Overview and Significance of Unconventional Resources*

By
Andrew Scott[1]

Search and Discovery Article #80021 (2008)
Posted August 10, 2008

*Presented at AAPG Annual Convention, San Antonio, Texas, April 20-23, 2008

[1]Altuda Energy Corporation, San Antonio, Texas (Andrew@altuda.com)

Presentation at Forum: Future of Unconventional Resource Plays (EMD/AAPG)

Other presentations by Pete Stark, Walter B. Ayers, Jr., Mark Bustin, Larry Lunardi, Timothy S. Collett, Barry A. Goldstein

OVERVIEW AND SIGNIFICANCE OF UNCONVENTIONAL RESOURCES

Andrew R. Scott

Altuda Energy Corporation
San Antonio, Texas USA
andrew@altuda.com

ALTUDA

2008 Annual AAPG Meeting

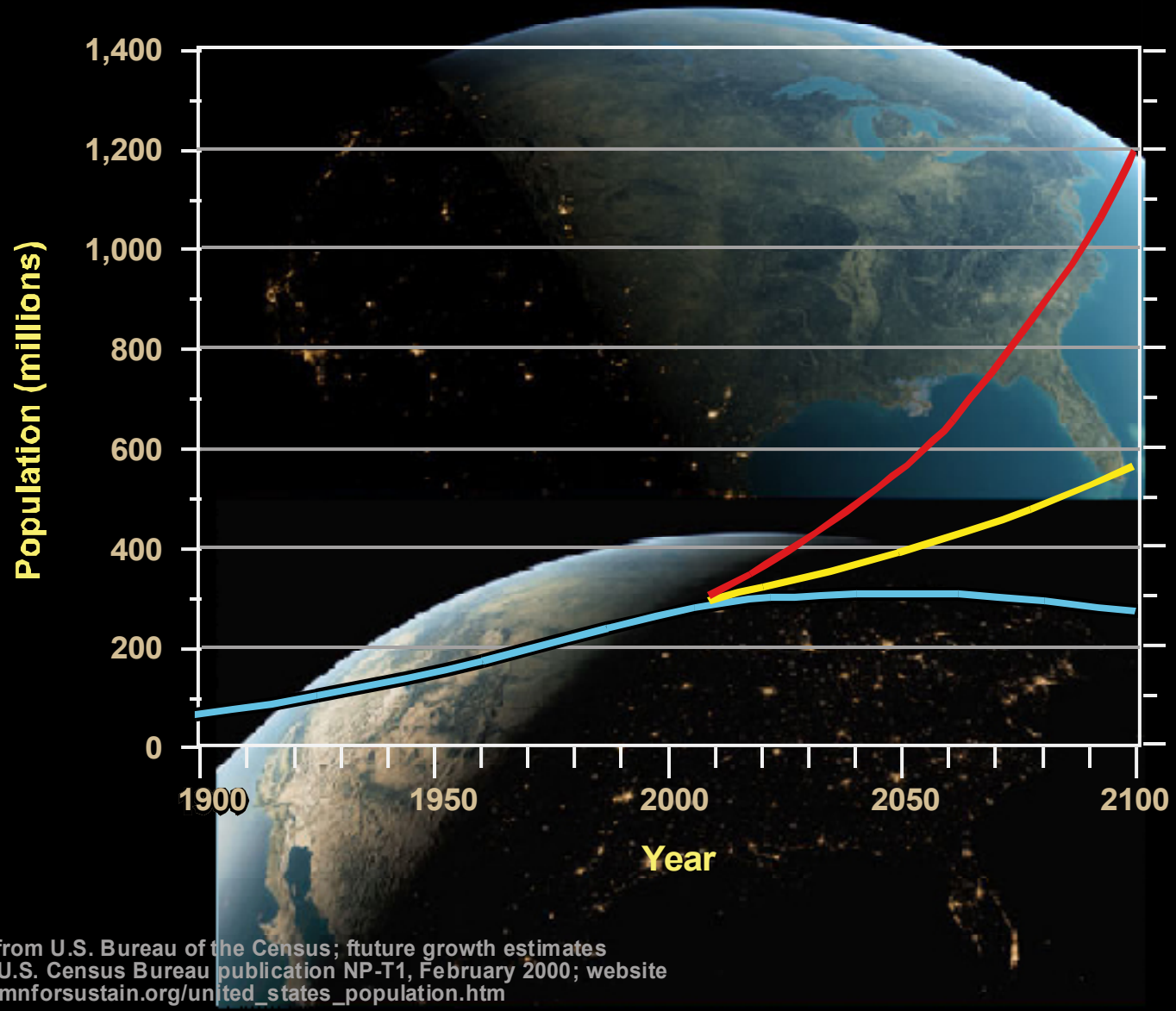
April 20-23, 2008
San Antonio, Texas


1. Energy
2. Water
3. Food
4. Environment
5. Poverty
6. Terrorism & War
7. Disease
2. Education
9. Democracy
10. Population

