

ROCKY MOUNTAIN OILFIELD TESTING CENTER





A Secure Domestic Energy Supply

CBM Fair
June 3, 2004





Balancing Natural Gas Policy

The Challenges of Meeting the Demands of a Growing Economy



National Energy Policy

- Recognizes Importance of Achieving Reliable, Affordable and Secure Energy
- Comprehensive in Scope
- Integrated Purpose and Application
- Natural Gas Key – Staple of Electric Power
- Diverse and New Energy Sources Required
- Energy Efficiency and Conservation
- Protect Environment – Science Based
- www.whitehouse.gov/energy/



NEP Steps Underway

- Proposed Royalty Relief in Deep Water
- Interagency Activities with Department of Interior – Access To Lands
- BLM and MMS Improving Processing of Permits and Lease Sales
- BLM Regional Task Forces on Drilling Applications



NEP Steps Underway (cont.)

- DOE Promoting Improved Exploration Technology – Public-Private Partnerships
- Long Term – Methane Hydrates Research
- FERC Steps To Expedite Permitting of LNG Import Facilities (www.ferc.gov)
- Addressing Natural Gas and Electric Power Transmission Systems Issues



Rocky Mountain Region DOE Steps

- DOE Secretary Abraham Commissioned Natural Gas Study by National Petroleum Council (NPC) In 2002
- Office of Fossil Energy Published Issues Report
 - *Rocky Mountain States Natural Gas – Resource Potential and Prerequisites to Expanded Production*

www.fossil.energy.gov/programs/oilgas/publications/naturalgas/rockymtn_final.pdf



NPC Study Timely

National Petroleum Council

- Federally Chartered, Privately Funded Advisory Committee
- Sole Purpose is to Advise and Make Recommendations to The Secretary of Energy
- Operates Under Federal Advisory Committee Act
- Council Comprised of ~175 Members
- www.npc.org/

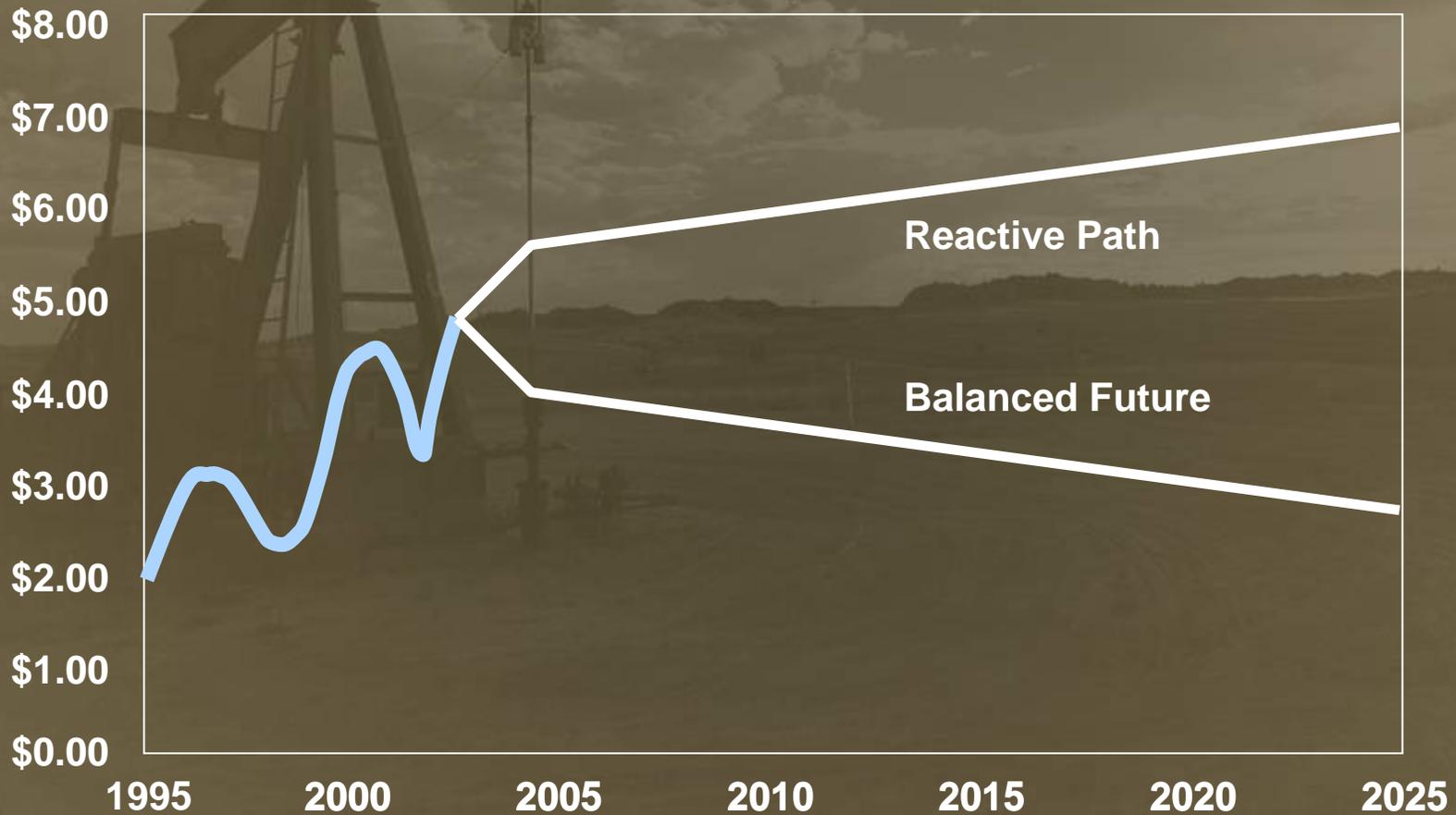
Secretary Abraham, March 2002

“Examine the potential implications of new supplies, new technologies, new perceptions of risk, and other evolving market conditions that may affect the potential for natural gas demand, supplies, and delivery through 2025 ... provide insights on energy market dynamics, including price volatility and future fuel choice, and an outlook on the longer-term sustainability of natural gas supplies ... advice on actions that can be taken by industry and Government to increase the productivity and efficiency of North American natural gas markets and to ensure adequate and reliable supplies of energy for consumers.”



