from public sources.



- Some of the differences are in plays that have been very recently assessed.
- Biggest differences in the Marcellus and Haynesville Shales (see next slide).
  - Producer reports indicate a difference of more than 600% in these two plays, totaling 228 Tcf in Marcellus and 217 Tcf in Haynesville. This makes up almost all of the difference between the NCI Assessment and the Maximum reported.
- The maximum reported gas in-place estimate is over 4,000 Tcf (see next slide). This indicates tremendous potential upside for improvement in recovery technologies.

NCI Collected Producer Assessments by Play

Ti brfh Qrbz	Cbtjo	Ufdi ojdbmz sfqpwfsbcrfh hbt		Hbt Jo. Qrbdf
		ODJ Nfbo	Nbyjn vn Sfqpsufe	Nbyjn vn Sfqpsufe
Bousjn	Njdi jhbo Cbtjo	24/3	31/1	87/1
Efwpojbo-xi jdi jodueft;	Bqqbrbdi jbo Cbtjo	7: /7	422/9	2855/2
Nbsfmnt	Bqqbrbdi jbo Cbtjo	45/3	373/1	2611/1
Ofx Bnboz	Jnjopjt Cbtjo	4/9	2: /3	271/1
GrpzeDi bubopphb	Crbdl X bssjps Cbtjo	3/2	5/6	33/6
I bzoftwjnfh	HvrgDpbtuPoti psf	45/1	362/1	828/1
Gbzfufwjnfh	Bsl pn b Cbtjo	37/1	52/7	63/1
X ppegpse Bsl pn b	Bsl pn b Cbtjo	9/1	22/5	34/1
Dbofz boe X ppegpse	Bsl pn b Cbtjo	Op Ebub		
X ppegpse Bsen psf	Bsen psf Cbtjo	5/3	7/1	89/1
Cbsofuu	GpsuX psui Cbtjo	37/3	55/1	279/1
Cbsofuuboe X ppegpse	Qfsnjbo Cbtjo	46/5	64/1	375/:
Qbnp Evsp	Qbnp Evsp Cbtjo	5/8	9/4	52/8
Mfxjt	Tbo Kvbo Cbtjo	21/3	23/4	72/5
Dbof Dsffl	Qbsbepy Cbtjo	Op Ebub		
Fydfnp0N vnz	Difspl ff Qbugpsn	Op Ebub		
Cbl l fo	X jnjtupo Cbtjo	2/9	4/1	26/2
Hbn n po	X jnjtupo Cbtjo	Op Ebub		
Ojpcsbsb)jodnfX bufocvsh*	Efowfs Cbtjo	2/4	3/8	24/5
I jnjtbse0Cbyufs0N bodpt	TX X zpn joh	22/9	33/8	224/6
Mfxjt	TX X zpn joh	24/6	2: /8	: 9/4
N px sz	TX X zpn joh	9/6	21/7	64/2
N poufssfz0N dDnsf	Tbo Kpbr vjo Cbtjo	Op Ebub		
UpubmTi brfh Hbt Bttfttn fou		385/4	952/9	4875/8

Note: Total does not include "L48 Offshore No Access"

The PGC Gas Assessment Augmented with NCI Shale Assessments

- PGC identifies shale and tight gas as "Traditional Gas", but does identify shale potential in a few plays.
- The compiled data from all sources indicate there may be up to 842 Tcf of technically recoverable shale gas, and about 3,765 Tcf of shale gas resource in-place.
  - Thus, technology can push us toward the latter (and much higher) number.
  - The AAPG identifies recovery rates for shale at between 10% and 20% typically.
  - Producer reports tend to be the most bullish regarding gas assessments—and these same producers are committing substantial capital based on these assessments.

QHD)3117* Bttfttn fou				
	N fbo	Zfbst budvssfou qspevdujpo	N ptuMjlfm	Zfbst budvssfou qspevdujpo
UpubmDCN	277/2		268/:	
Upubm#Usbejujpobm# Hbt	: 76/7		928/2	
pgx jdi u f Ti brfi Bttfttn foujÂ	[illegible]		[illegible]	
Brbtl b	2: 4/9		254/2	
Upubm	2436/7		2229/1	
, Qspwfe Sftfswft	315/1		315/1	
UpubmHbt Sftpvsdf	263: /7	93/7	2433/1	82/5

QHD)3117* x 0ODJ Ti brfi Bttfttn fousfqrbdjoh QHD Ti brfi				
Ti brfi Bttfttn fou	385/4		385/4	
Upubm	2579/:		2372/4	
, Qspwfe Sftfswft	322/2		322/2	
UpubmHbt Sftpvsdf	2791/1	99/5	2583/5	88/6

QHD)3117* x 0ODJ bvhnfoufe cz Qspevdfs SfqpsuTi brfi Bttfttn fousfqrbdjoh QHD Ti brfi				
Ti brfi Bttfttn fou	[illegible]		[illegible]	
Upubm	3147/5		2939/9	
, Qspwfe Sftfswft	322/2		322/2	
UpubmHbt Sftpvsdf	3358/6	229/4	314: /:	218/5

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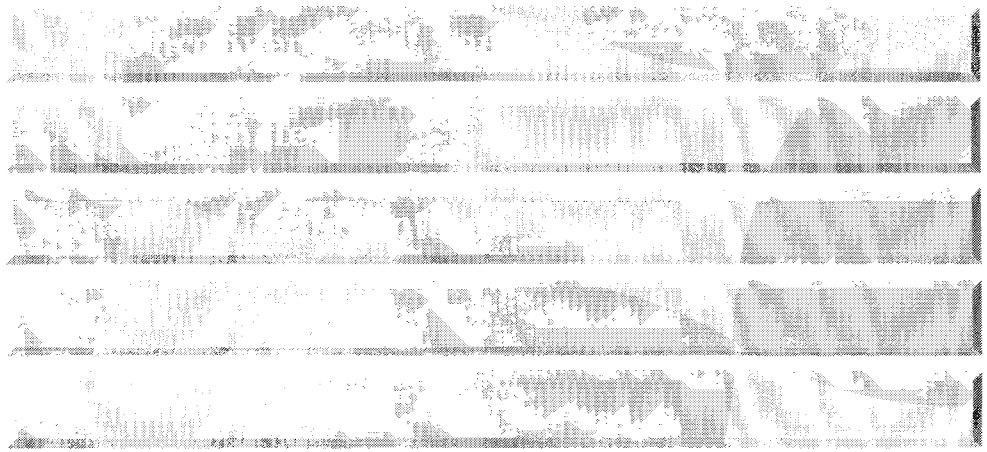
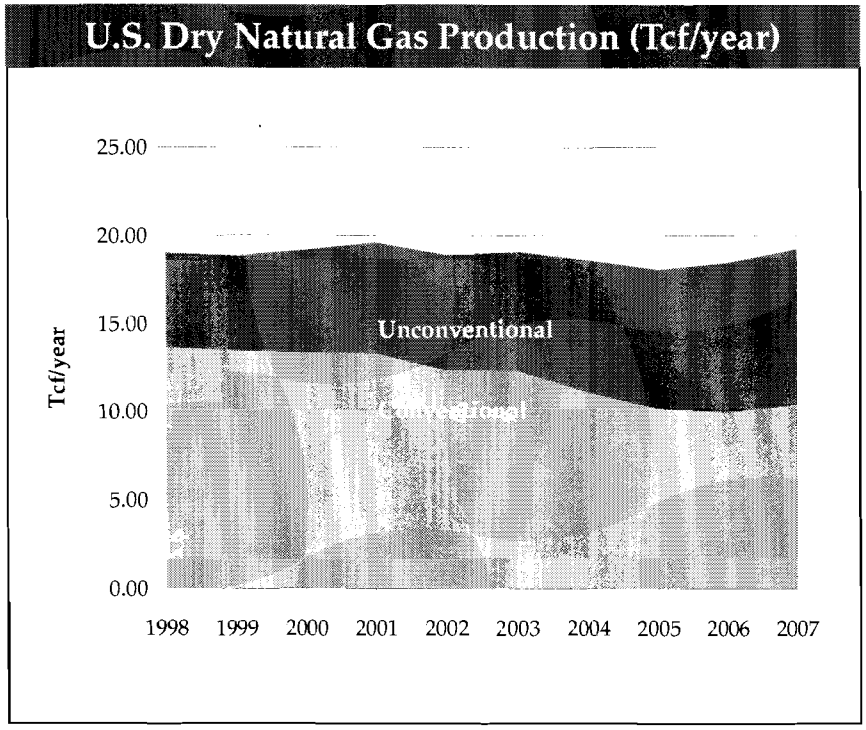
3 Natural Gas in North America

Production



Production has Increased Over the Last Few Years, Largely due to a Decade of Increased Unconventional Production

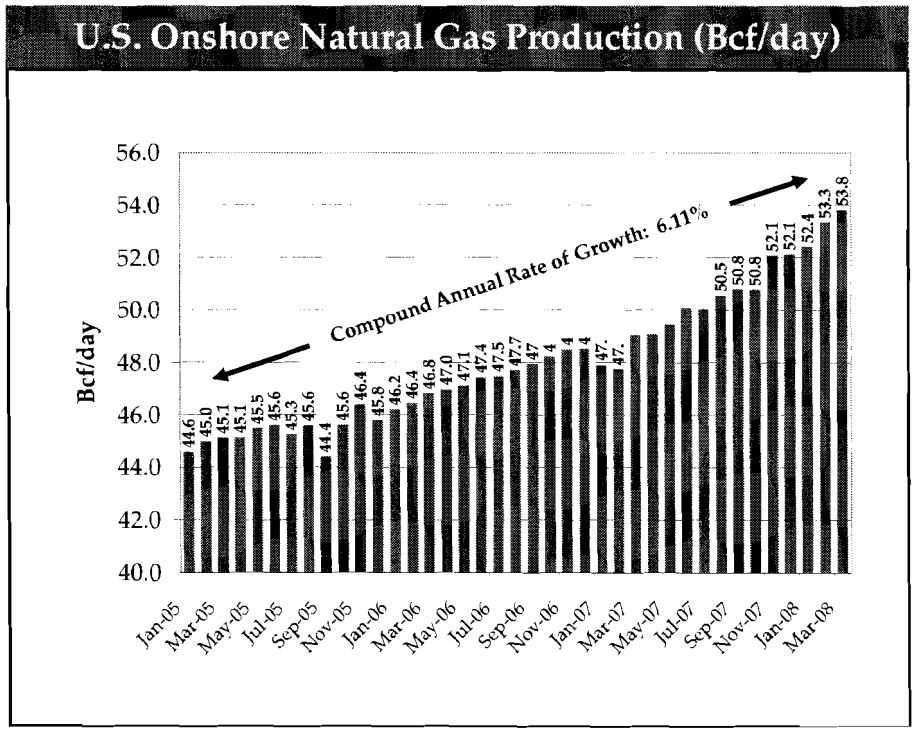
- Total U.S. production reached 19.3 Tcf/year (52.9 Bcf/day) by the end of 2007, a 4.3% increase over the 18.5 Tcf/year (50.7 Bcf/day) level at the end of 2006.
- Over the last decade, production from unconventional sources has increased almost 65%, from 5.4 Tcf/year (14.8 Bcf/day) in 1998 to 8.9 Tcf/year (24.4 Bcf/day) in 2007.
- Unconventional production has increased from 28% of total production in 1998 to 46% in 2007.



Source: EIA – Natural Gas Production Reports, EIA AEO2008 unconventional production, NCI calculations. See Appendix for supporting table.

Significant Growth in Onshore Production, Driven by Unconventional

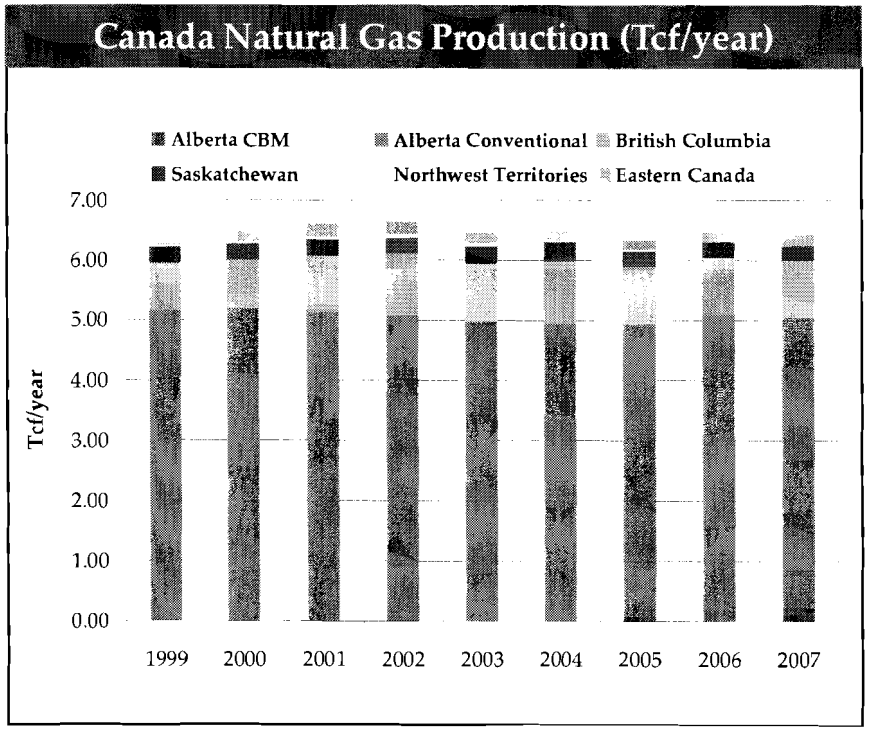
- Year-end 2007 onshore production was at 52.1 Bcf/day, up 7.4% over year-end 2006 levels of 48.5 Bcf/day, according to EIA Form 914 data.
- Average onshore production for 2007 exceeded 2006 by 5.32%.
- Conversely, EIA's 2008 AEO estimates 2006 – 2007 growth of less than half that, 2.39%.
- First quarter 2008 growth is even more pronounced, exceeding the same quarter in 2007 by 11.49%.
- This accelerating growth is consistent with the upward curve in unconventional gas production.