POPULATION GROWTH AND CARBON DIOXIDE

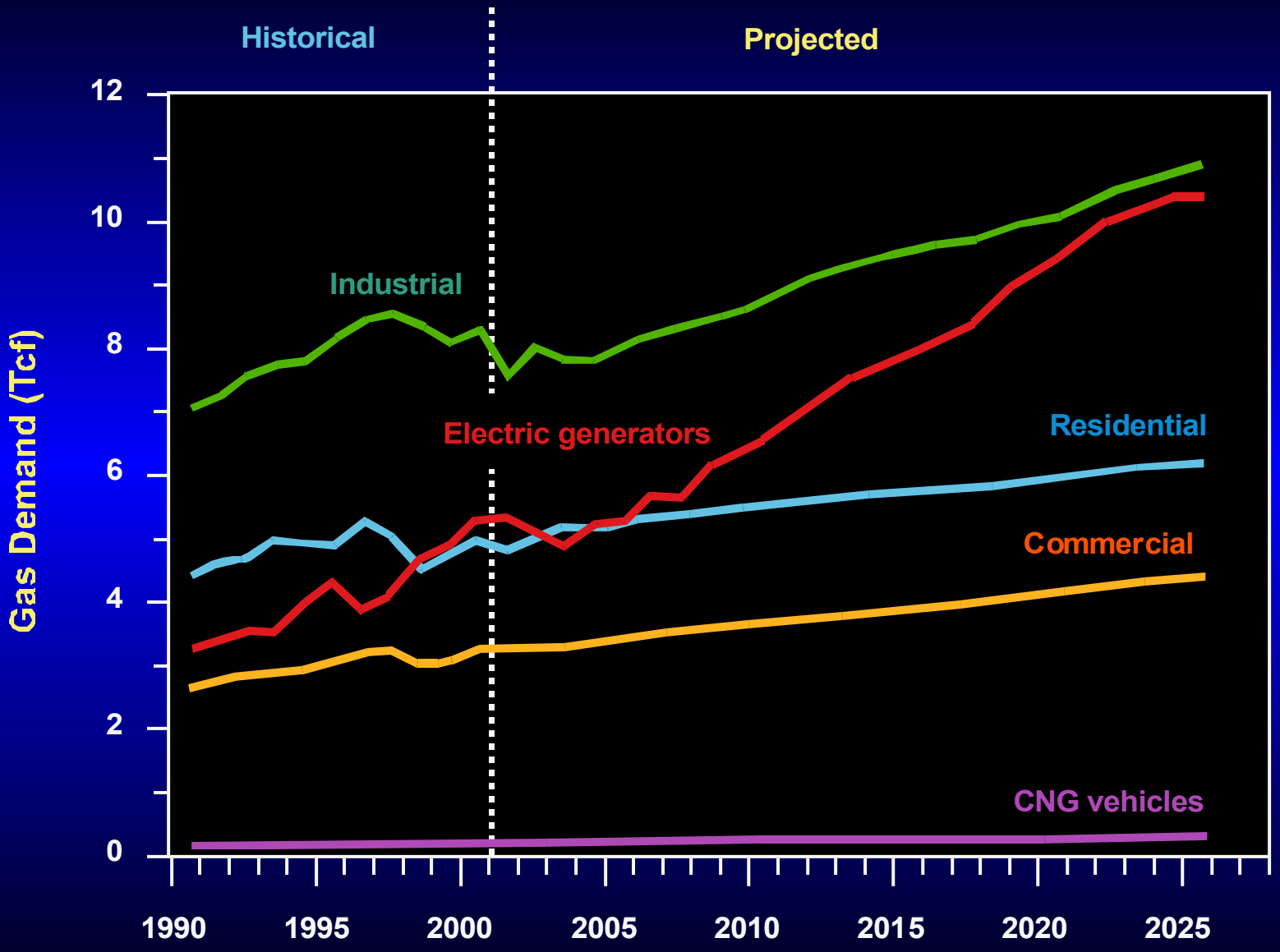
Fischer et al. (1999); Monnin et al. (2004); Keeling et al. (2004); Spahni et al (2005); Siegenthaler et al (2005); US Census Bureau (http://www.census.gov/ipc/www/worldhis.html)

ALTUDA



Data from U.S. Bureau of the Census; ftuture growth estimates from U.S. Census Bureau publication NP-T1, February 2000; website www.mnforsustain.org/united_states_population.htm