Potential Gas Price Range

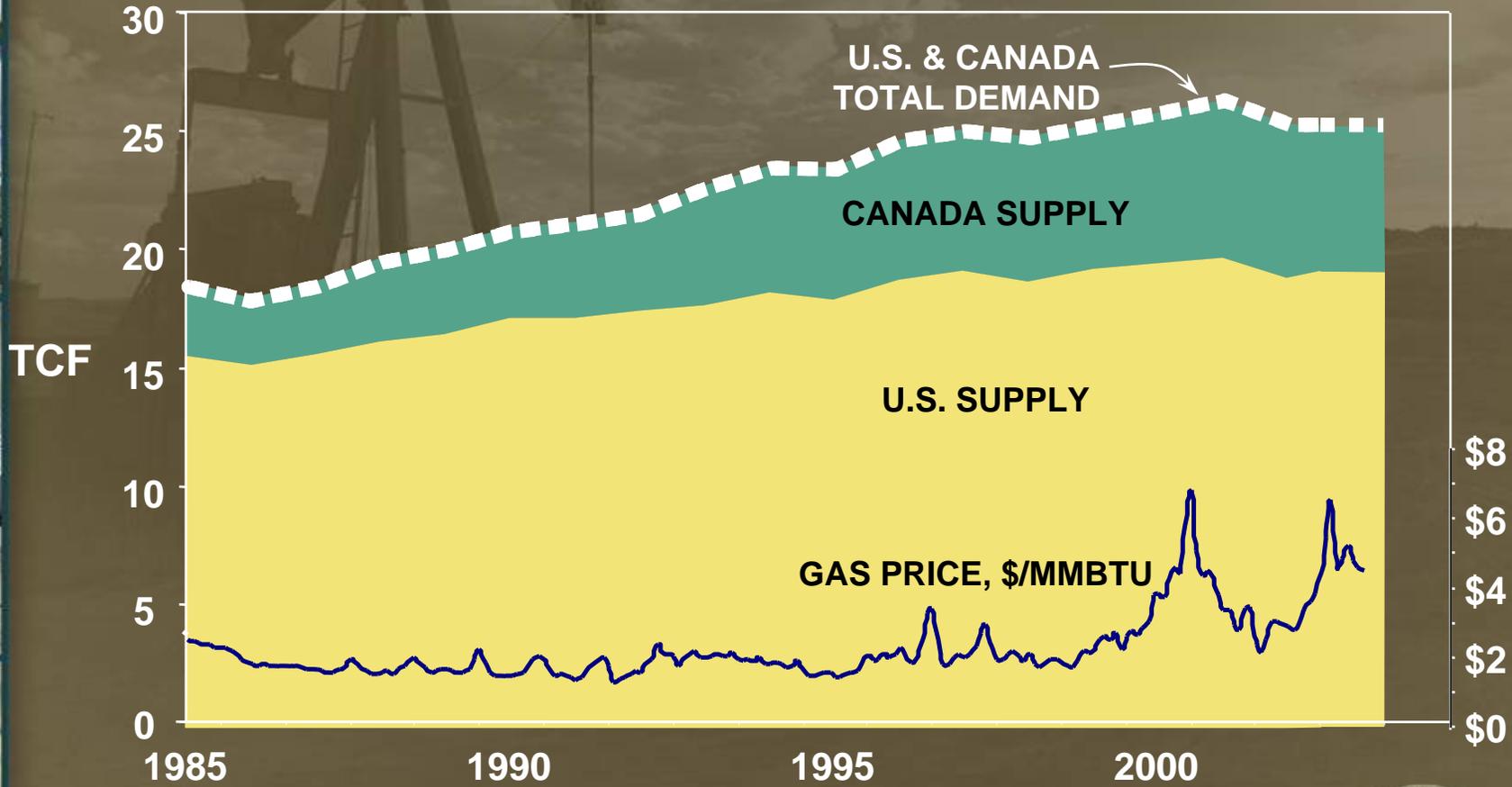
Annual Average Henry Hub Prices, \$/MMBTU (\$2002)