Source: EIA – Production Survey 914

Overall Canadian Natural Gas Production Relatively Flat over Last Decade; Production is Predominantly from Alberta

- Overall production in Canada was at 6.3 Tcf/year (17.3 bcf/day) in 2007, only slightly below the 10-year average of 6.4 Tcf/year (17.5 Bcf/day).
- Alberta is the largest producing province in Canada – marketable production of 4.8 Tcf/year (13.2 Bcf/day) accounts for 78% of Canada's total production of 6.3 Tcf/year (17.3 Bcf/day).



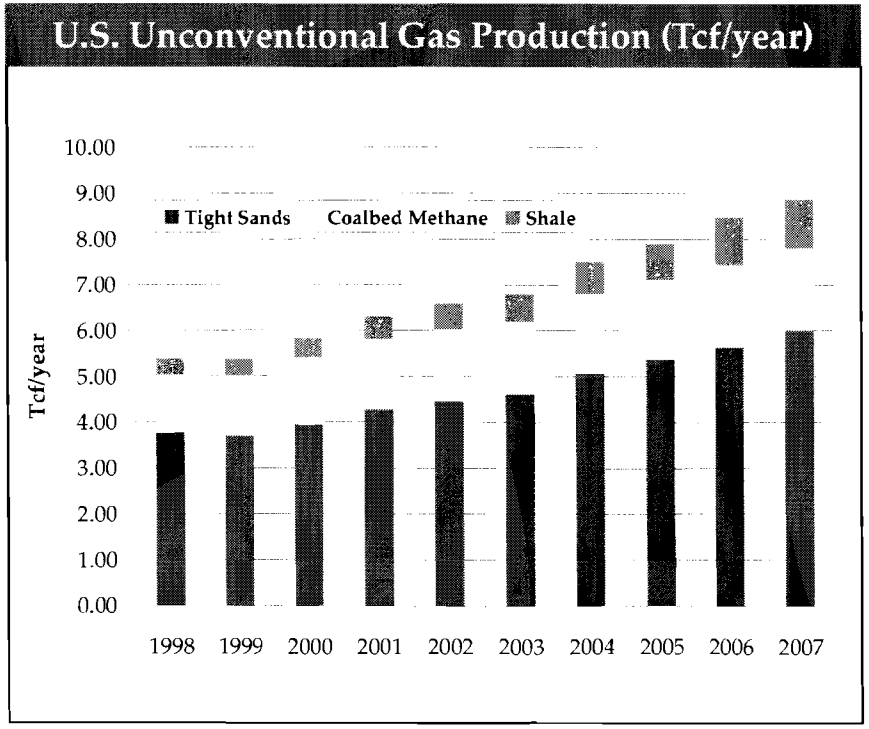
Source: NEB (Canada), Alberta ERCB, and Lippman Consulting, Inc. (LCI)
See Appendix for supporting table.

3 Natural Gas in North America

U.S. Unconventional Sources

All Three Unconventional Gas Sources have Seen Growth in the Last Decade, with Gas Shale Dominating in Terms of % Increase

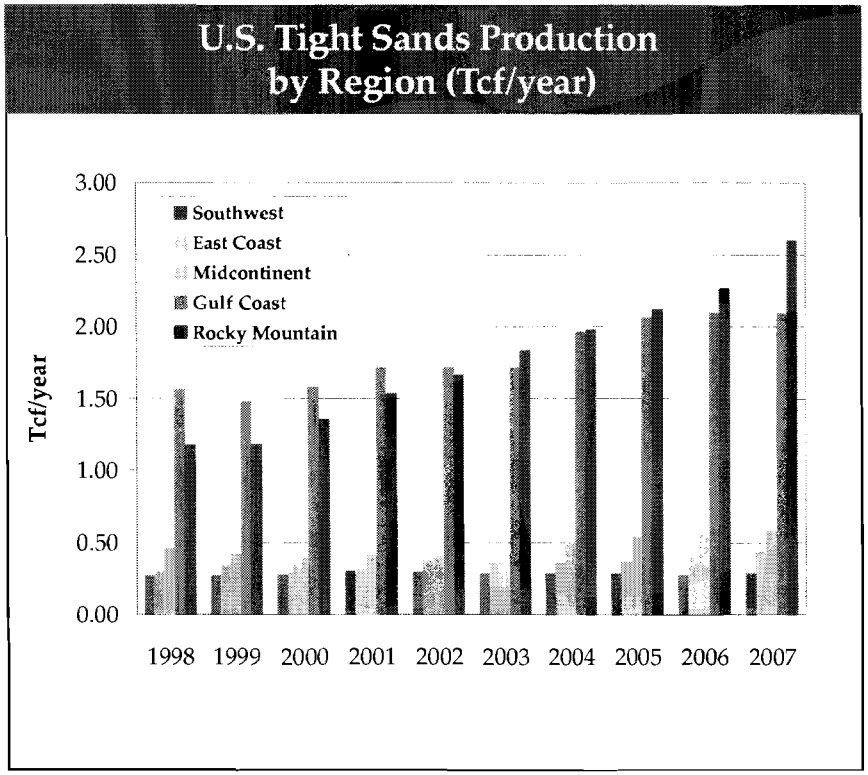
- Tight sands, coalbed methane, and shale have all seen growth in production over the last decade. While shale is still the smallest share of overall unconventional production (12% in 2007), it is undergoing the largest growth in % increase.
- Gas shales have experienced explosive growth in the last 10 years increasing from only 0.3 Tcf/year (0.8 Bcf/day) of production in 1998 to 1.05 Tcf/year (2.9 Bcf/day) in 2007, a remarkable 250% increase. This increase has resulted from a combination of technology improvements (in hydraulic fracturing and horizontal drilling) and a price environment that enables the use of those technologies.
- Tight sands production has increased from a level of 3.8 Tcf/year (10.4 Bcf/day) in 1998 to 6.0 Tcf/year (16.4 Bcf/day) in 2007, a growth of 58% over this time period.
- Coalbed methane production has also seen an increase, growing 38% over the last decade, from 1.3 Tcf/year (3.6 Bcf/day) in 1998 to 1.8 Tcf/year (4.9 Bcf/day) in 2007.



Source: EIA AEO 2008
See Appendix for supporting table.

Rockies Tight Sands Production Shows Strong Growth Over Last Decade

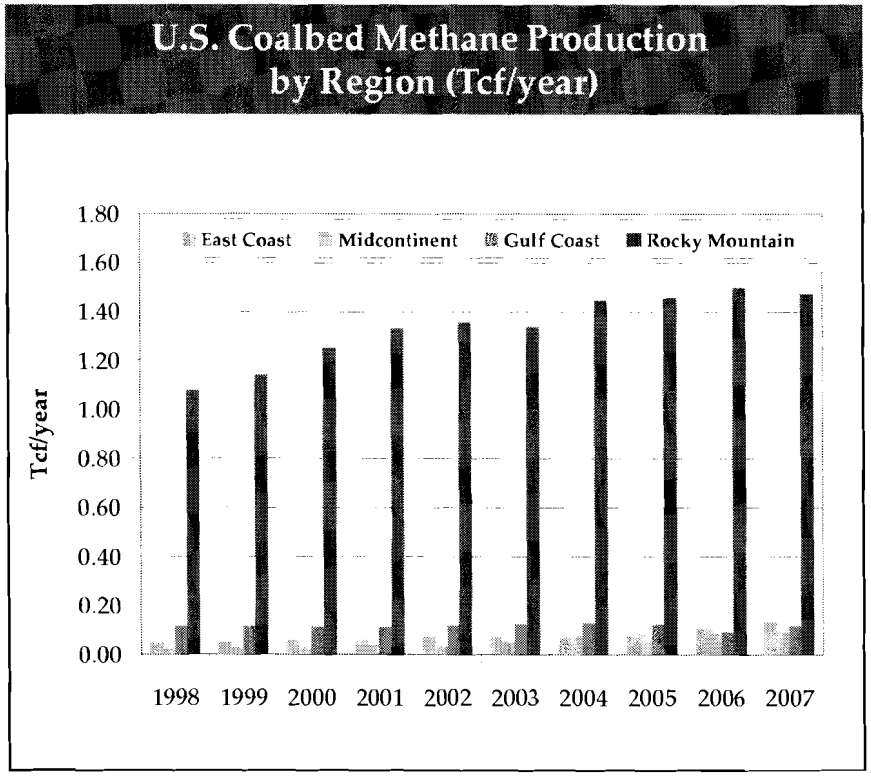
- This and the following slide focus on regional production of tight sands and coalbed methane. Regional shale production is covered in the U.S. Gas Shales section.
- Tight sands production is greatest in the Rocky Mountain region at 2.6 Tcf/year (7.1 Bcf/day) at end of year 2007. This region has also experienced the largest 10 year percent increase of 121% over 1998 production levels of 1.2 Tcf/year(3.3 Bcf/day). The increase has been driven by improved completion techniques, hydraulic fracturing, horizontal drilling, and a price environment that accommodates their use.
- Historically the highest production region, the Gulf Coast, was surpassed by the Rockies around 2004. Current production levels of 2.1 Tcf/year (5.8 Bcf/day) have been steady since 2005.



Source: EIA AEO 2008. EIA regional definitions.
See Appendix for supporting table.

Rocky Mountain Region Dominates Coalbed Methane Production

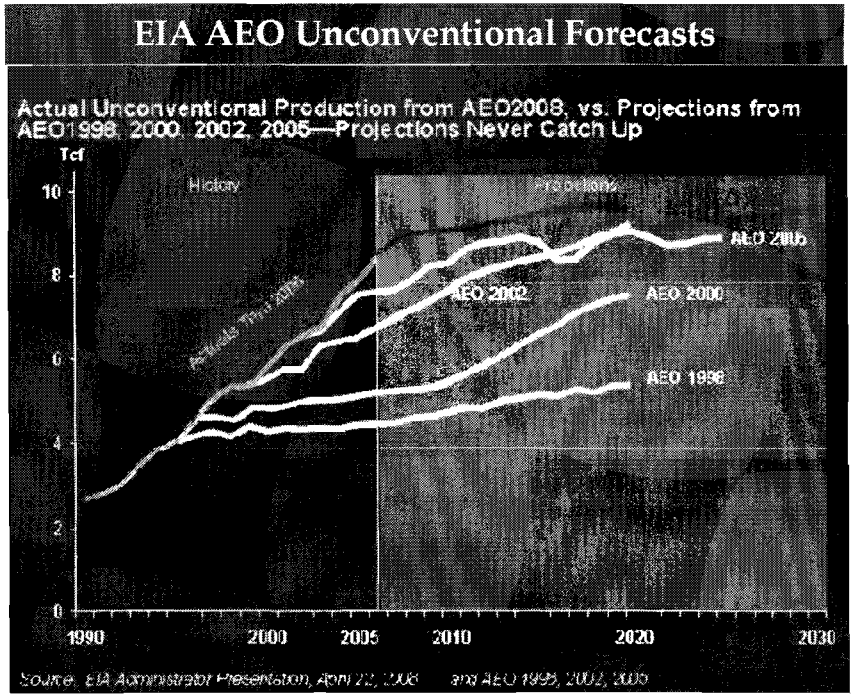
- The overwhelming majority of coalbed methane production is from the Powder River and San Juan Basins in the Rocky Mountain region; 2007 production levels of 1.5 Tcf/year (4.1 Bcf/day) represent 81% of the 1.8 Tcf/year (4.9 Bcf/day) of total coalbed methane production.



Source: EIA AEO 2008. EIA regional definitions.
See Appendix for supporting table.