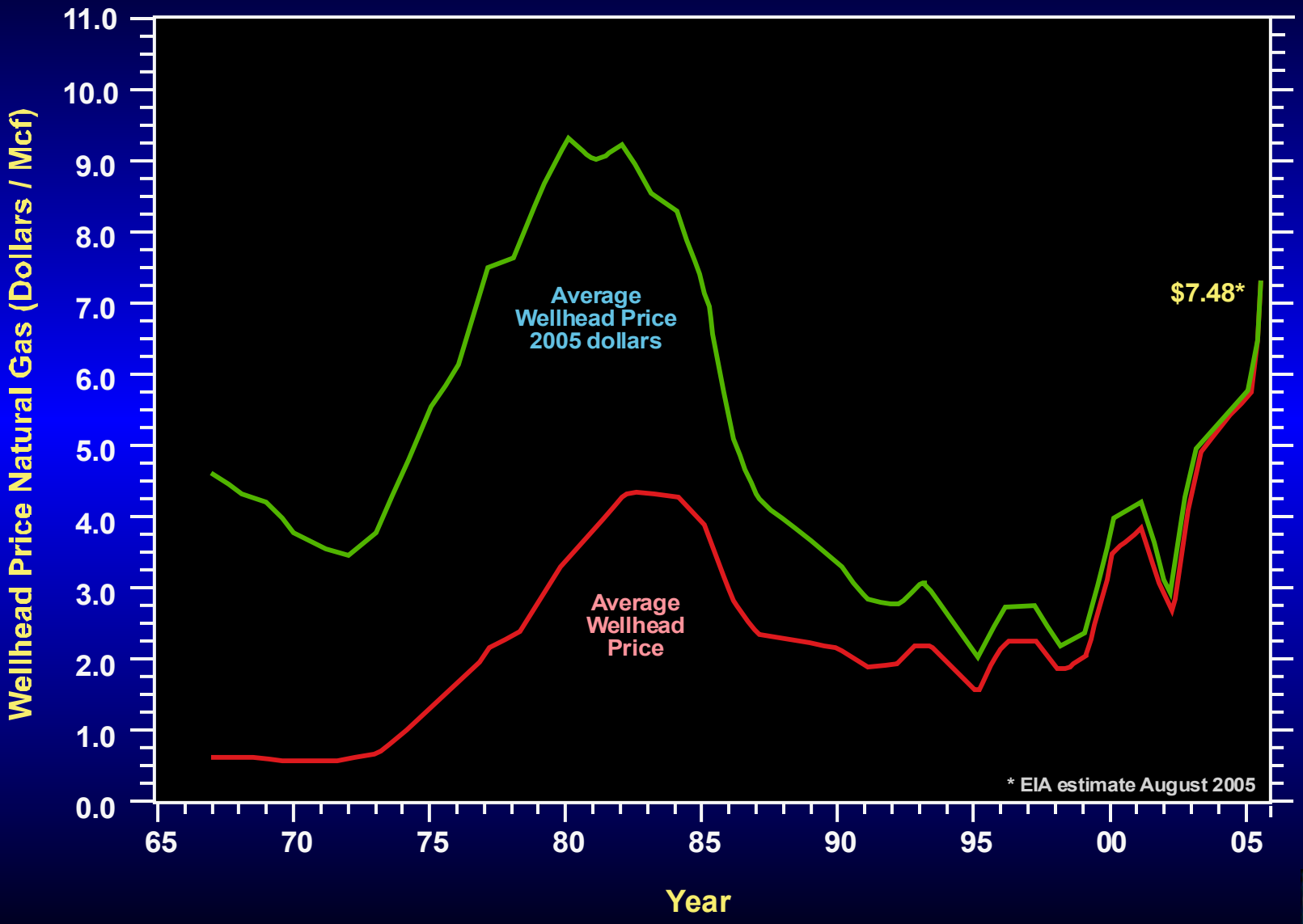
NATURAL GAS DEMAND



Energy Information Administration

ALTUDA

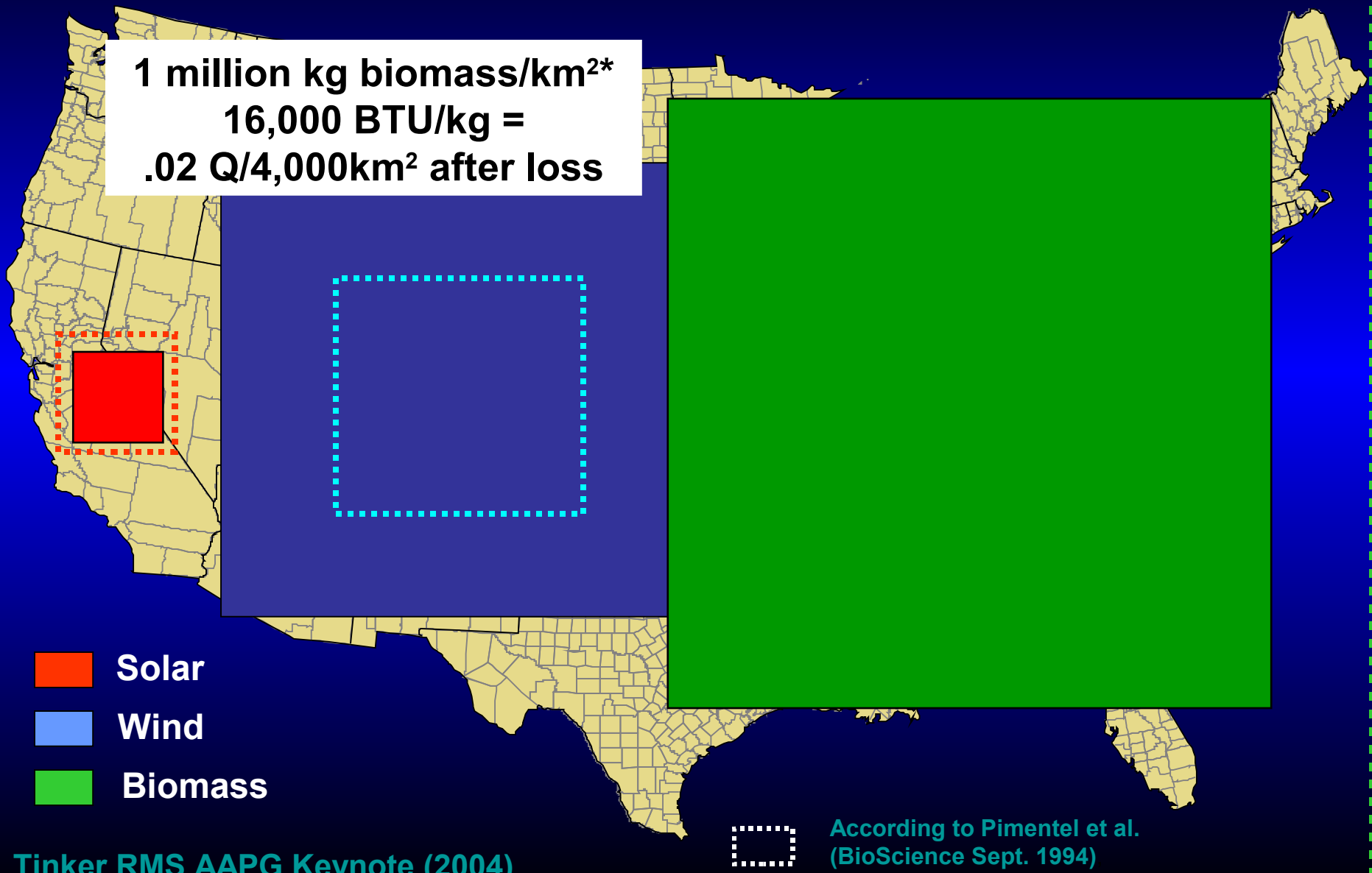