Source - NPC

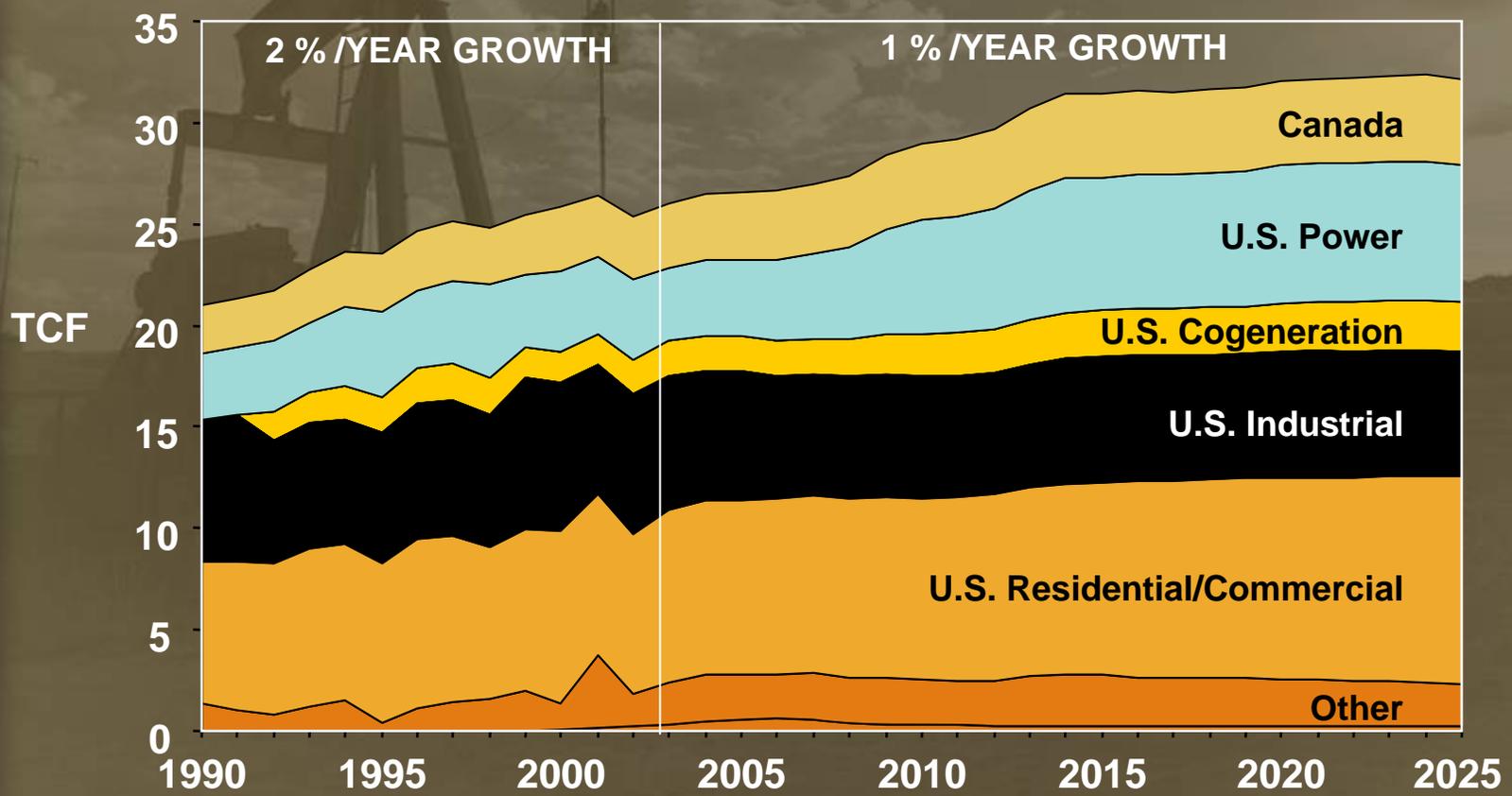


Prices Reflect Supply & Demand Shift



Demand Growth Will Moderate

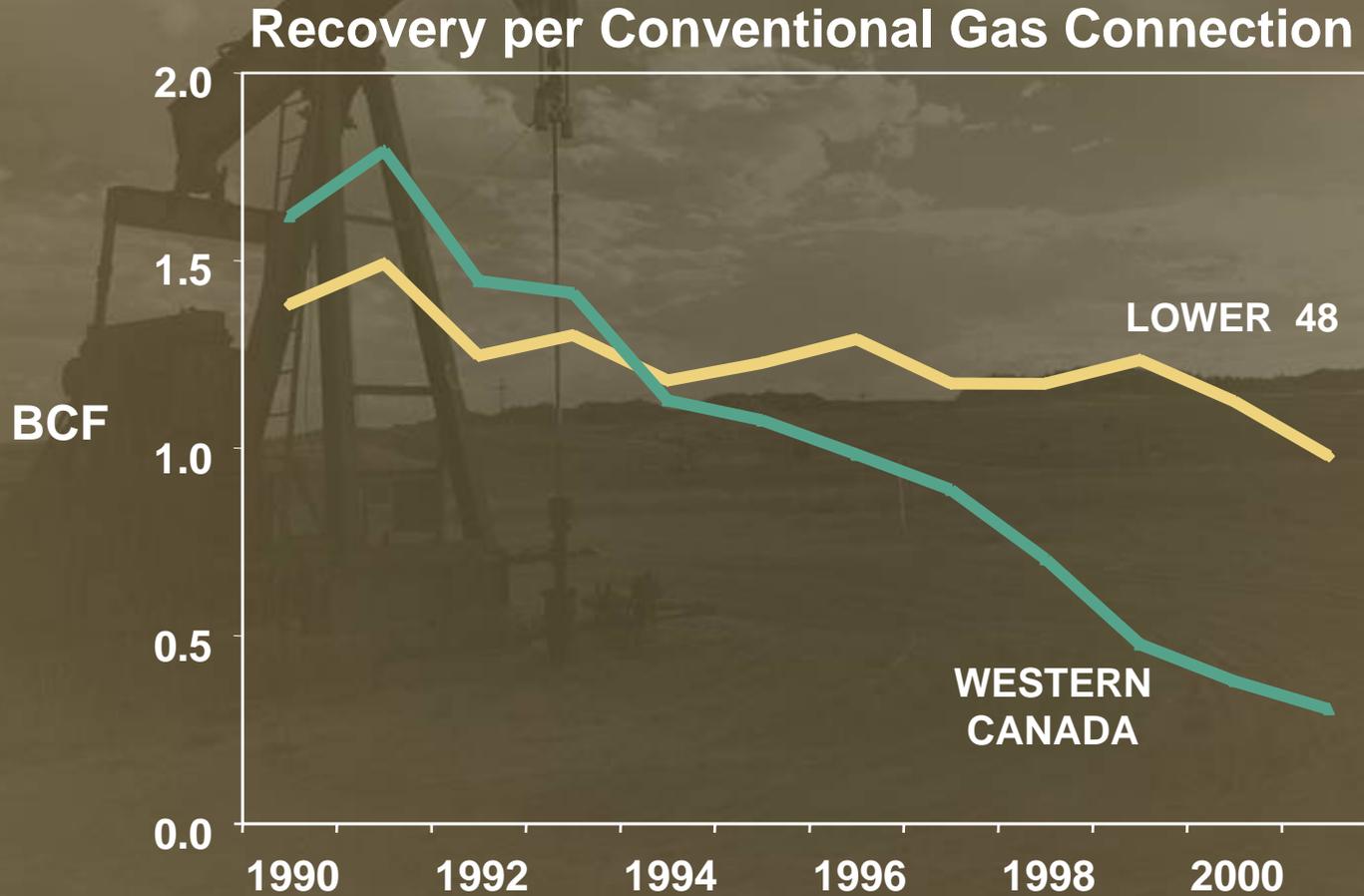