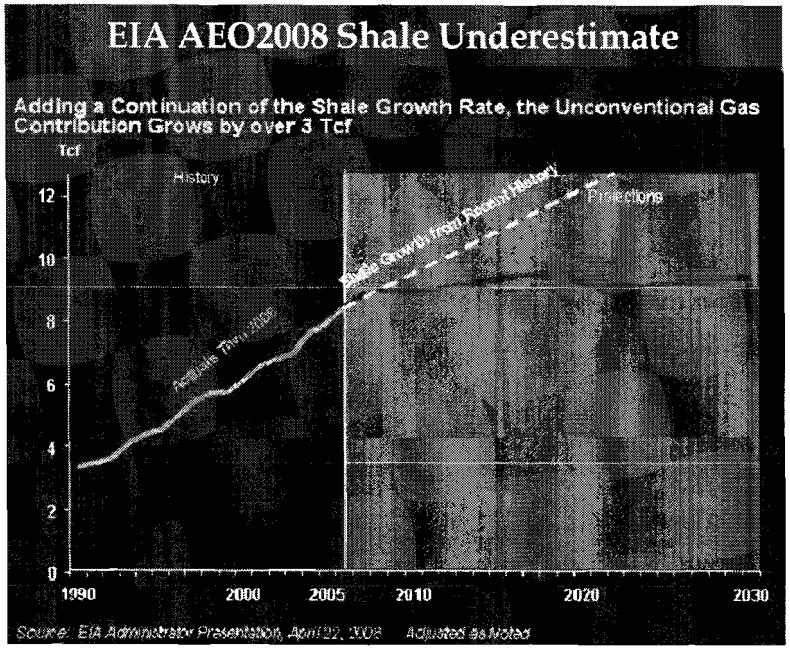
EIA Understatement of Resource Base and Development Appears Chronic

- EIA forecasts of unconventional gas production in each Annual Energy Outlook (AEO) from 1998 forward have been significantly outstripped by actual behavior.

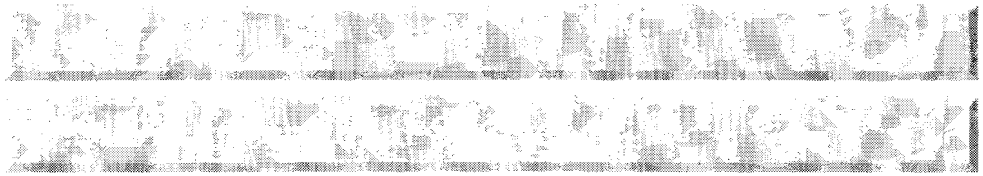


Much of EIA's Underestimate in Recent Years is in Shale Gas

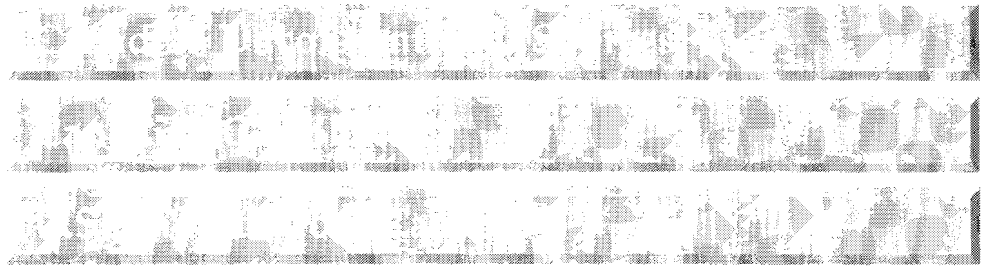
- Measuring the rapidly increasing growth in shale production, then projecting it if the resource base can support it, yields an unconventional gas contribution well in excess of EIA's most recent forecast.
- The questions to answer are :
  1) Is the rate of growth continuing, and
  2) Can the resource base support it?



3 Natural Gas in North America

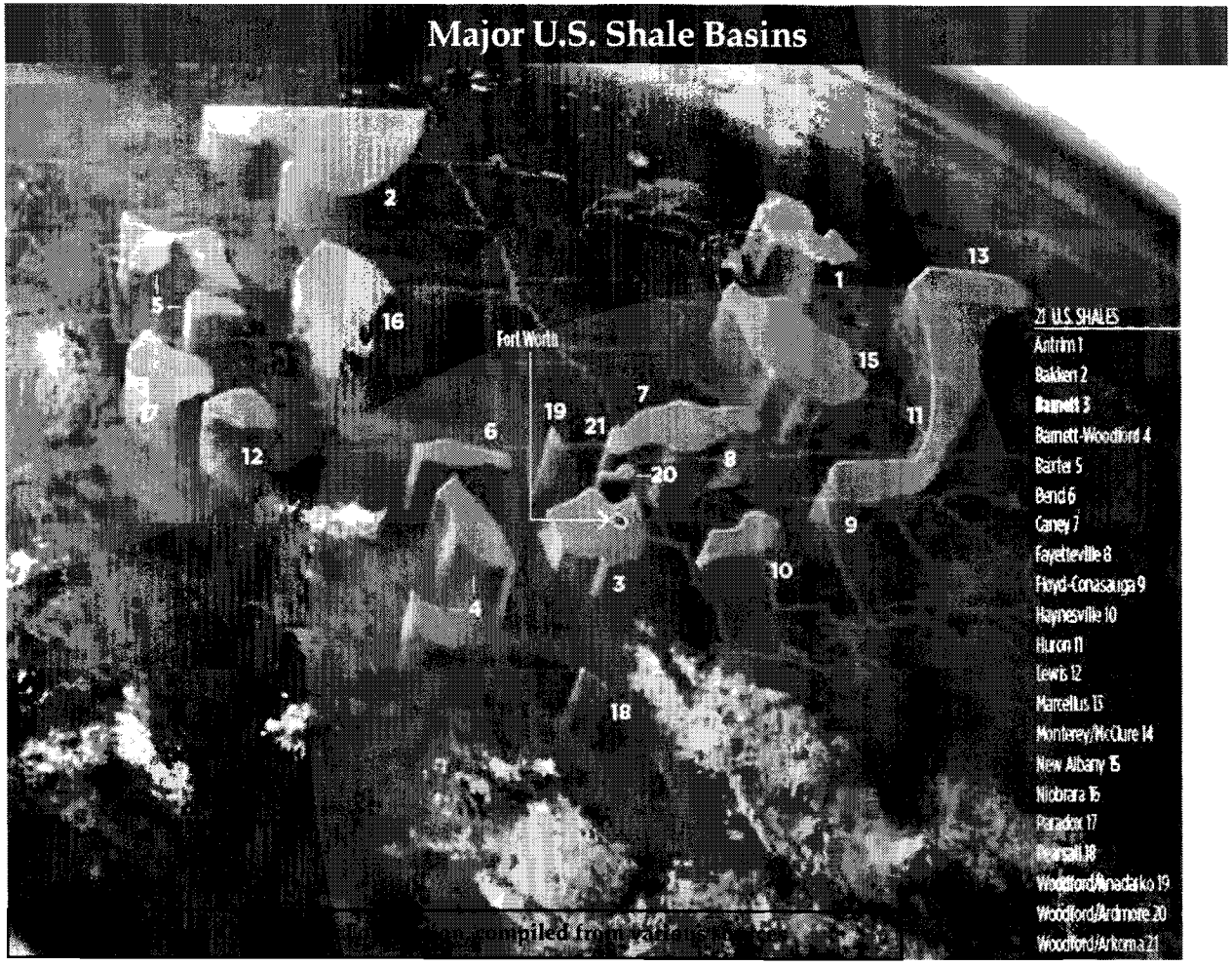


U.S. Gas Shales



Major Shale Basins are Located Across the Entire U.S.

- There are at least 21 shale basins located in over 20 states in the U.S.
- Producing areas include Antrim, Barnett, Devonian, Fayetteville, and Woodford.
- Emerging plays include Haynesville and Marcellus.
- The following slides highlight these major plays:
  - Barnett
  - Fayetteville
  - Haynesville
  - Marcellus
  - Woodford



Natural Gas in North America

U.S. Natural Gas Shale Basins Align with Pipeline Grid

Sources: EIA, US Natural Gas Pipeline Network

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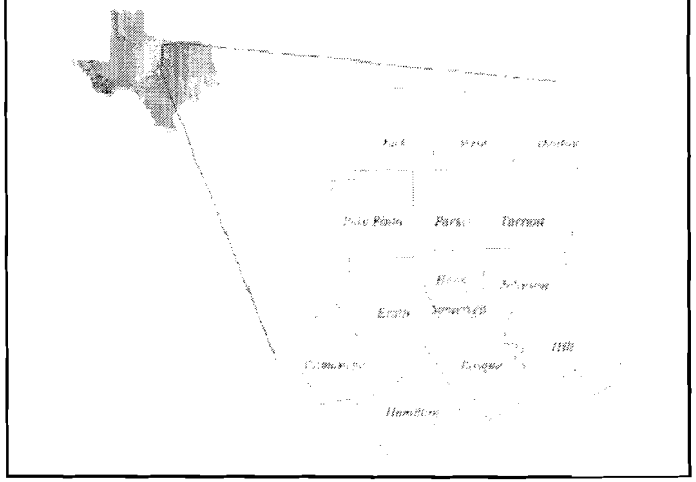
U.S. Gas Shales » Major Play Highlights » Barnett

- **Description of Play:**
  - Location – Fort Worth, Texas (north central TX).
  - Activity Level – most active shale play in U.S. by far.
- **Players:**
  - Devon, Chesapeake, XTO, EOG, Encana, Burlington Resources (now ConocoPhillips), Range Resources, Quicksilver, Carrizo, Denbury (Source: Texas RRC Top 10 Operators, 1st Quarter 2008).
- **Technically Recoverable Gas Estimate:**
  - NCI's estimate of mean technically recoverable gas is 26.2 Tcf with 'maximum reported' of 44 Tcf. Gas in place to 327 Tcf.
- **Current/Forecast Production:**
  - NCI's estimate of production for 1Q2008 is 3.6 Bcf/day and roughly 4.3% of total US total output (15% of Texas production in 2007). In a June 11 report, EIA indicated a contribution of 6% of Lower 48 production.
  - Some producer estimates for peak production to 7 Bcf/day (NCI Producer Survey).
- **Advantages/Disadvantages:**
  - Advantage – essentially known resource.
  - Disadvantage – somewhat more limited areal extent than some of the other shale plays.

Barnett Shale Counties

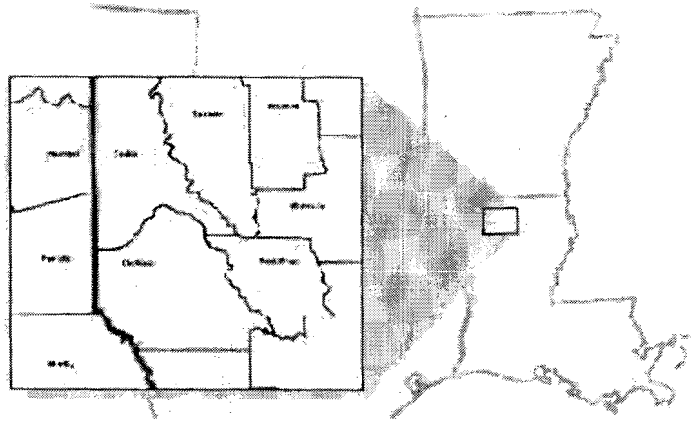


Source: Humble Geochemical, Pickering Energy Partners

U.S. Gas Shales » Major Play Highlight » Haynesville

- **Description of Play:**
  - Very large area in Northern Louisiana, accessible to the diverse network of major interstate pipelines to the Northeast and Southeast.
  - "This is the real deal. We've touched base with every public and private player we know and truly believe this play is indeed the next big thing (CHK is allowed a great big 'I told you so' on its next conference call). Recent weeks have shown Haynesville mania in full force." (Source: Tudor Pickering Holt Energy Daily Investor Newsletter, June 11, 2008)
- **Players:**
  - Chesapeake, Encana, Shell, Petrohawk, Plains, Goodrich, EXCO, Devon, XTO.
- **Technically Recoverable Gas Estimate:**
  - NCI's estimate of mean technically recoverable gas is 34 Tcf, approximately 30% larger than Barnett's mean estimate of 26 Tcf. Producer max. reported 251 Tcf Max. gas in place to 717 Tcf.
- **Current/Forecast Production:**
  - NCI's estimate of production for 1Q2008 is 25 MMcf/day, with producer estimates that this will increase to 100 MMcf/day by year-end.
  - On June 27, Petrohawk reported a new well producing 16.8 MMcf/day
  - Some producer estimates are as high as a peak of 10 Bcf/day (NCI Producer Survey).
- **Advantages/Disadvantages:**
  - Advantage – good location for infrastructure.
  - Disadvantage – development is in early stages.