NATURAL GAS PRICES



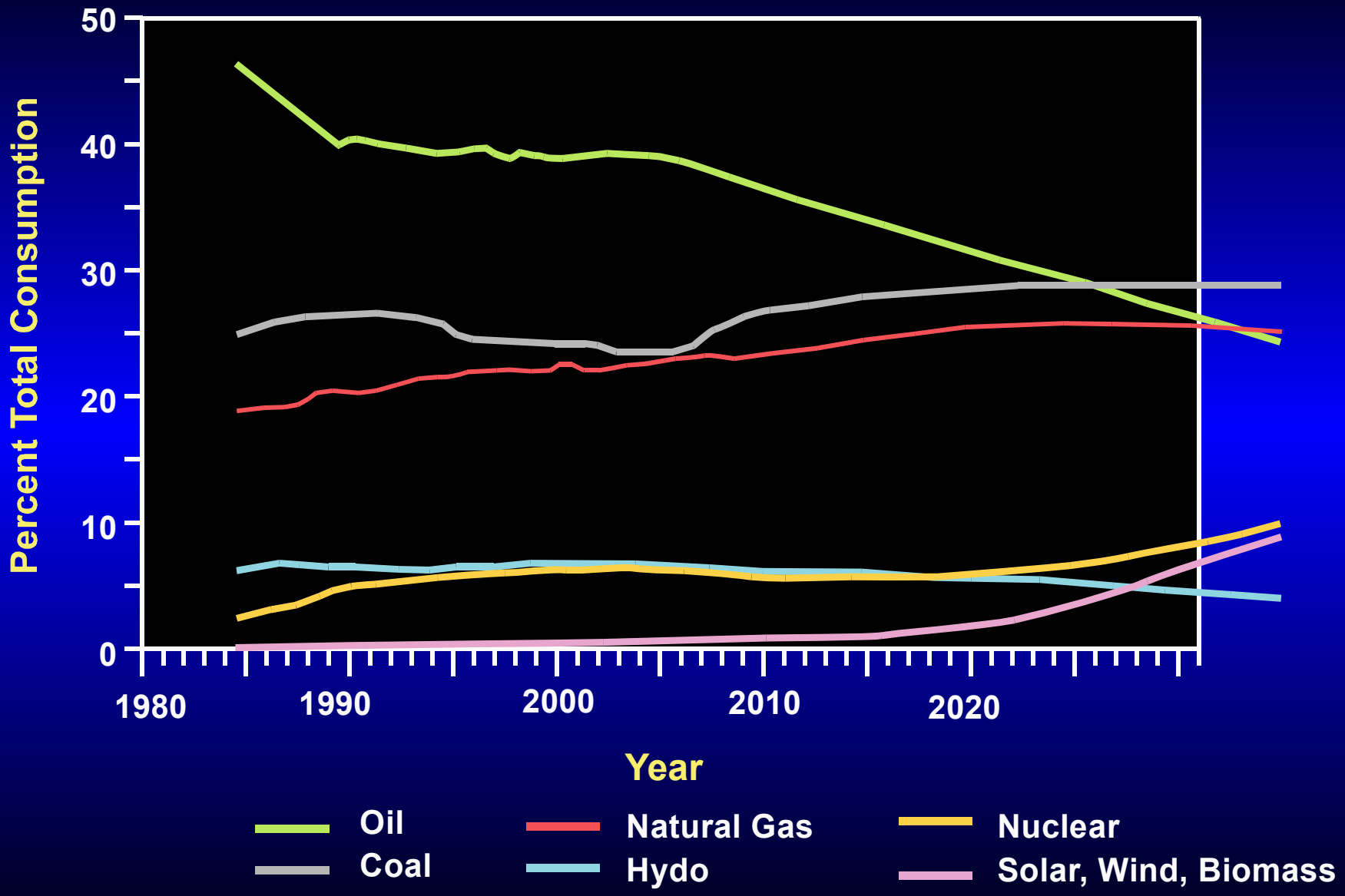
ALTUDA

U.S. ENERGY COMPARISON

To Produce 20% of US Energy Demand (20 Quads per year)