Power Sector Drives Growth



Source - NPC



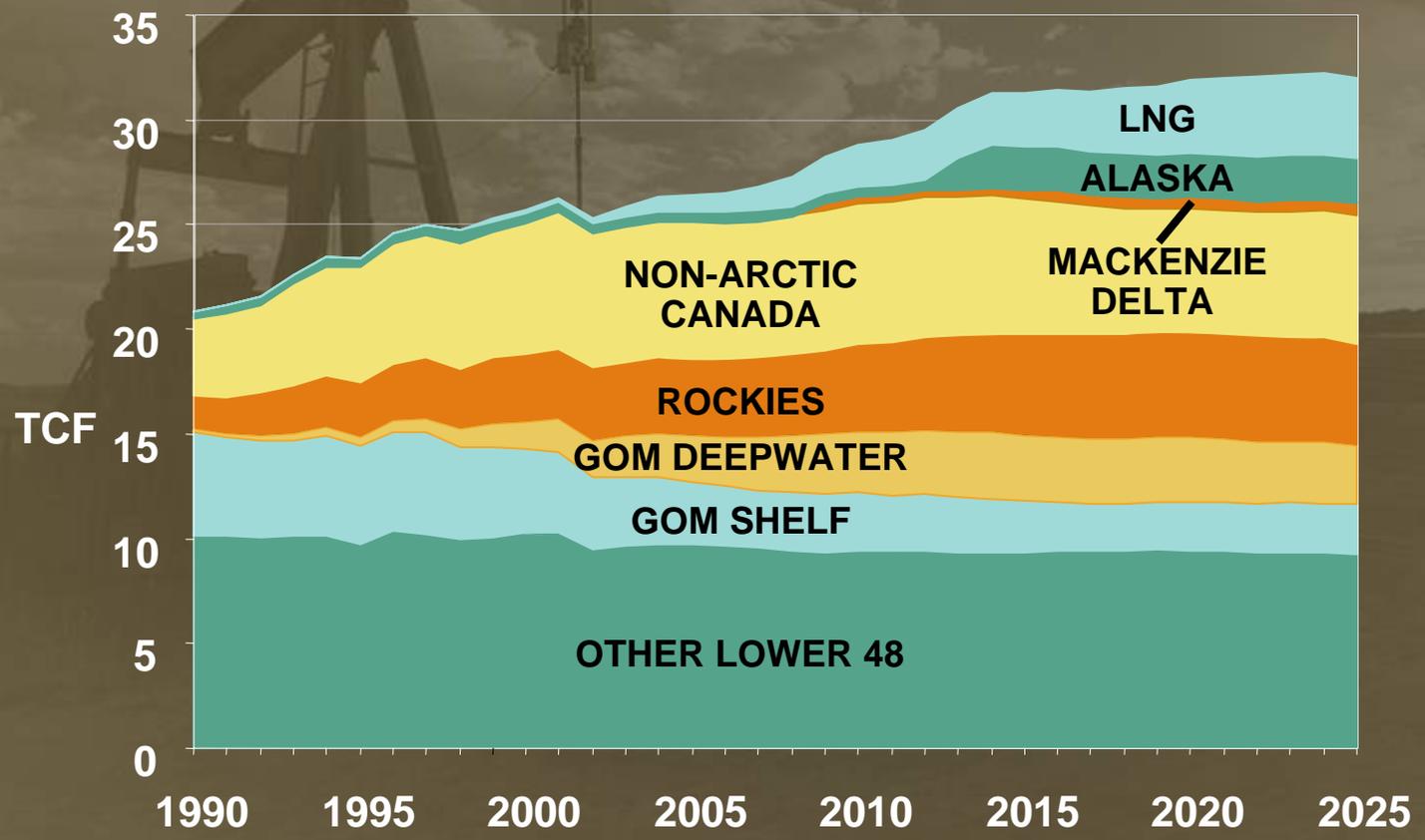
Prod. History Confirms Maturing Resource