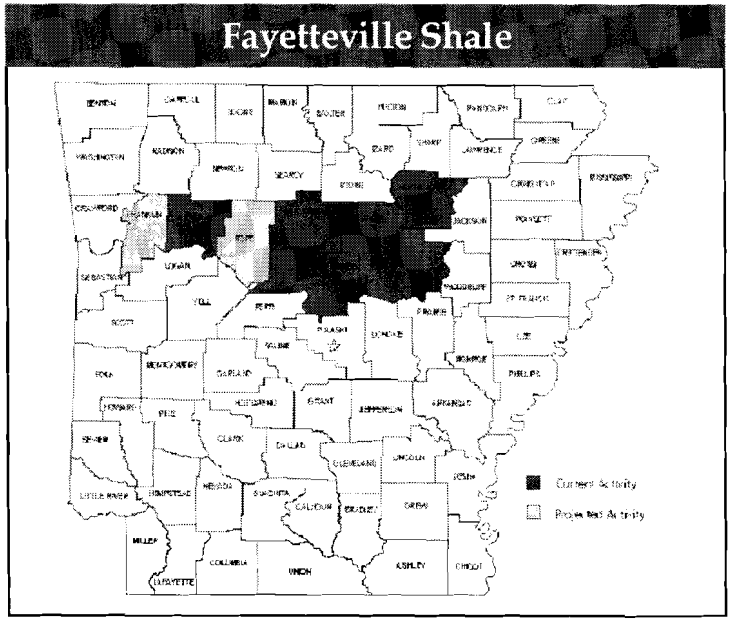
Haynesville Shale



Source: Petrohawk Presentation, RBC Capital Markets Energy Conference, June 2008

U.S. Gas Shales » Major Play Highlight » Fayetteville

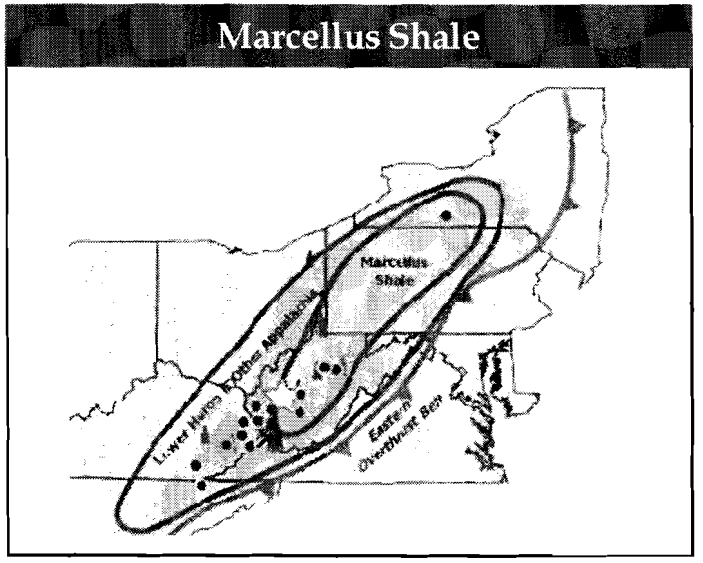
- **Description of Play:**
  - Fayetteville is located on the Arkansas side of the Arkoma Basin, ranging in thickness from 50 to 550 feet and ranging in depth from 1,500 to 6,500 feet. (Source: Southwestern Energy website)
- **Players:**
  - Southwestern Energy and Chesapeake are the largest producers in this play, with 400 MMcf/day and 130 MMcf/day respectively of production in 1Q08 (Source: Southwestern Energy website and NCI Producer Survey)
- **Technically Recoverable Gas Estimate:**
  - NCI's estimate of mean technically recoverable gas is 26.0 Tcf, approximately the same as Barnett's mean estimate of 26.2 Tcf. Max. recoverable to 41.6 Tcf.
- **Current/Forecast Production:**
  - Average production for 1Q08 is 517 MMcf/day (Source: Arkansas Oil and Gas Commission).
  - Producer forecast peak production to 6 Bcf/day (NCI Producer Survey).
- **Advantages/Disadvantages:**
  - Advantage – 'friendly' gas producing area.
  - Disadvantage – structural complexity.



Source: University of Arkansas study, Projecting the Economic Impact of the Fayetteville Shale Play for 2005-2008, May 2006

U.S. Gas Shales » Major Play Highlight » Marcellus

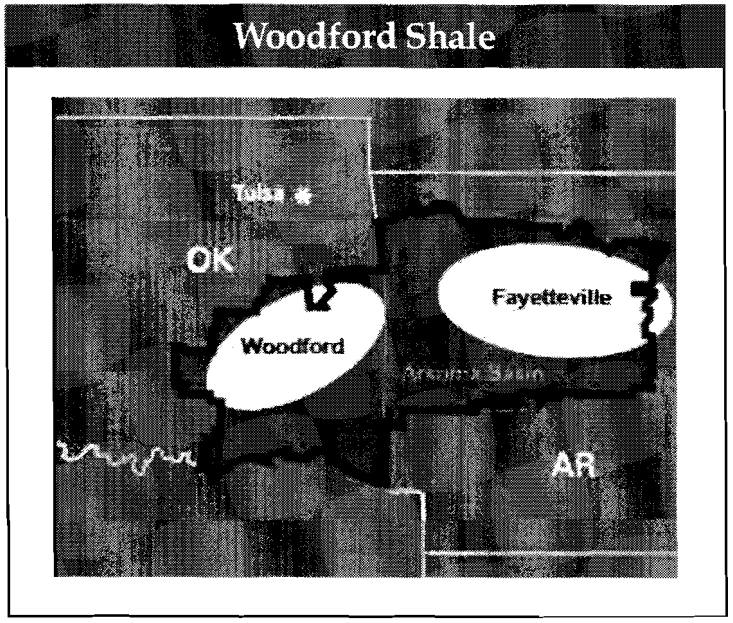
- **Description of Play:**
  - Core area runs through much of Pennsylvania and parts of West Virginia, Ohio, and New York.
  - Marcellus covers 54,000 square miles and extends over a 15-to-20 county area. This is a much larger scale geographically compared to Barnett, Fayetteville, and Woodford which all started out in a very finite, small area and expanded out.
- **Players:**
  - Chesapeake, Range Resources, EXCO, Atlas Energy Resources, Cabot, Chief, Southwestern, XTO, Anadarko, others.
- **Technically Recoverable Gas Estimate:**
  - NCI's estimate of mean technically recoverable gas is 34.2 Tcf, almost 31% higher than NCI's estimate of 26.2 Tcf for Barnett. Maximum recoverable to 262 Tcf with gas-in-place maximum estimates to 1,500 Tcf.
- **Advantages/ Disadvantages:**
  - Advantage - proximity to large Northeastern market (favorable basis), "super giant" area.
  - Disadvantage - lack of rigs that can drill horizontal wells, water management, non-producer area – lack of gas production experience, terrain.



Source: Chesapeake.

U.S. Gas Shales » Major Play Highlight » Woodford

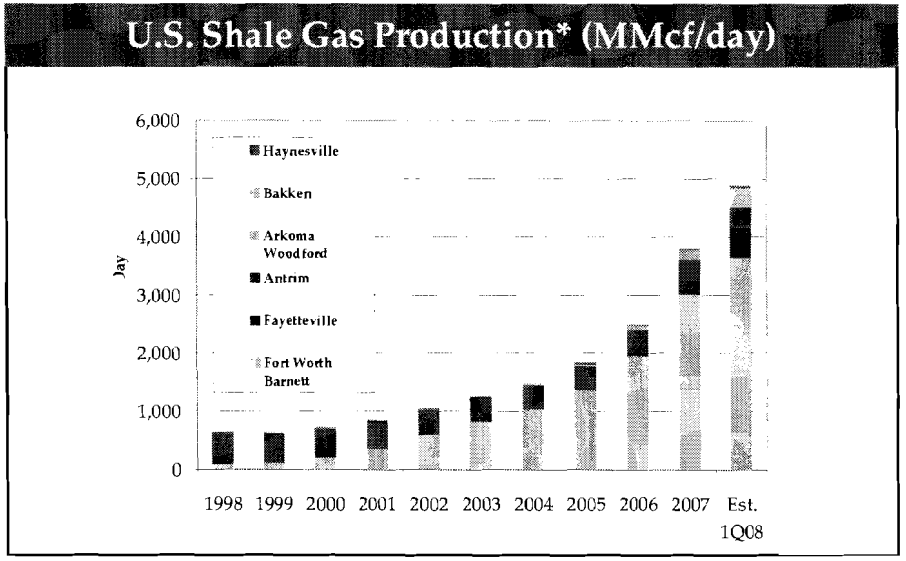
- **Description of Play:**
  - Arkoma Basin of southeastern Oklahoma.
  - Technical Info – has entered development phase for some producers, F&D costs below $2.00/Mcf for some producers.
  - Activity Level – remains high on horizontal drilling allowing increased fracture densities and higher initial and post peak production rates.
- **Players:** Newfield, Devon, Chesapeake, Continental, Pablo, St. Mary Land & Expl., XTO, Antero, BP
- **Technically Recoverable Gas Estimate:**
  - NCI's estimate of mean technically recoverable gas is 8.0 Tcf, approximately 70% smaller than Barnett's mean estimate of 26.2 Tcf. Maximum recoverable estimates to 11.4 Tcf with gas-in-place estimates to 52 Tcf.
- **Current/Forecast Production:**
  - NCI's estimate of production for 1Q2008 is 271 MMcf/day.
  - Producer estimates as high as 1.7 Bcf per day peak from field. (NCI Producer Survey)
- **Advantages/Disadvantages:**
  - Advantage – Mid-Continent location to market.
  - Disadvantage – 6,000 to 11,000 foot depth adds to drilling costs.



Source: PetroQuest

Gas Shales have Experienced Tremendous Growth in Recent Years with Barnett Leading the way and Signs of Early Followers

- Barnett has grown from 94 MMcf/day production levels in 1998 to 3,014 MMcf/day in 2007; an increase of more than 3000%.
- Based on NCI estimates, Fayetteville, Haynesville and Woodford are all showing similar signs of ramping production. Marcellus will be next.
- Technology has allowed access to and economic production of a vastly greater resource base. Specifically, improved hydraulic fracturing techniques and greatly improved horizontal drilling have allowed tight, geographically diffuse reserves to be developed in large volumes. Today's natural gas prices have enabled this use of enhanced technology to develop this resource.



Sources: Lippman Consulting, Inc. Production Database, Michigan Public Service Commission, Arkansas Oil and Gas Commission and NCI Calculations. See Appendix for supporting table.

* 1Q08 not reported yet by play but was estimated based on statistical analysis of production vs. price during the recently observed actual periods. Resulting estimates are consistent with observed growth in overall onshore gas production growth in 1Q08.

NCI Estimated Production in 1Q08 for Key Plays

Est. Shale Gas Production (MMcf/day)				
Date	**Fort Worth Barnett**	**Fayetteville**	**Haynesville**	**Arkoma Woodford**
2007	3,014	230	17	109
Est. 1Q08	3,645	517	25	271

- NCI estimated production for a number of key plays in 1Q2008 using a regression model based on the historical relationship between production and gas price (state data used for Fayetteville).
  - Barnett – LCI data through 2007, regression model 1Q08.
  - Fayetteville – LCI data through 2007, Arkansas Oil and Gas Commission 1Q08.
  - Haynesville – LCI data through 2007, NCI estimate 1Q08.
  - Woodford – LCI data through 2007, regression model 1Q08.

Current U.S. Production by Acreage from Producer Survey

- 16 respondents from NCI's producer survey provided information pertaining to current shale gas production by acreage.
- Each of these respondents provided a daily average production figure.
- A list of respondents and their respective production figures is provided on the following slide.

U.S. Gas Shales » Current U.S. Production by Acreage, *cont.*

Company	Play	Production	Units	Date of Estimate
Atlas Energy Resources	Antrim	59	MMcfe/d	5/1/2008
Bankers Petroleum	Woodford - Ardmore	6	MMcf/d	4/1/2008
Carizzo	Barnett	56	MMcfe/d	3/31/2008
Chesapeake Energy Corp	Barnett	430	MMcfe/d	3/31/08
	Caney	-	MMcfe/d	3/31/08
	Fayetteville	130	MMcfe/d	3/31/08
	Haynesville	Not Disclosed		
	Marcellus	Not Disclosed		
	New Albany	-	MMcfe/d	3/31/08
	Woodford - Ardmore	25	MMcfe/d	3/31/08
	Woodford - Arkoma	40	MMcfe/d	3/31/08
CubicEnergy	Haynesville	-		
Denbury	Barnett	47	MMcf/d	12/31/2007
Devon	Barnett	594	MMcf/d	2002 to 2007 Average
	Woodford - Caney, Arkoma, & Anadarko	27	MMcf/d	Q1 2008
DomesticEnergy	Floyd	0.2	MMcf/d	
Goodrich (GDP)	Haynesville	1	MMcf/d/Well	Q1 2008
Encana	Barnett	124	MMcf/d	FY2007
	Haynesville (Deep Bossier)	143	MMcf/d	FY2007
Marathon	Bakken	0.03	MMcf/d	Q1 2008
	Piceance	4	MMcf/d	
Newfield	Woodford - Anadarko or Arkoma	196	MMcfe/d	5/27/2008
Petrohawk	Fayetteville	43	MMcf/d	Avg through 5/15/08
Petroquest	Fayetteville	3	MMcfe/d	5/6/2008
	Woodford - Anadarko or Arkoma	19	MMcfe/d	4/2/2008
Range Resources	Barnett	90	MMcf/d	5/1/2008
	Barnett and Woodford	-		5/1/2008
	Devonian/Ohio	1	MMcf/d	5/1/2008
	Floyd	-		5/1/2008
	Marcellus	.003 to .004	MMcf/d	5/1/2008
	Woodford - Ardmore	.002 to .003	MMcf/d	5/1/2008
SouthWestern Energy	Fayetteville	400	MMcf/d	Q1 2008
StormCat	Fayetteville	3	MMcf/d	5/8/2008
Williams	Barnett	38	MMcf/d	Q1 2008
	Woodford - Arkoma	18	MMcf/d	12/31/2007
XTO	Barnett	425	MMcf/d	Q1 2008
	Fayetteville & Woodford - Arkoma	215	MMcf/d	Q1 2008