U.S. ENERGY COMPARISON

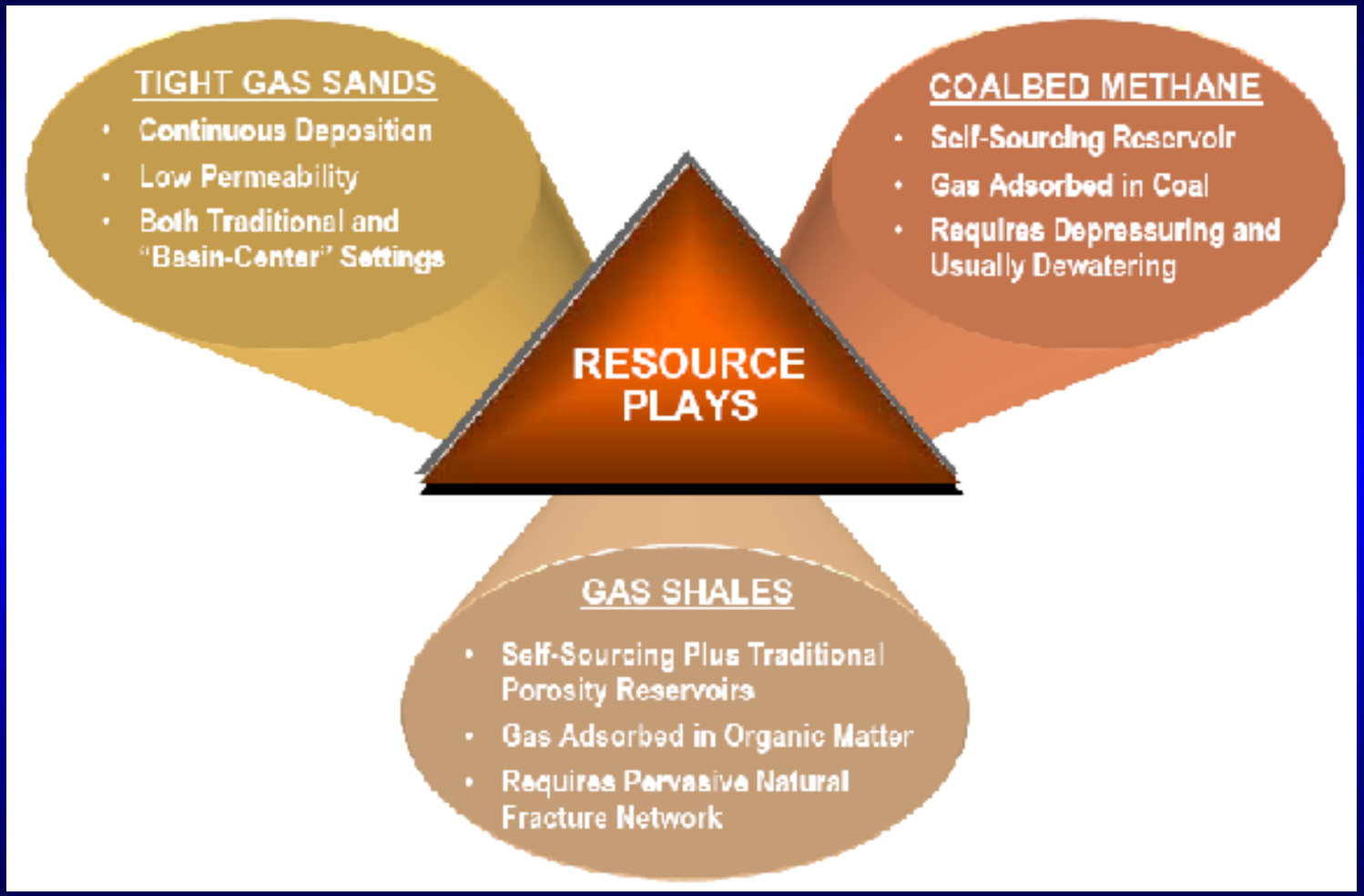


Unconventional now 105 Tcf of the 196 Tcf of proven reserves

	Estimated US Resources*	Billion BOE	Estimated Recoverable	Billion BOE	US Production	Remarks*
Coal	1.08 x 10^{12} tons	4,190	230 x 10^{9} tons	892	1 x 10^{9} tons	Mineable coal resources; in-place 17x
Coalbed Methane	1,777 Tcf	313	74	13	1.25 Tcf	GIP estimates include Alaska
Gas Hydrates	320,000 Tcf	56,939	n/a	n/a	n/a	Statistical mean estimate
Geothermal	1.7 x 10^{25} J	2.8 x 10^{6}	2.4 x 10^{21} J	430	n/a	Accessible at less than 7 km
Oil Shale	218 x 10^{10} bbl	2,180	n/a	n/a	n/a	Reserves are price dependent
Tar Sands/Heavy Oil	30.5 x 10^{9} bbl	30.5	n/a	n/a	225 x 10^{6} bbl	9% of oil reserves are <20 API
Nuclear	3,490 x 10^{6} lbs	139	271 x 10^{6} lbs	11	4 x 10^{6} lbs	U_3O_8 resources; 0.7% U-235; $30/lb
Oil	198 x 10^{9} bbl	1,98l	28.6 x 10^{9} bbl	29	2.8 x 10^{9} bbl	EIA technically recoverable resources
Natural Gas	1,431 Tcf	252	164 Tcf	339	18.9 Tcf	EIA technically recoverable resources

Scott (2001)

THE BIG THREE



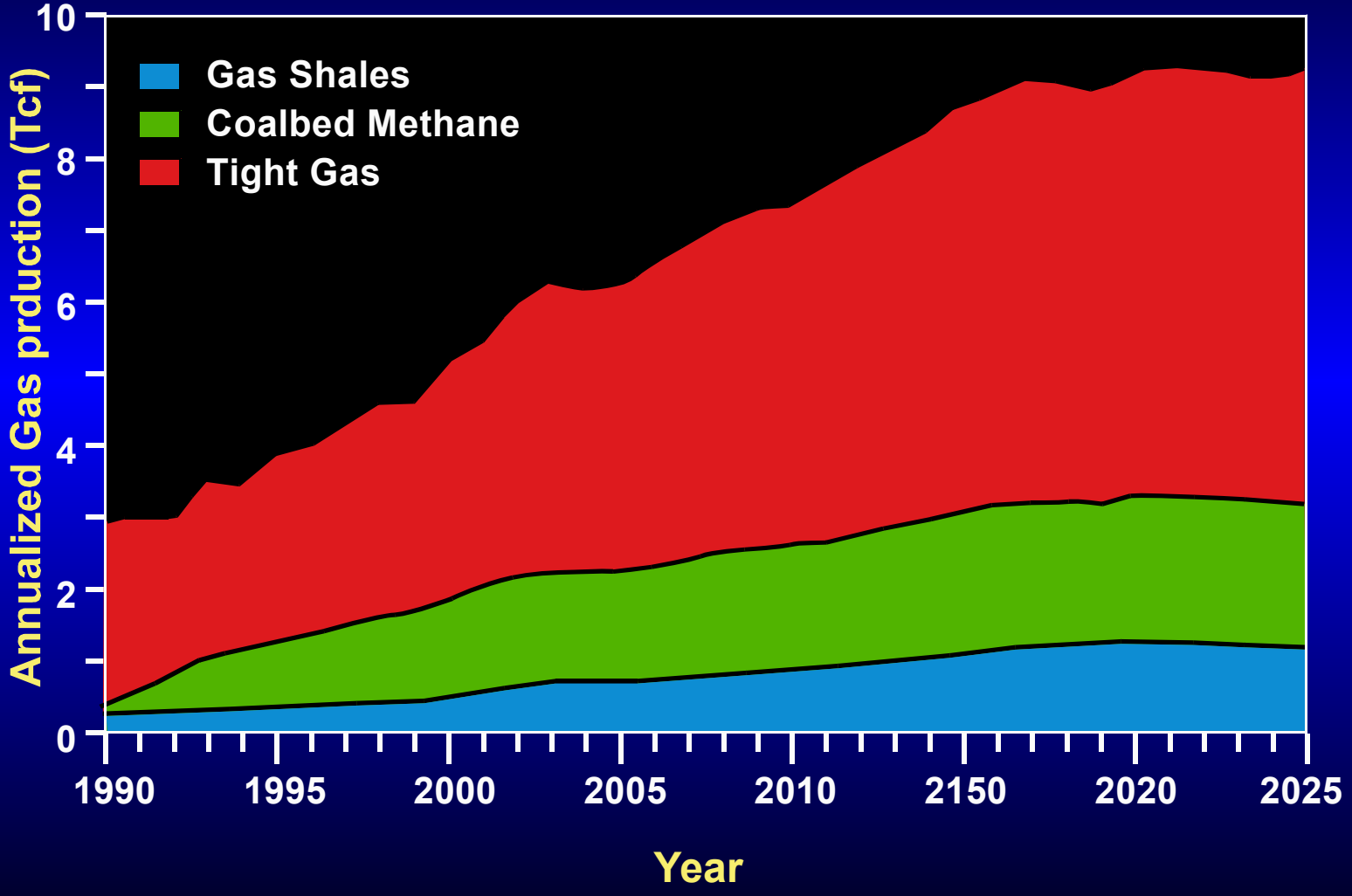
Kuuskra (2007)