Source - NPC



Demand Met from Diverse Supply Source

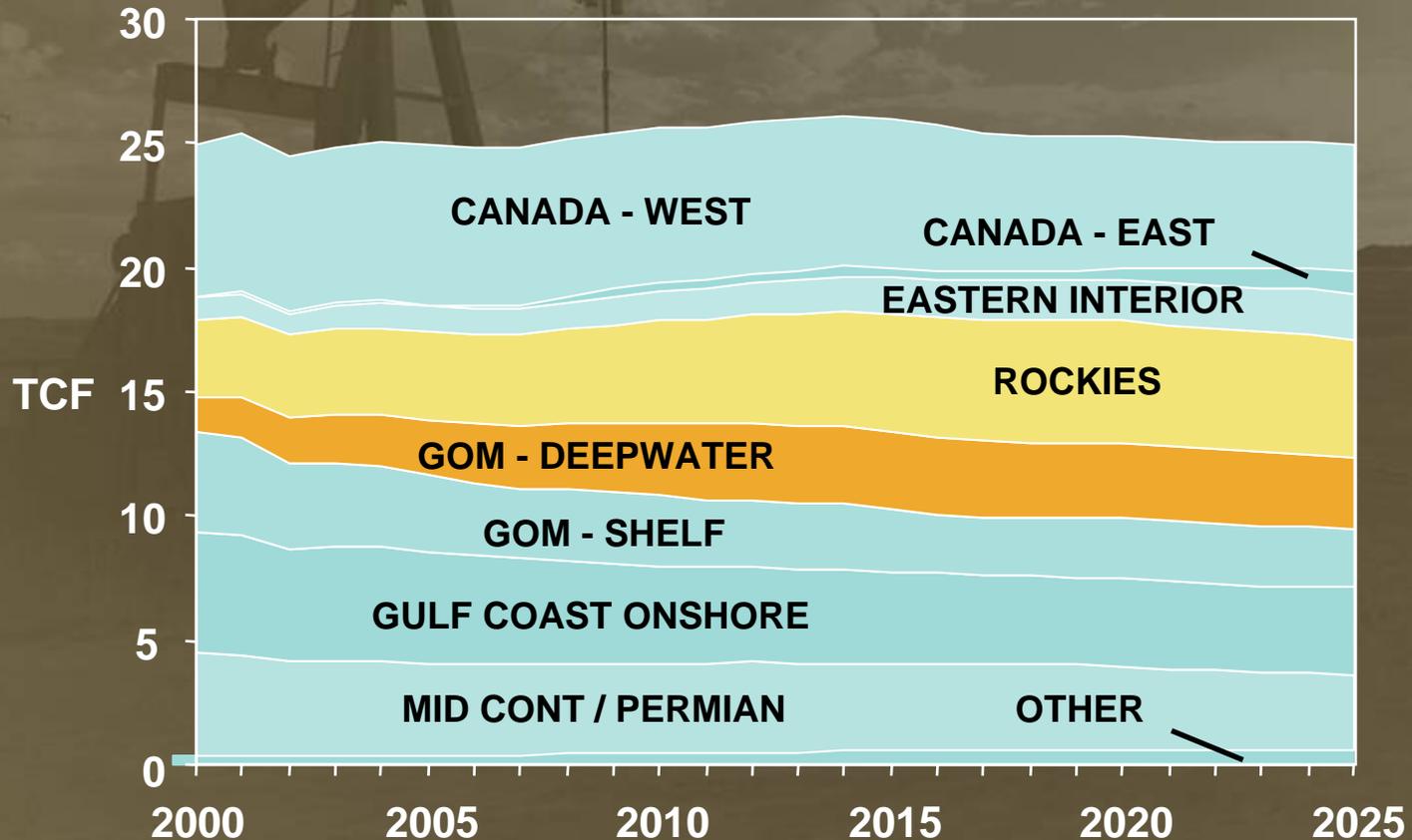


Source - NPC



Rockies Production Must Grow

Non-Arctic U.S. and Canadian Production Outlook

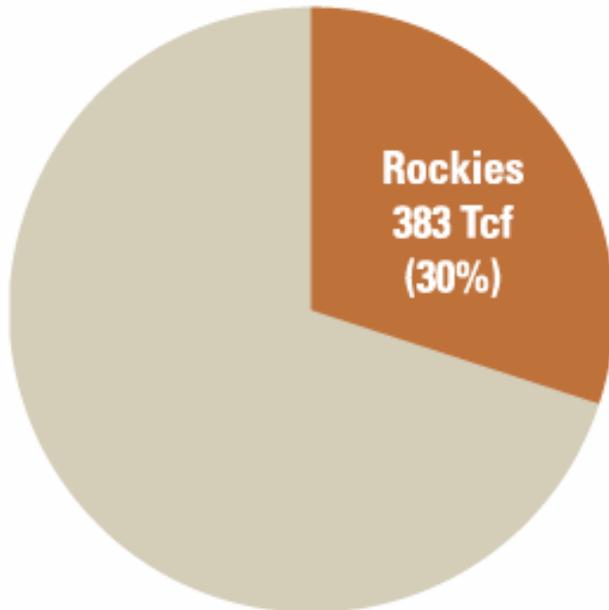


Source - NPC



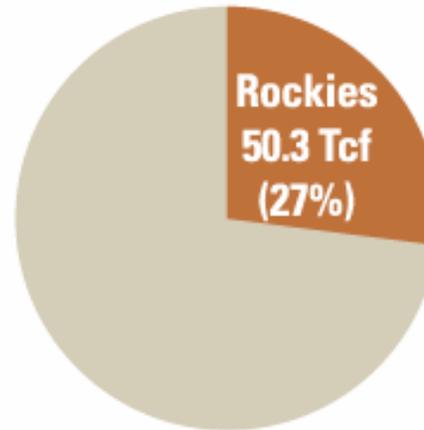
Rocky Mountain Gas vs. U.S. Total

Technically Recoverable Resources*



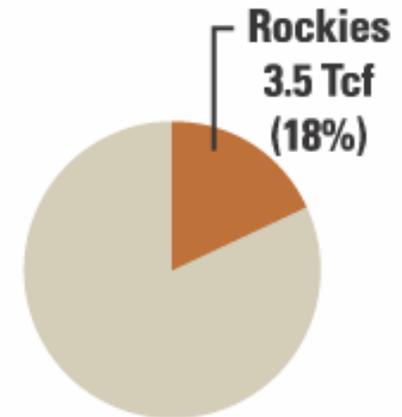
U.S. Total: 1290 Tcf
*Includes proved reserves

Proved Reserves



U.S. Total: 183.5 Tcf

Annual Production (2001)