Source: NCI Producer Survey

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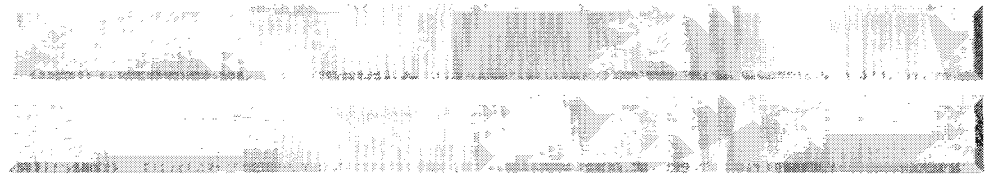
Canadian Unconventional Sources



Canadian Unconventional Gas Resources are Centered in Alberta and British Columbia; Quebec's Utica Shale Play is Embryonic

- Conventional gas accounts for most of Alberta's current production; however, CBM gas production has seen rapid growth in the past few years – growth is expected to continue.
  - Based on discussions with senior staff at the Alberta ERCB, commercial gas production from pure shale plays is non-existent.
  - Expectations for commercial shale gas production in Alberta are not nearly as high as they are in B.C., the result of significant differences in geology.
    - The Montney Play on the Alberta side of the border is 1/10 as thick as it is in B.C.
- In contrast, across the Provincial border, in B.C., almost one-third of production is unconventional, and consists of mainly tight-gas and shallow gas.
- Information on unconventional gas resources in other Provinces is limited as exploratory programs are just beginning to ramp up, i.e., Quebec.
  - This coupled with the fact that information tends to be published almost one year after data is collected by regulatory bodies, e.g., B.C. production/reserves summary for 2007 not due out until 09/2008.

Alberta's CBM Resource Potential Covers a Wide Swath of the Province; however, Commercial Production is More Narrowly Distributed

- Two plays, the Horseshoe Canyon formation and deeper Mannville Group account for much of Alberta's CBM production and reserves.
  - Deeper Mannville CBM play first saw commercial success in 2005 and is still considered an early stage play.
    - Success to date has come as a result of horizontal drilling.
- CBM reserves data, provided by the ERCB, was available through YE2007 for the past few years.
- Gas production from CBM is up a staggering 11-fold between 2004 and 2007.
- Production is forecast to reach 1.76 Bcf/d by 2017, a CAGR of 10.3%.

Alberta CBM Reserves and Production

Year	Remaining Established Reserves (Bcf)	Production (MMcf/d)
2004	-	58
2005	740	233
2006	875	486
2007	864	661

Alberta CBM Resource Potential Map

Image Source: Alberta ERCB

Production in B.C. Occurs in the Northeast Corner of the Province. The Region is Part of the Western Canadian Sedimentary Basin (WCSB)

- Based on the most current data available from the B.C. Ministry of Energy, Mines and Petroleum Resources (MEMPR), production from tight gas was 340 Bcf for FY2006.
- Major tight gas plays include: Jean Marie Play – Greater Sierra; Cadomin Play – Cutbank; and, Montney Play – Dawson Creek.
- No commercial production of gas from CBM has been recorded to-date; however, 87 wells have been drilled through 04/2008.
- The most current estimates of remaining undiscovered market gas resources from the Province are current as of FY2006.

Gas Producing Regions of British Columbia

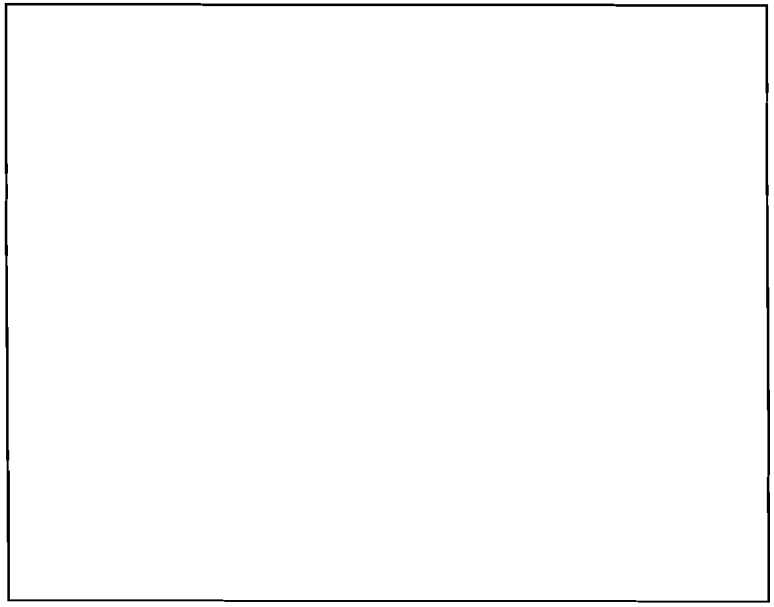
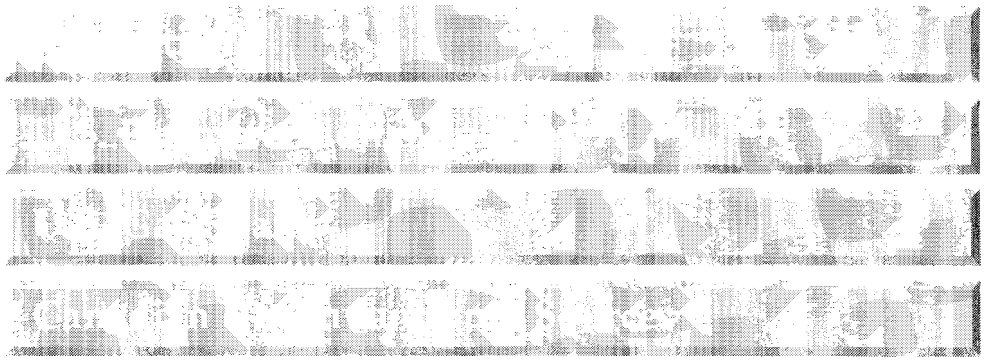


Image Source: B.C. MEMPR

Resource Potential by Type

Resource Type	Estimate (Tcf)
Offshore	2.5
Interior Basins	1
Conventional	15
Total	**43**

3 Natural Gas in North America



Canadian Gas Shales

B.C.'s More Advanced Shale Gas Plays are the Upper Montney and Horn River Plays; However, Horn River is Still an Exploratory Play

- Commercial shale gas production in the Province is still at an early stage relative to plays in the U.S. as evidenced by the lack of commercial production.
- Commercial shale gas production within the Upper Montney began in 2000-2001
  - Growth in production has been exceptional ~ 26 MMcf/d in 2005 versus > 80 MMcf/d by YE2007*.
  - Based on conversations with B.C. MEMPR staff, Horn River commercial production is still 2-5 years off.
- Encana, Apache, EOG, Devon, and Nexen are all active and have experimental schemes within the Horn River play.
- Results from experimental wells drilled within the boundaries of the Provinces' shale gas regulatory designation remain confidential for three years versus one year for normal wells.

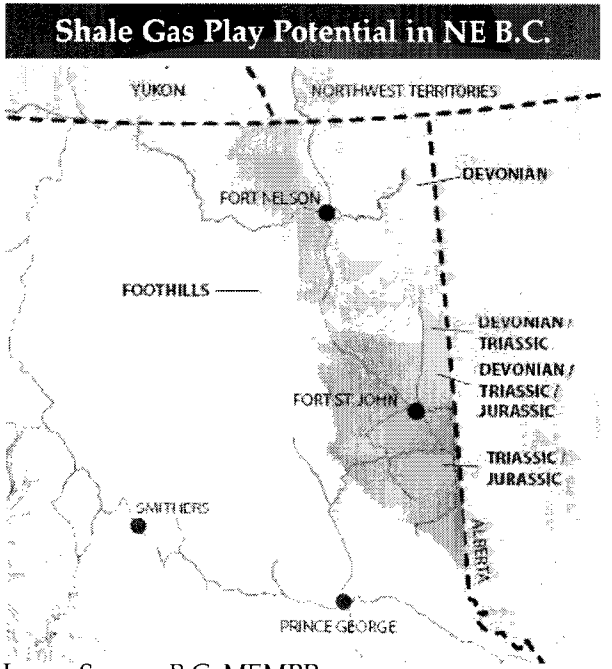


Image Source: B.C. MEMPR

*Source: B.C. MEMPR 2008 AAPG Annual Convention and Exhibition Presentation

NAVIGANT CONSULTING

Current Canadian Shale Production by Acreage from Producer Survey

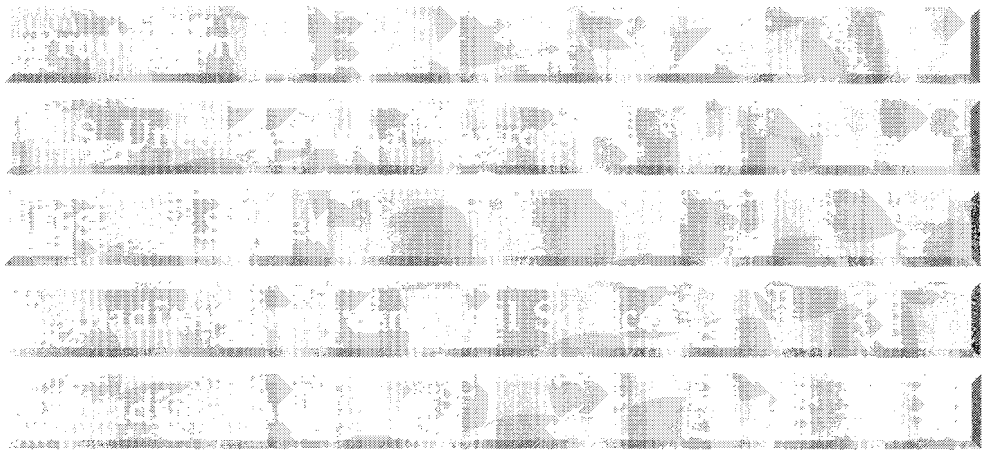
- None of the respondents were able to provide projected production by acreage for Canadian shale gas resources.

Canadian Projected Shale Production by Play from Producer Survey

- Of the 66 respondents, only one, Encana, was able to provide forecasted production estimates by play.

Company	Play	Data	Units	Date of Estimate	Comments
Encana	Montney	245	MMCf/d	Q1-2008	FY2008 forecast

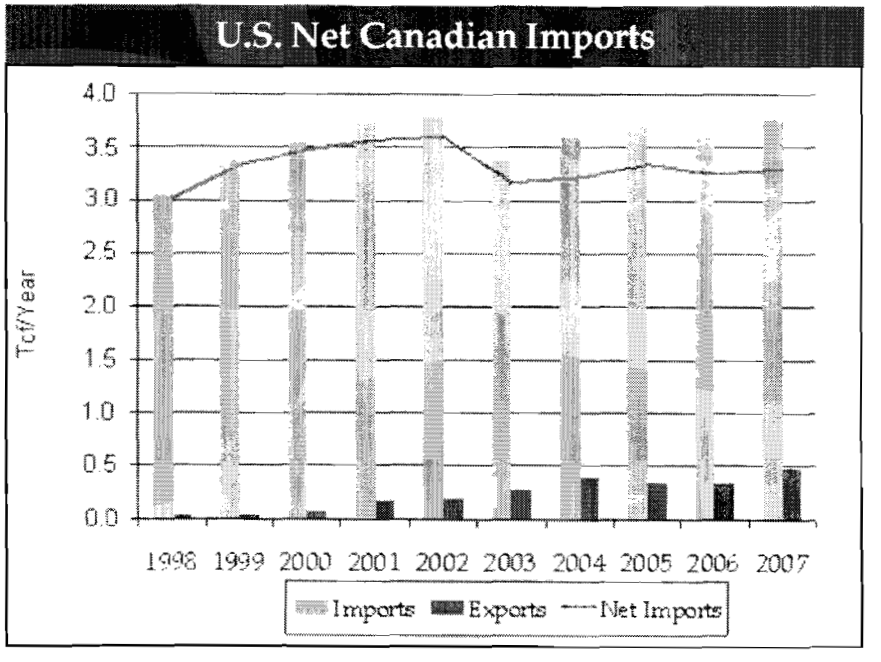
3 Natural Gas in North America



U.S. Imports from Canada

U.S. Net Imports from Canada Begin to Decline as Exports Increase

- U.S. net imports of Canadian gas have declined from a 5-year average of 3.4 Tcf/year (9.3 Bcf/day) in 1998 – 2002, to 3.3 Tcf/year (9.0 Bcf/day) in 2003 – 2007.
- This decline is largely due to an increase in pipeline exports from the U.S. to Canada.