THE BIG THREE UNCONVENTIONAL

5.0 Tcf or 14 Bcfd 1996

8.6 Tcf or 24 Bcfd (43%) 2006

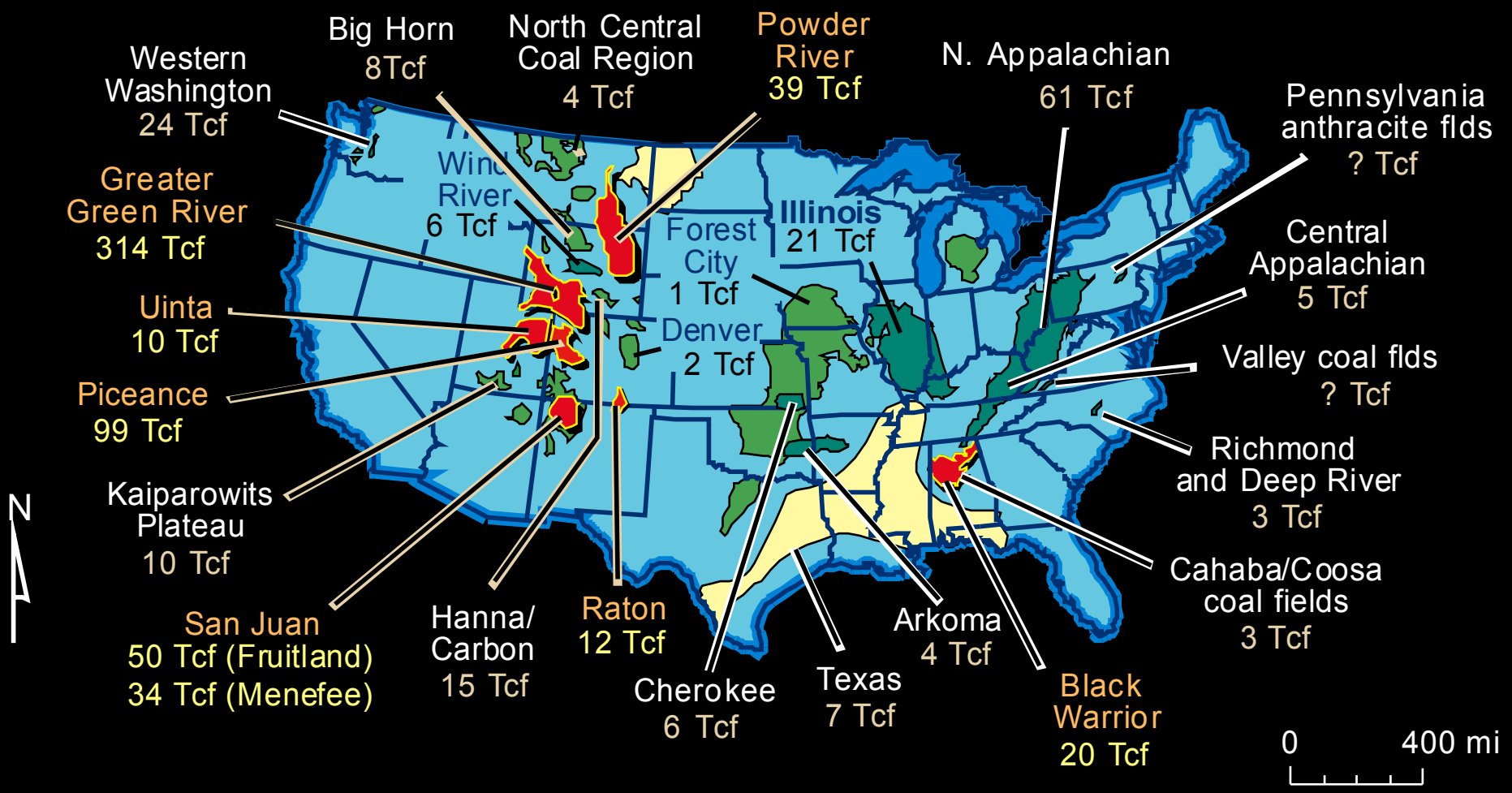
14+ Tcf or 38+ Bcfd



Tinker (2007)

COALBED METHANE RESOURCES OF THE U.S.

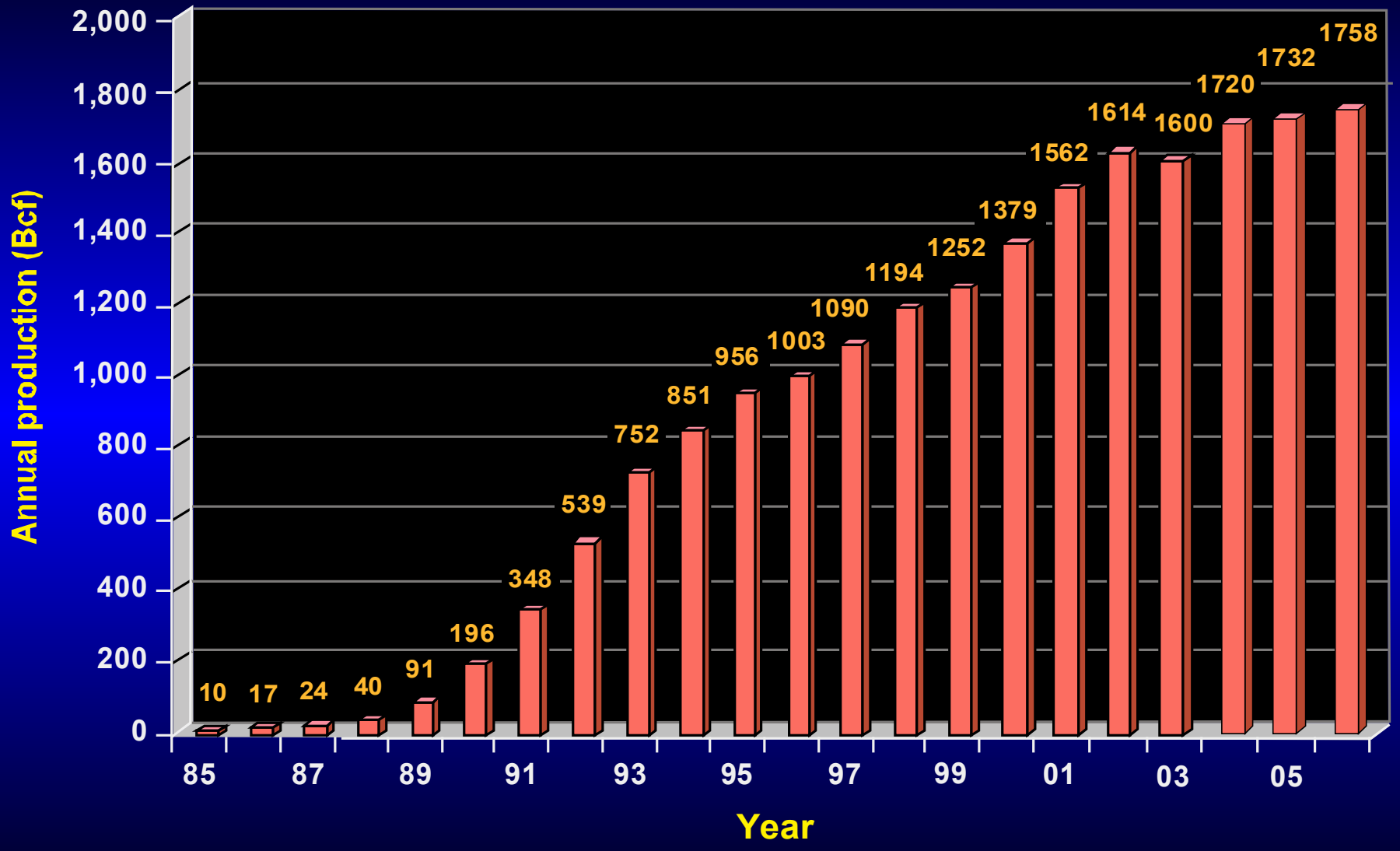
Total Resources: 755 Tcf



Data from ICF Resources (1990); Ayers and others (1991); Stevens and others (1992); Scott and others (1994); Scott and others (1995); GRI (1999): Scott and Balin (2001)