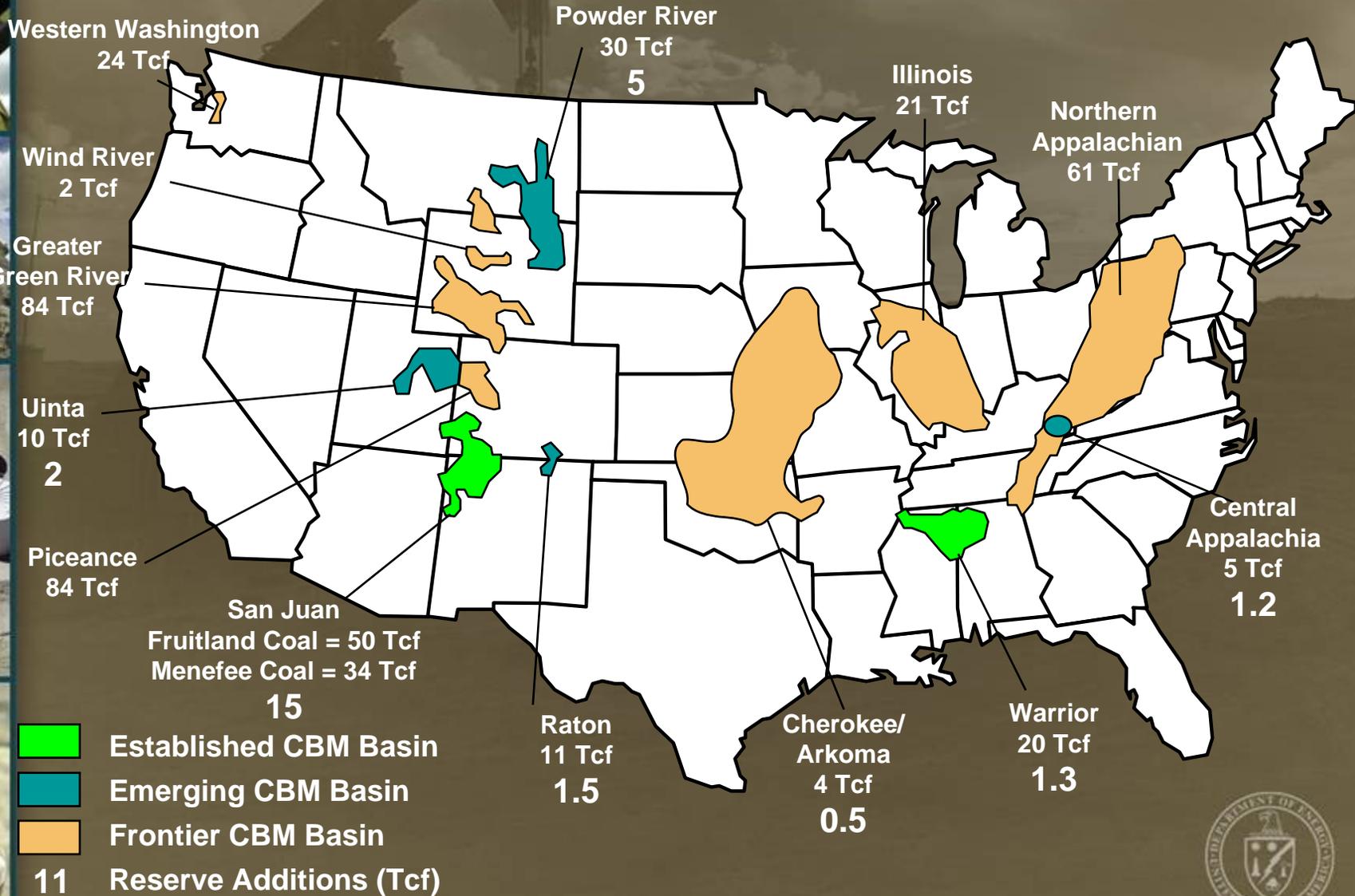


U.S. Total: 19.8 Tcf

Source: Energy Information Administration (2003).

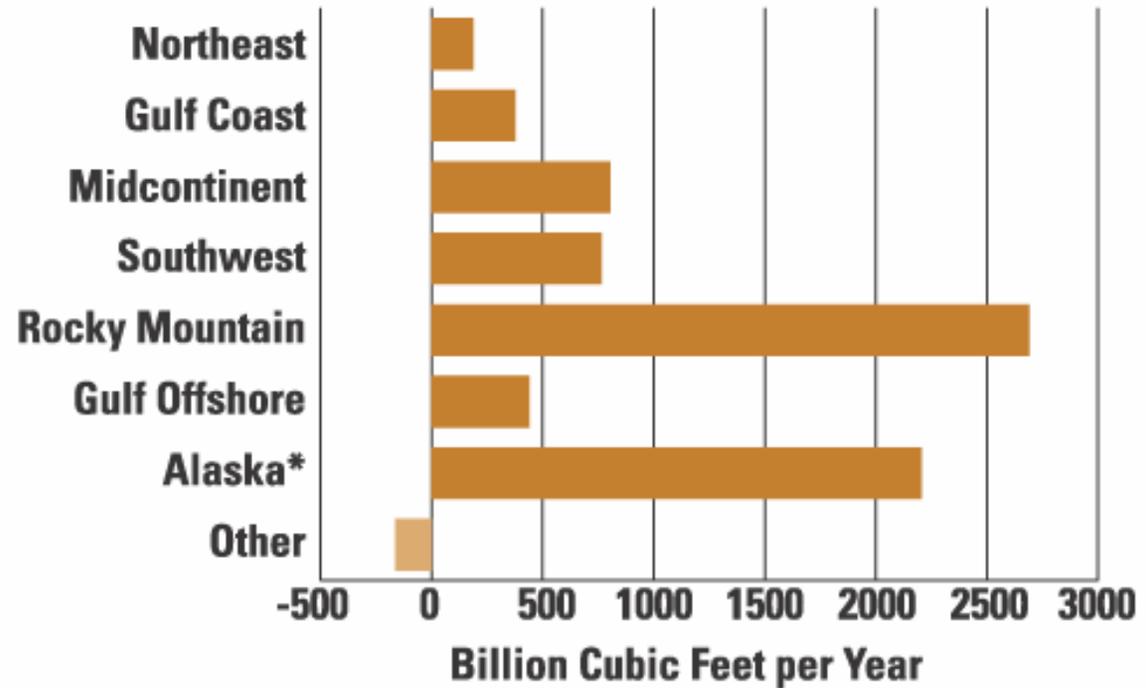


Of 400 tcf of CBM Gas In Place, Over 20 tcf of Reserves Have Been Booked



Possible Large Increase from Rockies

Figure 4. Rocky Mountain States could provide the largest regional increase—an additional 2.7 Tcf per year—in future U.S. natural gas supplies by 2025.