Source: EIA. Note: EIA annual net imports differ on average by less than 1% from Canada's National Energy Board figures.

See Appendix for supporting table.

4 Technology Assessment

Technology has Aided Shale Development

- Every shale is different, so each new play has its own learning curve.
- The experience in the Barnett Shale has proved valuable in shale plays such as Woodford and Fayetteville, and may prove so in other shale plays as well.
- Shales tend to have lower recovery rates than conventional plays. Thus, future innovations could drive the technically recoverable shale gas up considerably. For example, the Marcellus Shale is estimated to have up to 516 Tcf of gas in-place (Egerton (2007)), but only yield about 10% in production. Doubling the recovery factor to 20% would substantially improve the Marcellus prospect.
- Hydraulic fracturing the shale formation is key to maintaining flow and optimizing recovery.
  - Fracing can account for up to 25% of the total development cost (Schlumberger).
  - Most shale wells are horizontal; all must be fracture treated.
  - Methods have improved substantially in the last decade. Fracs are done in sequence in order to maximize the amount of fractures for improved recovery. Commercial considerations limit the number of stages, but the more the better, generally.
  - Naturally fractured shales tend to be preferred, all else equal.
  - Much research is currently ongoing in the area of fracing. The type of fluid and proppant (the material used to hold open the fractures) are being actively researched.
- Given the amount of activity in shale and the room for technological innovation to have substantial commercial value, it is likely that new techniques will lower costs per mcf over time, just as it has with other hydrocarbons. Given the relative newness of shale development of the magnitude being seen today, we are simply lower on the learning curve, so the room to improve is likely higher.

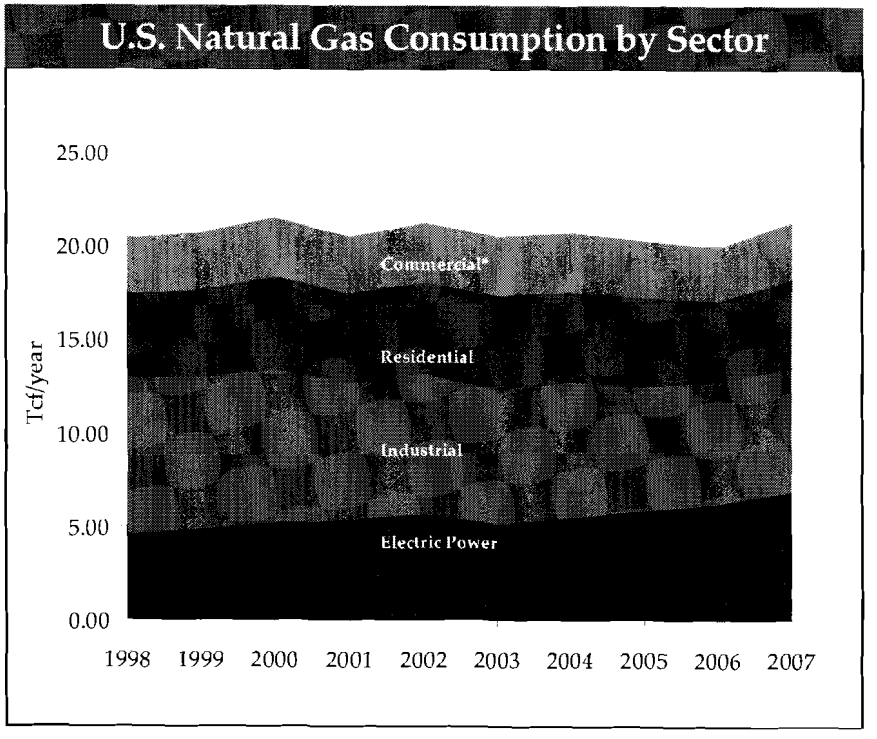
Much of the Active Shale Gas Production is Likely to be Profitable

- Bank of America (BoA) NYMEX Breakeven Analysis (2006) places the median price at $6.64/mcf for companies involved in shale developments. The lowest cost producer's breakeven is at about $4.20/mcf and the highest cost producer's breakeven is at about $11.50/mcf.
- In the current market, the majority of the active acreage holders in shale are profitable.
- The BoA data indicate the variability of costs of prospective acreage. Higher production rates per well favor the economics. The least cost producers tend to hold acreage positions with shale deposits that have some, if not all, of the following characteristics:
  - fairly thick;
  - are naturally fractured;
  - have high organic content;
  - are not characterized as clay-rich shales; and
  - are thermally mature.
- The shales that fit this criterion appear to be
  - Barnett, Woodford, Fayetteville, Haynesville, Marcellus, and Utica.
  - Geologic data indicate several others may have similar characteristics (Floyd (Black Warrior Basin), Huron (Appalachian Basin), Niobrara (Denver Basin), Lewis (San Juan Basin), and the Barnett and Woodford (Permian Basin)), but more work is underway in these areas as well as others.

5 Natural Gas Consumption

Gas-fired Electric Generation Gas Demand has been Strong Over the Last Decade

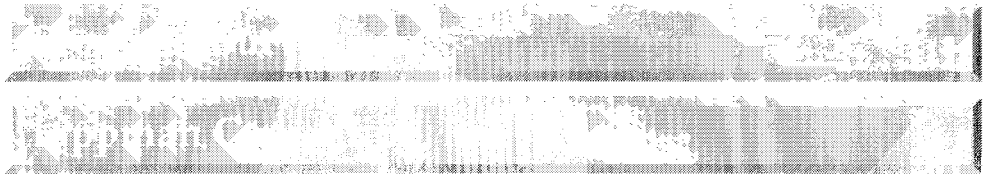
- Natural gas consumption has been relatively flat in the residential, commercial and industrial sectors.
- Gas-fired electric generation is the only sector that has experienced a significant change, with an increase of demand from 4.6 Tcf/year (12.6 Bcf/day) in 1998 to 6.9 Tcf/year (18.9 Bcf/day) in 2007 (an almost 50% increase). The 10-year average annual percentage change for this sector is 12.4%.



Source: EIA. * Commercial consumption includes Vehicle Fuel. See Appendix for supporting table.

6 Methodology

Review of Publicly Available Data



As part of its Research, NCI Reviewed these Key Studies

- PGC (2006)
- USGS
- AAPG
- Egerton (2007)
- MMS (2006)

As part of its Research, NCI Reviewed Reports from the Following Analysts

- Tudor Pickering Holt & Co.
- Credit Suisse Equity Research
- Turner Investment Partners
- Morningstar
- RBC Capital Markets
- Deutsche Bank Global Markets Research
- Oppenheimer
- Wachovia Securities
- Jefferies & Company, Inc.
- Natexis Bleichroeder Inc.
- Coker & Palmer
- Ziff and Associates
- Peters and Co.

NCI Reviewed Articles and Research from the Following Publications

- SNL Energy Daily Gas Report
- Platts Gas Daily
- EnergyBiz Magazine
- Shreveport Times
- Foster Natural Gas Report
- CNN Money
- Oil and Gas Journal
- Evaluate Energy
- Bloomberg
- Wall Street Journal
- Natural Gas Intelligence

NCI Also Reviewed ARI Articles, As Published in the Oil and Gas Journal

- A series of six articles by Vello A. Kuuskraa, President of ARI and Associates published in July and August of 2007:
  1. A Decade of Progress in Unconventional Gas
  2. The Unconventional Gas Resource Base
  3. New and Emerging Unconventional Gas Play and Prospects
  4. Nature and Importance of Technology Progress for Unconventional Gas
  5. Economics of Unconventional Gas
  6. Outlook for Unconventional Gas: The Next Decade
- The articles by ARI were identified by NCI as particularly relevant (if slightly dated) for the present report in providing the history and context of unconventional gas development growth in the country.

NCI Also Conducted a Survey to the State Agencies Responsible for Minerals Management for the Largest 21 Natural Gas Producing States

- The State and Provincial agencies identified in each jurisdiction were allocated to NCI consultants for contacting.
- The agencies identified by jurisdiction were:

State	Agency	Website
Alabama	Alabama State Oil and Gas Board	http://www.ogb.alabama.gov/ogb/database.aspx
Arkansas	Oil and Gas Commission	http://www.aogc.state.ar.us/
Colorado	Colorado Department of Natural Resources	http://dnr.state.co.us/
Illinois	Office of Mines and Minerals - Division of Oil and Gas	http://www.dnr.state.il.us/mines/dog/index.htm
Indiana	Natural Resources Commission	http://www.in.gov/nrc/2529.htm
Kentucky	Division of Oil and Gas Conservation	http://www.dogc.ky.gov/
Louisiana	Department of Natural Resources	http://dnr.louisiana.gov/
Michigan	Department of Environmental Quality	http://www.michigan.gov/deq/0,1607,7-135-3311_4111---,00.html
Mississippi	Mississippi State Oil and Gas Board	http://www.ogb.state.ms.us/
Montana	Montana Board of Oil and Gas	http://bogc.dnrc.mt.gov/
New Mexico	New Mexico Public Regulatory Commission	http://www.nmprc.state.nm.us/index.htm
New York	Department of Environmental Conservation	http://www.dec.ny.gov/energy/1601.html
North Dakota	Natural Resources Trust Board of Directors	http://www.governor.nd.gov/boards/boards-query.asp?Board_ID=112
Ohio	Mineral Resources Management	http://www.dnr.state.oh.us/mineral/Home/default/tabid/10352/Default.aspx
Oklahoma	Oklahoma Corporation Commission - Oil and Gas Conservatic	http://www.occ.state.ok.us/Divisions/OG/newweb/publications.htm
Pennsylvania	Bureau of Oil and Gas Management	http://www.dep.state.pa.us/dep/deputate/minres/oilgas/oilgas.htm
Tennessee	Tennessee Regulatory Authority	http://tennessee.gov/ecd/energy.htm
Texas	Railroad Commission	http://www.rrc.state.tx.us/
Utah	Utah Governor's Energy Policy	http://www.utah.gov/energy/governors_priorities/oil_shale_tar_sands.html
West Virginia	Office of Oil and Gas	http://www.wvdep.org/item.cfm?ssid=23
Wyoming	Wyoming State Geological Survey	http://www.wsgs.uwyo.edu/
Canadian		
Alberta	Energy Resources Conservation Board	
British Columbia	Government of BC (Ministry of Energy, Mines, and Petroleum	http://www.em.gov.bc.ca/subwebs/oilandgas/stat/monthly.htm
All of Canada	National Energy Board	http://www.neb.gc.ca/clf-nsi/rnrgynfmtn/sttstc/mrktblntrlgsprdctn/mrktblntrlgsprdctn-eng.html
All of Canada	Statistics Canada	

Subsequently NCI Identified Key Universities By State Who Were Thought to Be Involved With the State Agencies

- The key universities likely to be involved with the State Minerals Management were then identified for contact:

State	Agency	Website	State University*
Alabama	Alabama State Oil and Gas Board	http://www.ogb.alabama.gov/ogb/database.aspx	University of Alabama
Arkansas	Oil and Gas Commission	http://www.aogc.state.ar.us/	University of Arkansas
Colorado	Colorado Department of Natural Resources	http://dnr.state.co.us/	Colorado School of Mines
Illinois	Office of Mines and Minerals - Division of Oil and Gas	http://www.dnr.state.il.us/mines/dog/index.htm	
Indiana	Natural Resources Commission	http://www.in.gov/nrc/2529.htm	Indiana University
Kentucky	Division of Oil and Gas Conservation	http://www.dogc.ky.gov/	University of Kentucky
Louisiana	Department of Natural Resources	http://dnr.louisiana.gov/	LSU
Michigan	Department of Environmental Quality	http://www.michigan.gov/deq/0,1607,7-135-3311_4111---,00.html	Michigan State or University of Michigan
Mississippi	Mississippi State Oil and Gas Board	http://www.ogb.state.ms.us/	
Montana	Montana Board of Oil and Gas	http://bogc.dnrc.mt.gov/	Montana State
New Mexico	New Mexico Public Regulatory Commission	http://www.nmprc.state.nm.us/index.htm	University of New Mexico/New Mexico State
New York	Department of Environmental Conservation	http://www.dec.ny.gov/energy/1601.html	NYU
North Dakota	Natural Resources Trust Board of Directors	http://www.governor.nd.gov/boards/boards-query.asp?Board_ID=112	
Ohio	Mineral Resources Management	http://www.dnr.state.oh.us/mineral/Home/default/tabid/10352/Default.aspx	Ohio State University
Oklahoma	Oklahoma Corporation Commission - Oil and Gas Conservatic	http://www.occ.state.ok.us/Divisions/OG/newweb/publications.htm	Oklahoma University
Pennsylvania	Bureau of Oil and Gas Management	http://www.dep.state.pa.us/dep/deputate/minres/oilgas/oilgas.htm	Pennsylvania State University
Tennessee	Tennessee Regulatory Authority	http://tennessee.gov/ecd/energy.htm	
Texas	Railroad Commission	http://www.rrc.state.tx.us/	University of Texas
Utah	Utah Governor's Energy Policy	http://www.utah.gov/energy/governors_priorities/oil_shale_tar_sands.html	Utah State
West Virginia	Office of Oil and Gas	http://www.wvdep.org/item.cfm?ssid=23	West Virginia University
Wyoming	Wyoming State Geological Survey	http://www.wsgs.uwyo.edu/	

The Success in Obtaining Pertinent Information from the State Agencies and University Outreach, However Hopeful, was Minimal

- In the process to contact the State Minerals Oversight Agencies in our information gathering we experienced the following:
  - Unexpected difficulty in making the proper contact.
  - When contact was made, often the contact was not prepared or ill equipped to answer our questionnaire or answer other questions.
  - In the few times we were successful, the agency directed the consultant to State data base often with information at the well level.
  - When this occurred, NCI did not pursue this any further due to the likelihood that obtaining information from the database would be highly technical in nature perhaps requiring specialized programs to interpret or if not, the information would be beyond our limited technical abilities.
- Because of the extra time taken for the State level outreach, NCI *was not able to pursue* the outreach to the key university GeoScience, Geology or Earth Sciences Department Heads.
- This could be attempted with perhaps reasonable expectation of success, with additional time for this labor intensive outreach.