ALTUDA

COALBED METHANE PRODUCTION

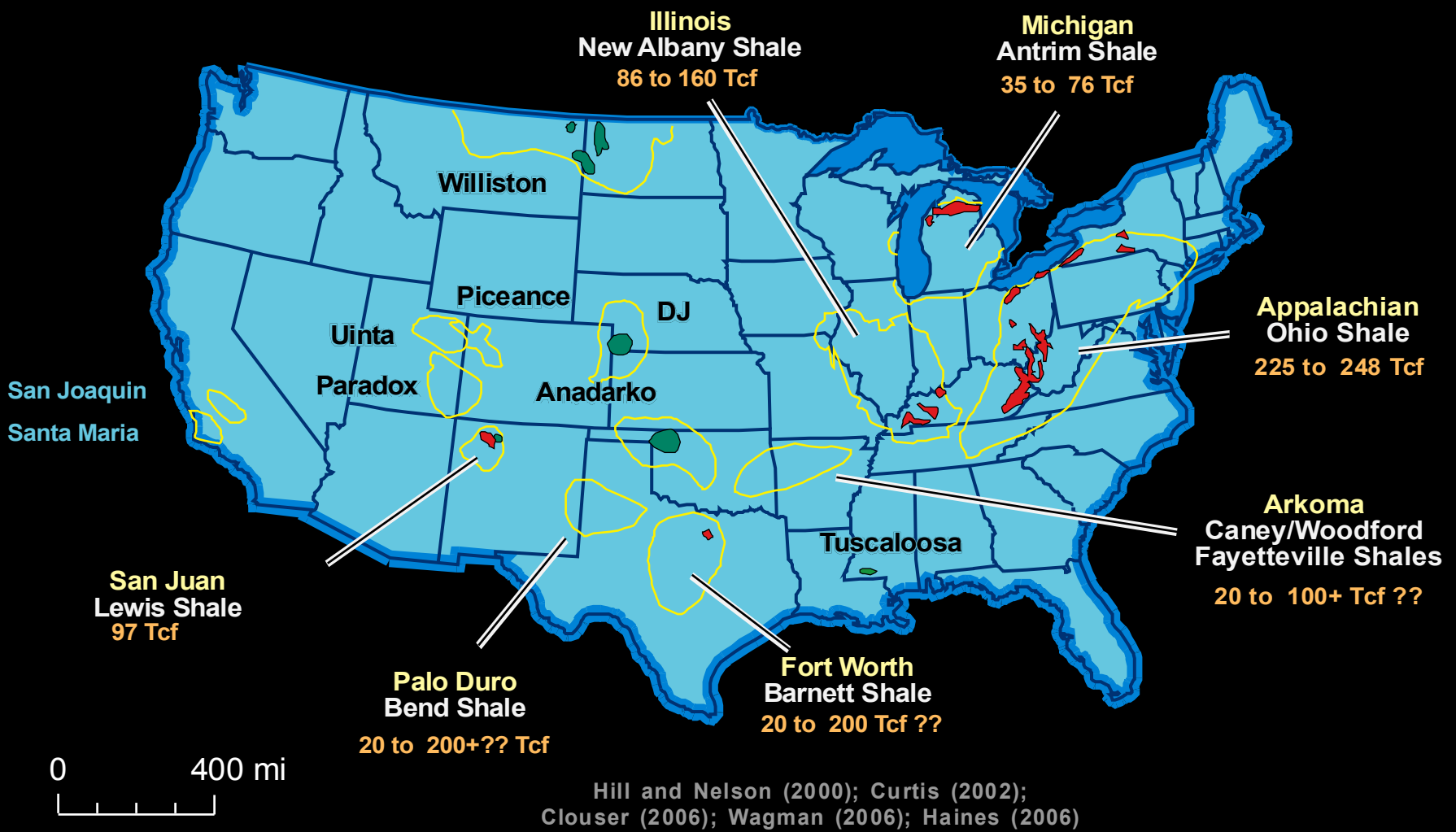


Energy Information Administration (1992, 1995,1999, 2002, 2007)

ALTUDA

SHALE GAS RESOURCES OF THE U.S.