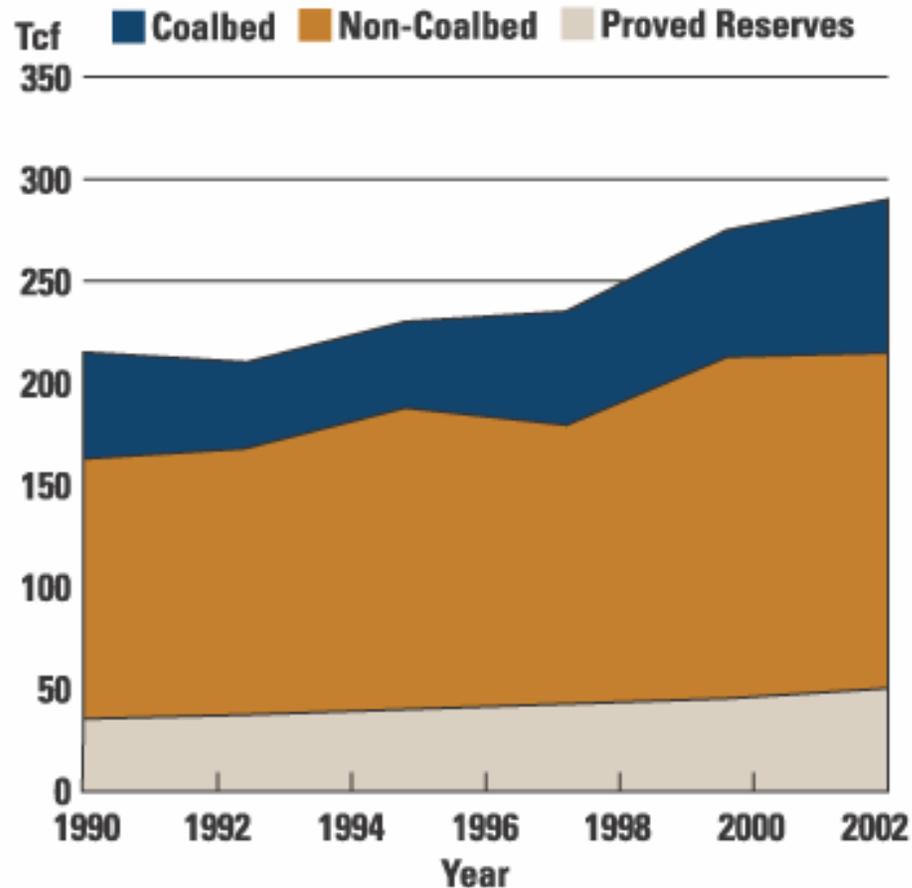
** Assumes that the Alaska Natural Gas Pipeline is completed before 2025.*

Source: Energy Information Administration, 2003.



Rockies Gas Resource Expansion

Figure 1. Assessments of natural gas resources in the Rocky Mountain States have shown a steady, technology-driven expansion.



Source: Potential Gas Committee, 1990-2002.

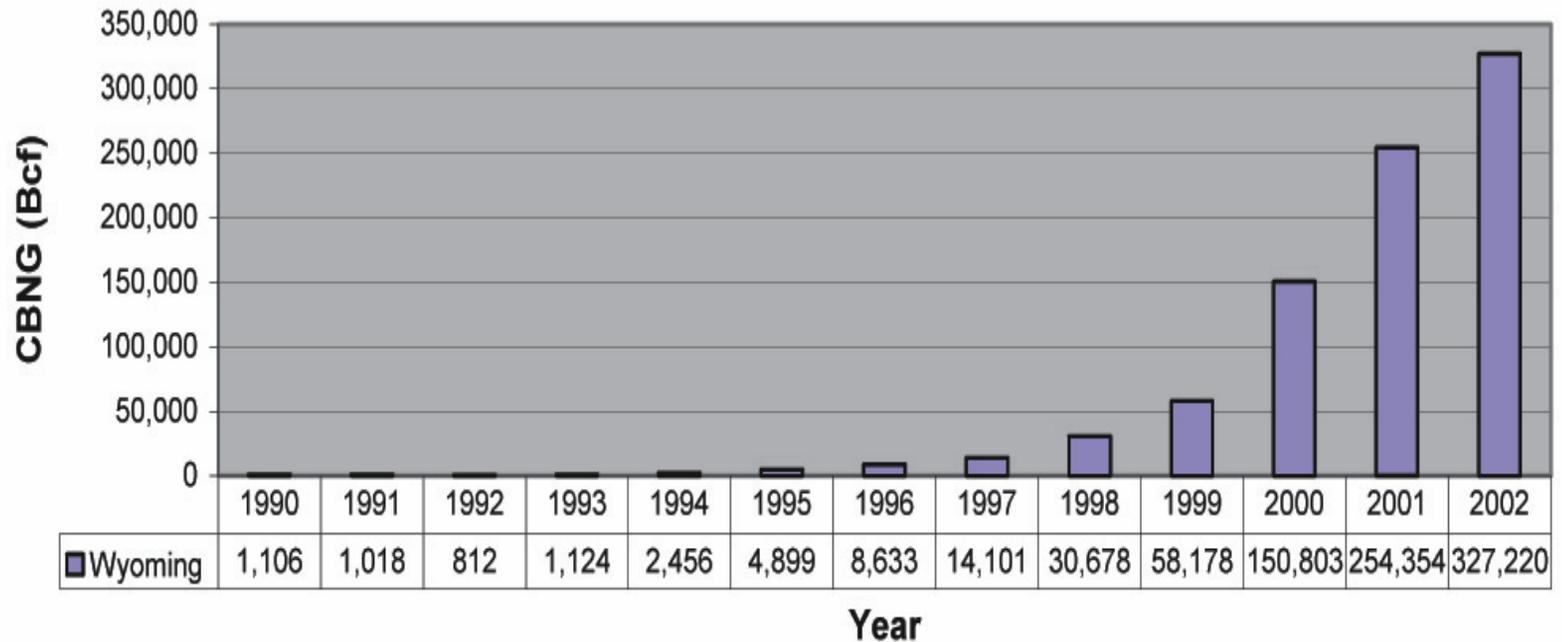


Rockies Gas Resource Expansion (cont.)