6 Methodology

Producer Survey

Producer Survey » Overview

- The American Clean Skies Foundation requested that NCI compile the most recent natural gas production information from North American natural gas producers.
- In order to comply with ACSF's request, NCI developed a producer survey according to the following parameters:
  - Contact natural gas producers responsible for 90% of gas production.
  - Find a contact person for each producer, preferably Vice Presidents of Investor Relations.
  - Find publicly available information pertaining to production of unconventional natural gas.
  - Request information for the most recent estimates, preferably the first quarter of 2008.
  - Establish a relationship with the contact person to allow for follow-up questions.

Producer Survey » Contact List

- The Producer Survey contact list consists of 114 natural gas companies (see Appendix for complete listing).
  - Of these companies, 20 came from a current list of Top 20 Producers (Source: Chesapeake, June 2008 Investor Presentation).
  - Approximately 30 more producers came from the EIA's top producer list (Source: Table A6. Top U.S. Operators Ranked by Reported 2006 Operated Production Data, http://www.eia.doe.gov/, see Appendix for complete listing). EIA's full list of 50 producers represents roughly 72% of the NG production in the U.S.
  - In order to increase the sample size, NCI included 64 additional North American natural gas producers.
- Producers from this list were separated by play and the list was distributed amongst a group of consultants performing the phone survey.
- The consultants established a contact person from each producer to survey.

Producer Survey » Contact Template & Script

- In order to facilitate the phone interview and create a uniform survey, each consultant was given a script and a template to fill out during the phone interview process (see Appendix for contents of the survey script).
- The template contained the following 12 questions:
  - Total Remaining Proved Reserves in Play;
  - Total Remaining Proved Reserves in your Acreage;
  - Expected Ultimate Recoverability (EUR) for Play;
  - Expected Ultimate Recoverability (EUR) for your Acreage;
  - Estimate of Total Natural Gas Resource in Play;
  - P2 Estimate (Proved + Probable);
  - P3 Estimate (Proved + Probable + Possible);
  - Current Play Production;
  - Projected Play Production;
  - Current Production for your Acreage;
  - Projected Production for your Acreage; and
  - Acreage Position.

Producer Survey Response Rates

- Of the 114 producers contacted, NCI received responses from 66, an overall response rate of 58%.
- On a more granular basis, out of 2,875 questions asked, NCI received responses to about 16% of their questions (see Appendix for complete count of responses by category).

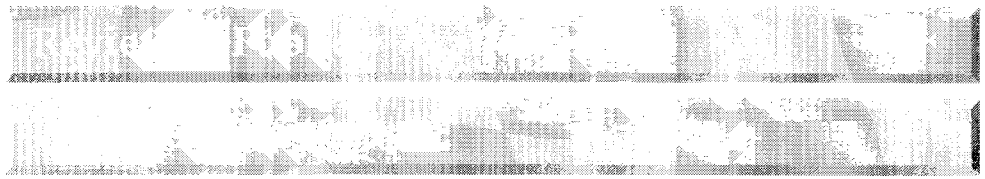
Questions	Response Rate	No Rresponse Rate
Total Remaining Proved Reserves in Play	5%	95%
Total Remaining Proved Reserves in your Acreage	27%	73%
Expected Ultimate Recoverability (EUR) for Play	9%	91%
Expected Ultimate Recoverability (EUR) for your Acreage	14%	86%
Estimate of Total Natural Gas Resource in Play	15%	85%
P2 Estimate (Proved + Probable)	7%	93%
P3 Estimate (Proved + Probable + Possible)	15%	85%
Current Play Production	18%	82%
Projected Play Production	8%	92%
Current Production for your Acreage	35%	65%
Projected Production for your Acreage	9%	91%
Acreage Position	73%	27%
Other	8%	92%
Total	**16%**	**84%**

Producer Survey Results

- The frequency of responses varied amongst the categories, with "Acreage Position" showing the highest frequency of responses:

Questions	Percent of Total Responses
Total Remaining Proved Reserves in Play	2%
Total Remaining Proved Reserves in your Acreage	10%
Expected Ultimate Recoverability (EUR) for Play	3%
Expected Ultimate Recoverability (EUR) for your Acreage	5%
Estimate of Total Natural Gas Resource in Play	6%
P2 Estimate (Proved + Probable)	3%
P3 Estimate (Proved + Probable + Possible)	6%
Current Play Production	7%
Projected Play Production	3%
Current Production for your Acreage	13%
Projected Production for your Acreage	3%
Acreage Position	27%
Other	14%
Total	211&

6 Methodology



Lippman Consulting, Inc.

Lippman Consulting, Inc. » Database Overview

- Lippman Consulting, Inc. (LCI) is a recognized provider of broad based as well as specific natural gas supply information, statistics, and intelligence for North America.
  - In particular, NCI subscribed to LCI's Production Database which contains 66 reports divided into a number of types:
    - Quarterly Regional Production Reports – covers regional wellhead production through 3Q07 in Alaska, West Coast, Permian Basin, Rocky Mountain, San Juan, Gulf Coast, Mid-Continent, Eastern U.S., and Canada. Each region further breaks-out production into more granular basins or fields.
    - Monthly Gulf Coast Production Reports – covers monthly wellhead production through 2007 in various Gulf Coast states.
    - Other Monthly Reports – includes total U.S. and Canada wellhead, dry, and marketed production, and drilling rig activity through April 2008.
    - Top 20 Producers – covers total annual production through 2007 from top 20 operators in parts of 17 U.S. states (for a few areas data is only through 2006). Also has reports on top 20 operators in three Canadian provinces through 2006.
    - Top 20 E&P Companies – covers total annual new gas discovered through 2006 from top 20 operators in same states as Top 20 Producers reports. Also includes Canadian new gas supplies through 2006.

Lippman Consulting, Inc. » Unconventional Coverage

- LCI's Quarterly Regional Production Reports also include unconventional coverage in two main reports:
  - Lower 48 States Shale Production – contains shale production from a number of regions in the U.S. through 3Q07. Quarterly Regional Reports for specific regions extend the production data for a number of shales.
    - Mid Continent – Barnett (Texas – through 2007), Woodford (Oklahoma – through 3Q07), Fayetteville (Arkansas – through 3Q07).
    - Eastern U.S. – Antrim (Michigan – through 2007).
    - Rocky Mountain – Bakken (Montana and North Dakota – through 2007).
    - Gulf of Mexico – Haynesville (Louisiana – through 11/2007).
  - Lower 48 States Coal Seam Production – contains coal seam production through 3Q07.
    - San Juan – Colorado and New Mexico.
    - Rocky Mountain – Powder River Basin, Raton Basin, Uinta Basin, Green River Basin.
    - Gulf Coast Onshore – Black Warrior Basin.
    - Mid Continent – Cherokee Basin, Arkoma Basin, and Anadarko Basin.
    - Eastern U.S. – Appalachian Basin.

7 Appendix

Production » U.S.

Table: U.S. Production

Year	Total		Conventional		Unconventional		Percent Unconventional
	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day	
1998	19.02	52.12	13.64	37.37	5.38	14.75	28%
1999	18.83	51.60	13.46	36.87	5.37	14.72	29%
2000	19.18	52.55	13.35	36.57	5.84	15.99	30%
2001	19.62	53.74	13.31	36.47	6.30	17.27	32%
2002	18.93	51.86	12.34	33.81	6.59	18.05	35%
2003	19.10	52.32	12.31	33.73	6.79	18.60	36%
2004	18.59	50.93	11.09	30.39	7.50	20.54	40%
2005	18.05	49.45	10.16	27.83	7.89	21.62	44%
2006	18.48	50.62	10.00	27.40	8.48	23.22	46%
2007	19.28	52.82	10.41	28.51	8.87	24.30	46%
1Q 2008 (equiv.)	20.28	55.56					

Sources: Total Production – EIA Natural Gas Production Reports,
Unconventional – EIA AEO2008, Conventional – NCI calculation.

U.S. Unconventional Sources » Production by Type

Table: U.S. Unconventional Production

	Tight Sands		Coalbed Methane		Shale		Total	
Year	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day
1998	3.77	10.33	1.26	3.46	0.35	0.95	5.38	14.75
1999	3.69	10.11	1.33	3.65	0.35	0.96	5.37	14.72
2000	3.96	10.84	1.45	3.97	0.43	1.18	5.84	15.99
2001	4.29	11.74	1.54	4.21	0.48	1.32	6.30	17.27
2002	4.46	12.23	1.57	4.31	0.55	1.51	6.59	18.05
2003	4.62	12.65	1.58	4.33	0.59	1.61	6.79	18.60
2004	5.09	13.95	1.72	4.71	0.69	1.88	7.50	20.54
2005	5.38	14.74	1.74	4.77	0.77	2.10	7.89	21.62
2006	5.64	15.46	1.80	4.92	1.04	2.84	8.48	23.22
2007	6.01	16.46	1.81	4.96	1.05	2.88	8.87	24.30

Source: EIA AEO2008.

U.S. Unconventional Sources » Tight Sands Production by Region

Table: U.S. Tight Sands Production by Region

Year	East Coast		Gulf Coast		Midcontinent		Southwest		Rocky Mountain		Total	
	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day	Tcf/year	Bcf/day
1998	0.30	0.83	1.56	4.28	0.46	1.25	0.27	0.74	1.18	3.22	3.77	10.33
1999	0.34	0.93	1.48	4.05	0.42	1.15	0.27	0.74	1.18	3.23	3.69	10.11
2000	0.34	0.94	1.58	4.33	0.40	1.09	0.28	0.76	1.36	3.72	3.96	10.84
2001	0.31	0.86	1.72	4.70	0.41	1.13	0.31	0.84	1.54	4.22	4.29	11.74
2002	0.37	1.02	1.72	4.71	0.40	1.10	0.30	0.82	1.67	4.58	4.46	12.23
2003	0.36	0.98	1.71	4.69	0.42	1.16	0.29	0.79	1.84	5.03	4.62	12.65
2004	0.36	0.99	1.97	5.38	0.50	1.37	0.29	0.79	1.98	5.42	5.09	13.95
2005	0.37	1.01	2.06	5.65	0.54	1.48	0.29	0.79	2.12	5.80	5.38	14.74
2006	0.43	1.17	2.10	5.74	0.58	1.58	0.28	0.76	2.27	6.21	5.64	15.46
2007	0.44	1.20	2.10	5.74	0.58	1.60	0.29	0.80	2.60	7.12	6.01	16.47

Source: EIA AEO2008. EIA Oil and Gas Supply Module Regions.