Total Resources: 500 to 1,081 Tcf

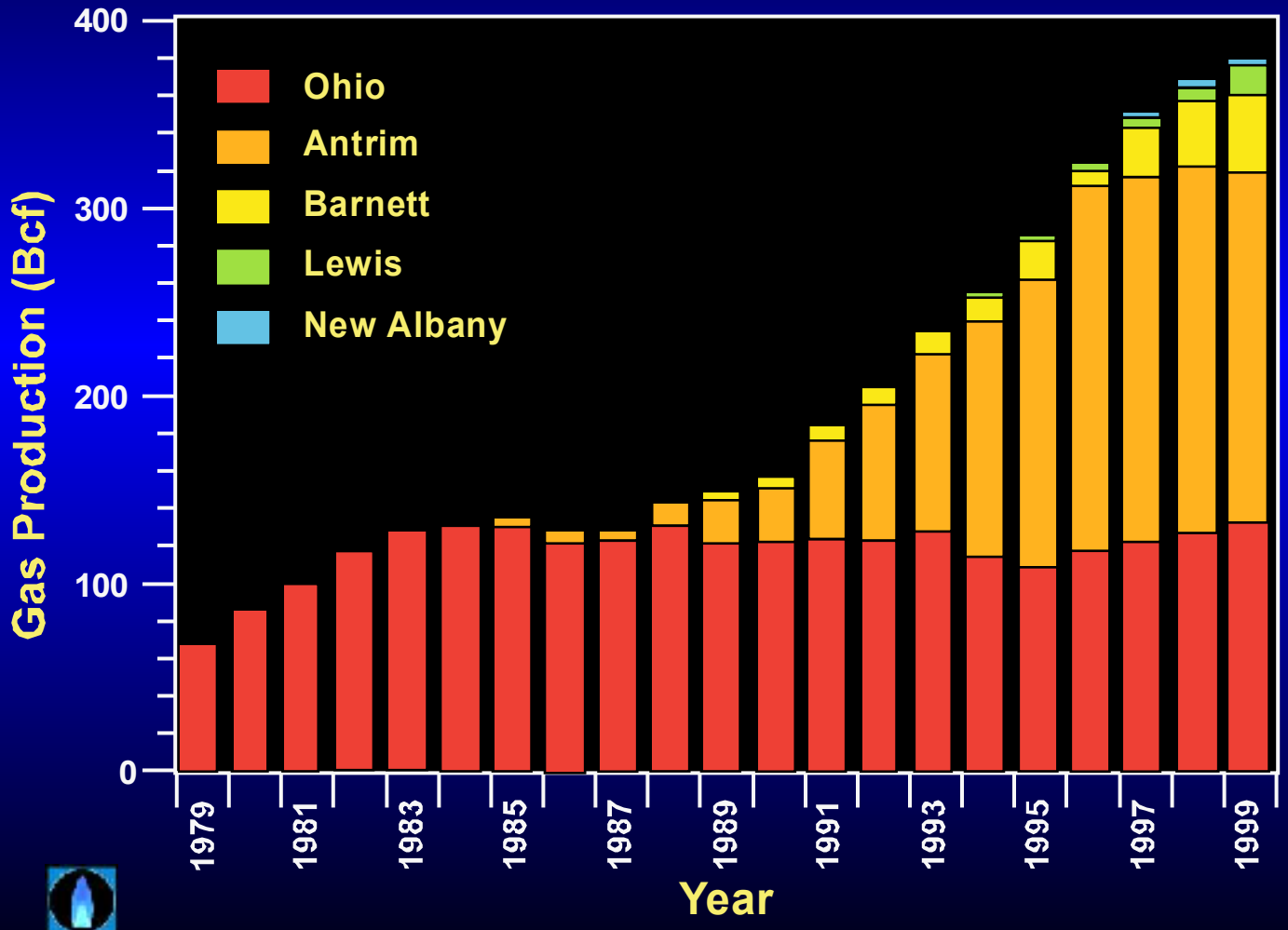


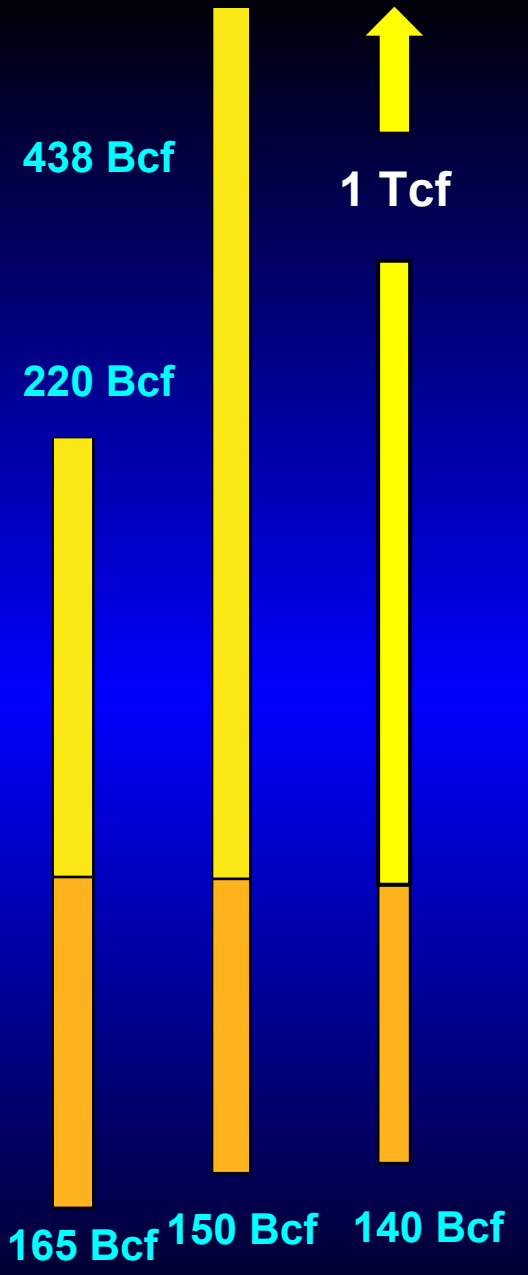
Hill and Nelson (2000); Curtis (2002);
Clouser (2006); Wagman (2006); Haines (2006)

ALTUDA

SHALE GAS PRODUCTION

After Hill and Nelson (2000); New data from Foster (2003); Michigan Oil
and Gas Commission (2003); Clouser (2006); Wagman (2006)





ALTUDA

DARK CLOUDS ON THE HORIZEN

"Even with this list of accomplishments, dark clouds have begun to appear on the horizon for unconventional gas. For many years, progress in technology was able to counter resource production, holding the key performance measures (reserves added per well) relatively constant. This unfortunately, is no longer the case. With reductions in unconventional R&D and technology investment, (including termination the Gas Research Institute and the decline of the DOE gas research and technology program), overall technology progress has slowed considerably."

Vello Kuuskraa (2007)

	Estimated US Resources*	Billion BOE	Estimated Recoverable	Billion BOE	US Production	Remarks*
Coal	1.08 x 10^{12} tons	4,190	230 x 10^{9} tons	892	1 x 10^{9} tons	Mineable coal resources; in-place 17x
Coalbed Methane	1,777 Tcf	313	74	13	1.25 Tcf	GIP estimates include Alaska
Gas Hydrates	320,000 Tcf	56,939	n/a	n/a	n/a	Statistical mean estimate
Geothermal	1.7 x 10^{25} J	2.8 x 10^{6}	2.4 x 10^{21} J	430	n/a	Accessible at less than 7 km
Oil Shale	218 x 10^{10} bbl	2,180	n/a	n/a	n/a	Reserves are price dependent
Tar Sands/Heavy Oil	30.5 x 10^{9} bbl	30.5	n/a	n/a	225 x 10^{6} bbl	9% of oil reserves are <20 API
Nuclear	3,490 x 10^{6} lbs	139	271 x 10^{6} lbs	11	4 x 10^{6} lbs	U_3O_8 resources; 0.7% U-235; $30/lb
Oil	198 x 10^{9} bbl	1,98l	28.6 x 10^{9} bbl	29	2.8 x 10^{9} bbl	EIA technically recoverable resources
Natural Gas	1,431 Tcf	252	164 Tcf	339	18.9 Tcf	EIA technically recoverable resources

Scott (2001)