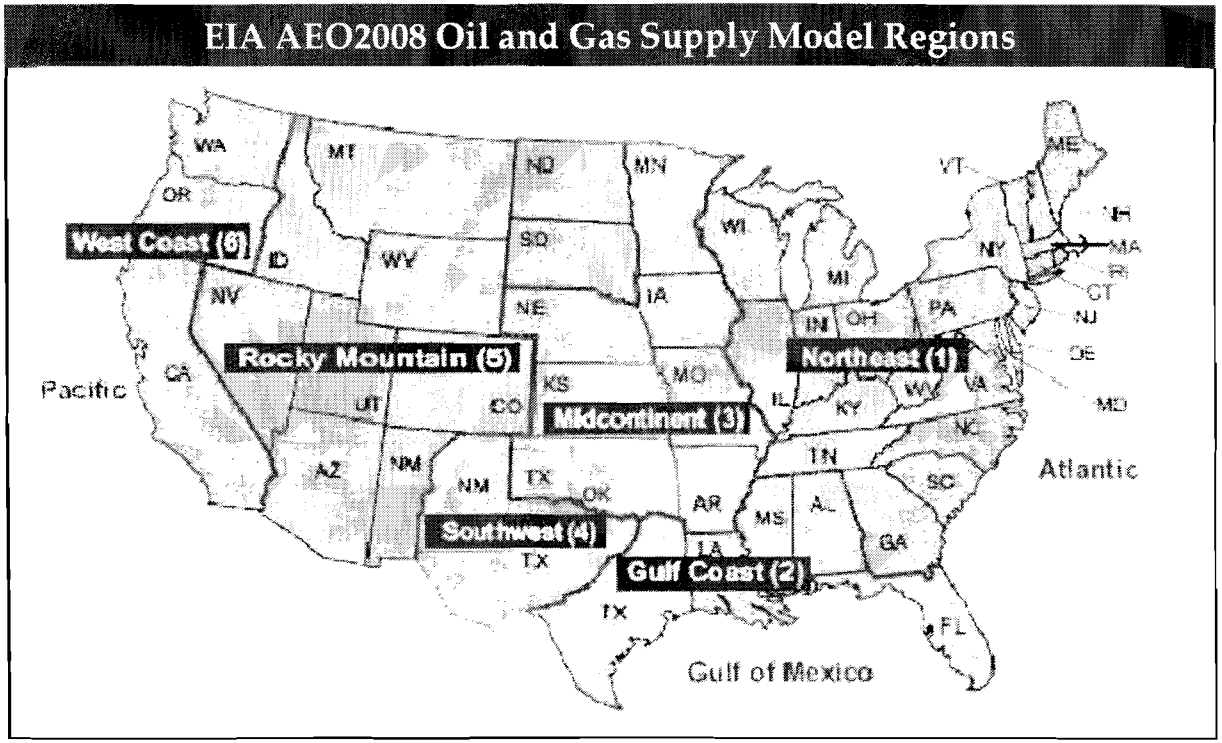
U.S. Unconventional Sources » Coalbed Methane Production by Region

Table: U.S. Coalbed Methane Production by Region

Year	East Coast		Gulf Coast		Midcontinent		Southwest		Rocky Mountain		Total	
	Tcf/Year	Bcf/Day	Tcf/Year	Bcf/Day	Tcf/Year	Bcf/Day	Tcf/Year	Bcf/Day	Tcf/Year	Bcf/Day	Tcf/Year	Bcf/Day
1998	0.05	0.13	0.12	0.32	0.03	0.07	0.00	0.00	1.08	2.95	1.26	3.46
1999	0.05	0.14	0.12	0.32	0.03	0.07	0.00	0.00	1.14	3.12	1.33	3.65
2000	0.06	0.15	0.11	0.30	0.03	0.08	0.00	0.00	1.25	3.43	1.45	3.97
2001	0.06	0.15	0.11	0.31	0.04	0.10	0.00	0.01	1.33	3.64	1.54	4.21
2002	0.07	0.19	0.12	0.32	0.03	0.08	0.00	0.01	1.36	3.72	1.57	4.31
2003	0.07	0.19	0.12	0.33	0.05	0.14	0.00	0.01	1.34	3.66	1.58	4.33
2004	0.07	0.20	0.13	0.35	0.07	0.20	0.00	0.00	1.44	3.96	1.72	4.71
2005	0.08	0.21	0.12	0.33	0.09	0.24	0.00	0.00	1.46	3.99	1.74	4.77
2006	0.11	0.29	0.09	0.25	0.10	0.27	0.00	0.00	1.50	4.11	1.80	4.92
2007	0.13	0.36	0.11	0.31	0.09	0.25	0.00	0.00	1.47	4.04	1.81	4.96

Source: EIA AEO2008. EIA Oil and Gas Supply Module Regions.

U.S. Unconventional Sources » EIA AEO2008 Regions



Source: EIA

U.S. Gas Shales » Shale Production by Play

U.S. Annual Average Shale Gas Production* (MMcf/Day)						
Year	Antrim	Bakken	Fort Worth Barnett	Fayetteville	Haynesville	Arkoma Woodford
1998	546	8	94	0	0	0
1999	522	7	112	0	0	0
2000	501	6	216	0	0	0
2001	479	6	367	0	0	0
2002	454	6	601	0	0	0
2003	422	9	832	0	0	0
2004	408	14	1,045	0	0	2
2005	399	31	1,369	8	25	6
2006	385	44	1,960	63	20	25
2007	373	60	3,014	230	17	109
Est. 1Q08	363	55	3,645	517	25	271

Sources: Lippman Consulting, Inc. Production Database, Michigan Public Service Commission, Arkansas Oil and Gas Commission and NCI Calculations.

* 1Q08 not reported yet by play but was estimated based on statistical analysis of production vs. price during the recently observed actual periods. Resulting estimates are consistent with observed growth in overall onshore gas production growth in 1Q08.

U.S. Imports from Canada

Table: U.S. Imports from Canada

Year	U.S. Natural Gas Pipeline Imports From Canada (Bcf)	U.S. Natural Gas Pipeline Exports to Canada (Bcf)	U.S. Natural Gas Net Canadian Imports (Bcf)
1998	3,052	40	3,012
1999	3,368	39	3,329
2000	3,544	73	3,471
2001	3,729	167	3,562
2002	3,785	189	3,596
2003	3,437	271	3,166
2004	3,607	395	3,212
2005	3,700	358	3,342
2006	3,590	341	3,249
2007	3,777	482	3,295

Source: EIA. Note: EIA annual net imports differ on average by less than 1% from Canada's National Energy Board figures.

U.S. Natural Gas Consumption

Table: U.S. Natural Gas Consumption by Sector (Tcf/year)					
Date	Total Delivered to Consumers	Residential	Commercial*	Industrial	Electric Power
1998	20.44	4.52	3.01	8.32	4.59
1999	20.68	4.73	3.06	8.08	4.82
2000	21.54	5.00	3.20	8.14	5.21
2001	20.50	4.77	3.04	7.34	5.34
2002	21.23	4.89	3.16	7.51	5.67
2003	20.56	5.08	3.20	7.15	5.14
2004	20.72	4.87	3.15	7.24	5.46
2005	20.32	4.83	3.02	6.60	5.87
2006	19.94	4.37	2.86	6.49	6.22
2007	21.27	4.72	3.03	6.64	6.87

Source: EIA. * Commercial consumption includes vehicle fuel.

Producer Survey » Contact List

Table: Producer Survey Contact List

Op/	Company Name	Op/	Company Name	Op/	Company Name
2	Abraxas	33	CDX Gas	54	Energy Partners
3	Alta	34	Chesapeake	55	EOG Res
4	Amerada Hess	35	Chevron	56	Equitable Res
5	American Oil and Gas	36	Chief	57	Errington midland texas
6	Anadarko	37	Cimarex	58	Exco
7	Antero	38	CNX Gas	59	Exxon
8	Apache	39	Comstock	5:	Fidelity Exploration and Production
9	Atlas Energy Resources	3:	ConocoPhillips	61	Forest Oil
:	Audubon Gas	41	Consol Energy	62	Fortuna
21	Aurora Oil and Gas	42	Contango	63	Fossil Operating
22	Banker's Petroleum	43	Continental Resources	64	Galleon Energy Inc.
23	Baseline Oil and Gas	44	Cubic Energy	65	Gasco Energy (GSX)
24	Bill Barrett	45	Denbury	66	Gastar (Hilltop Resort Field)
25	BP	46	Devon	67	Goodrich Petroleum Corporation
26	Brigham Exploration	47	Domestic Energy Corporation	68	Hallwood
27	Brightburn Energy (MLP E&P)	48	Dominion	69	Hilcorp
28	Burlington Resources	49	East Resources	6:	Hunt Oil
29	Cabot	4:	Edge Petroleum	71	Junex
2:	Camterra	51	El Paso	72	J-W Operating Co.
31	Canada Energy Partners	52	Encana	73	Kaiser - Francis Oil
32	Carrizo	53	Energen	74	KCS Energy

Producer Survey » Contact List , *cont.*

Table: Producer Survey Contact List, *cont.*

Op/	Company Name
75	Linn Petroleum
76	Marathon
77	Mariner Energy
78	Maverick
79	Merit
7:	National Fuel Gas
81	Newfield
82	Nexen
83	Noble
84	North Coast Energy
85	Occidental Petroleum
86	Odysey Energy Limited (ODY)
87	Orleans Energy
88	Pathfinder (bought back Shell's assets)
89	Penn Virginia
8:	Petrohawk
91	Petroquest
92	Pin Oak
93	Pioneer Natural Resources (PXD)
94	Plains
95	Pogo

Op/	Company Name
96	Quest
97	Questar
98	Questerre
99	Quicksilver
9:	Range Resources
: 1	Rex
: 2	Samson
: 3	Sandridge
: 4	Schuepbach Energy
: 5	Sedna Energy
: 6	Seneca
: 7	Shell Oil
: 8	Southwestern
: 9	St. Mary Land and Expl
: :	Stephens Production
211	Stormcat Energy
212	Sun Coast
213	Talisman energy (TLM)
214	Tatonka Oil and Gas
215	The Houston Exploration Co
216	Tyner Resources

Op/	Company Name
217	Ultra Petroleum
218	Unbridled Energy
219	Unit
21:	W & T Offshore
221	Walter Oil & Gas
222	Williams
223	Winchester
224	XTO
225	Yates

Producer Survey » Contact List , *cont.*

Table: Top 20 Producers 1Q 2008

Production Ranking	Company (c)	Ticker	Daily U.S. Natural Gas Production (a,b) 1Q'08	4Q'07	1Q'07	1Q'08 vs. 4Q'07 % Change	1Q'08 vs. 1Q'07 % Change	2007 U.S. Net Proved Reserves	2007 Proved U.S Gas Reserve Ranking	RP Ratio (d)	Drilling at US Rigs 5/23/08 (e)
1.	BP	BP	2,149	2,183	2,163	(1.6%)	(0.6%)	15,375	1	20	24
2.	Anadarko (1)	APC	2,137	2,013	2,204	6.2%	(3.0%)	8,504	6	11	35
3.	Chesapeake (2)	CHK	2,063	2,041	1,564	1.1%	31.9%	10,137	4	13	149
3.	ConocoPhillips	COP	2,063	2,203	2,312	(6.4%)	(10.8%)	12,634	3	17	35
5.	Devon (3)	DVN	1,878	1,845	1,624	1.8%	15.6%	7,143	7	10	60
6.	XTO (4)	XTO	1,708	1,671	1,264	2.2%	35.1%	9,441	5	15	71
7.	Chevron	CVX	1,666	1,675	1,723	(0.5%)	(3.3%)	3,226	11	5	10
8.	EnCana (5)	ECA	1,552	1,464	1,222	6.0%	27.0%	6,008	8	11	52
9.	ExxonMobil	XOM	1,305	1,405	1,529	(7.1%)	(14.7%)	13,172	2	28	6
10.	Shell	RDS	1,105	1,138	1,162	(2.9%)	(4.9%)	2,468	15	6	13
11.	EOG (6)	EOG	1,085	1,010	915	7.4%	18.6%	4,220	9	11	67
12.	Williams	WMB	1,013	983	845	3.1%	19.9%	4,143	10	11	29
13.	Apache (7)	APA	744	773	740	(3.8%)	0.6%	2,699	13	10	31
14.	El Paso	EP	726	757	671	(4.1%)	8.2%	3,100	12	12	23
15.	Occidental	OXY	580	578	585	0.3%	(0.9%)	2,672	14	13	5
16.	Marathon	MRO	482	474	472	1.7%	2.1%	1,007	20	6	14
17.	Newfield (8)	NFX	444	412	576	7.8%	(22.9%)	1,810	18	11	27
18.	Southwestern (9)	SWN	425	370	243	14.9%	74.9%	1,450	19	9	22
19.	Noble (10)	NBL	393	419	408	(6.1%)	(3.7%)	1,840	17	13	14
20.	Questar (11)	STR	387	336	343	15.2%	12.8%	1,868	16	13	18
	Totals / Average		**23,905**	**23,749**	**22,565**	**1.8%**	**9.1%**	**112,918**		**12**	**705**

(a) Based on company reports
(b) In mmcf per day
(c) Independents in green, majors in black, pipelines in red
(d) Based on annualized Q1' 07 Production and 2006 natural gas reserves
(e) Source: Smith International Survey (operated rig count)
(f) APC 2Q '07 production is from continuing operations
(g) El Paso production is as of Q1'07

Source: Chesapeake, June 2008 Investor Presentation

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Producer Survey » Results

Table: Count of Responses by Category

Questions	Responses	No Response	Total Questions
Total Remaining Proved Reserves in Play	8	155	163
Total Remaining Proved Reserves in your Acreage	48	128	176
Expected Ultimate Recoverability (EUR) for Play	15	153	168
Expected Ultimate Recoverability (EUR) for your Acreage	24	144	168
Estimate of Total Natural Gas Resource in Play	26	146	172
P2 Estimate (Proved + Probable)	12	160	172
P3 Estimate (Proved + Probable + Possible)	26	144	170
Current Play Production	32	141	173
Projected Play Production	13	158	171
Current Production for your Acreage	59	112	171
Projected Production for your Acreage	15	157	172
Acreage Position	128	48	176
Other	65	758	823
Total	**471**	**2,404**	**2,875**