WYOMING

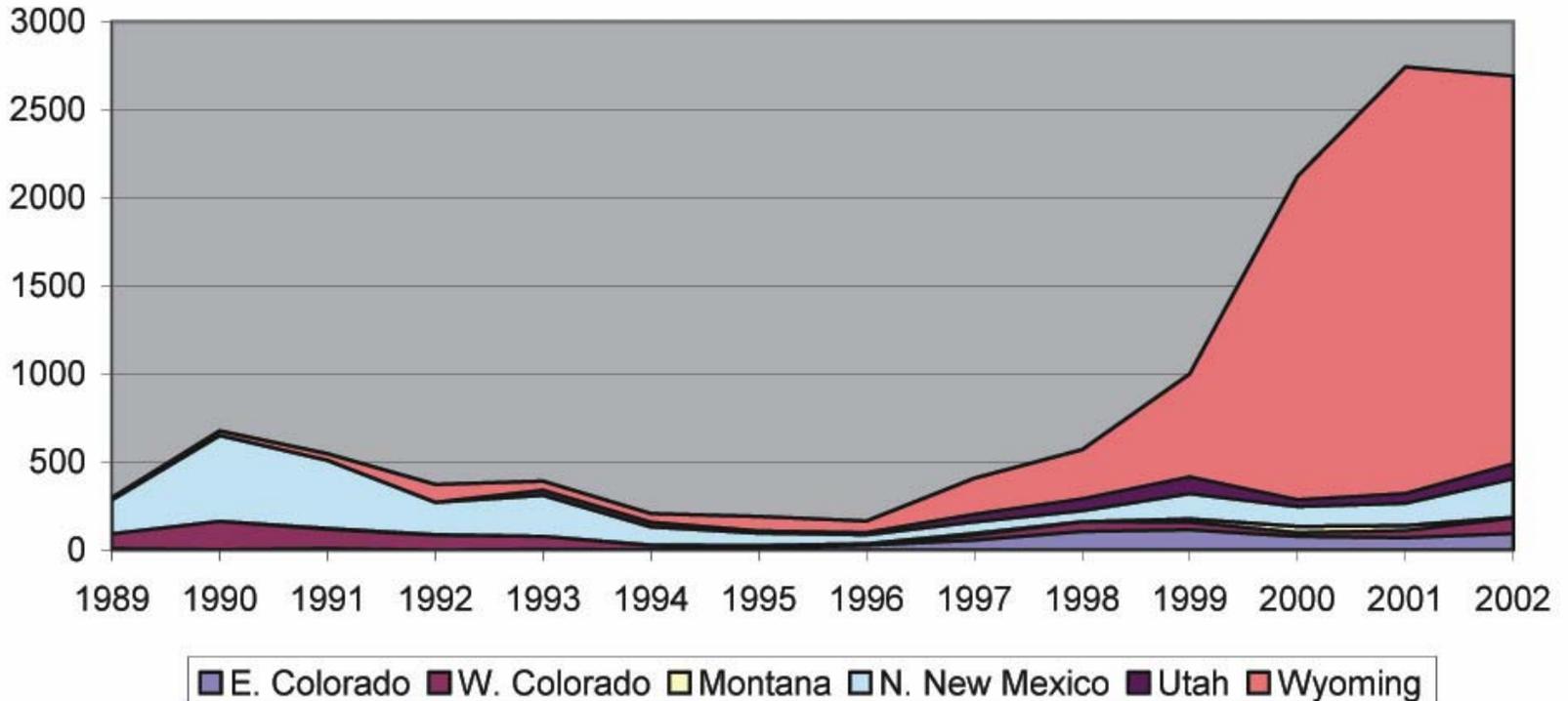
From Wyoming Oil and Gas Commission

Wyoming CBNG Production



Rockies Gas Resource Expansion (cont.)

IHS Rocky Mountain CBNG Completions



Rockies Gas Resource Expansion (cont.)

Rocky Mountains Contribution to U.S. Energy Supply

NATURAL GAS

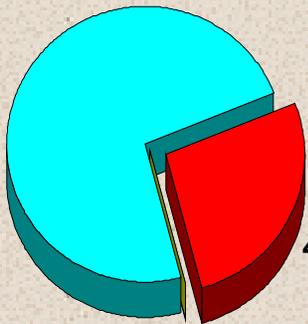
COALBED METHANE

COAL

RESERVES

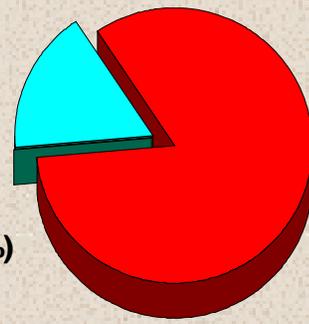
RESERVES

RESERVES



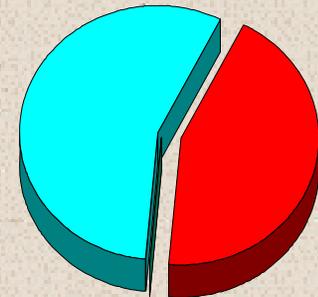
Rocky Mountains
49.4 Tcf (27%)

Total: 183.5 Tcf



Rocky Mountains
14.6 Tcf (83%)

Total: 17.5 Tcf



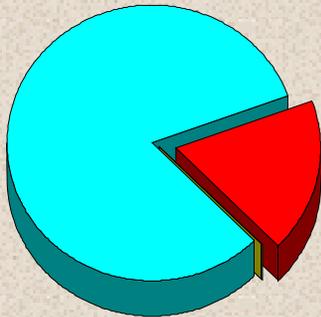
Rocky Mountains
220 Billion Tons (44%)

Total: 500 Billion Tons

PRODUCTION

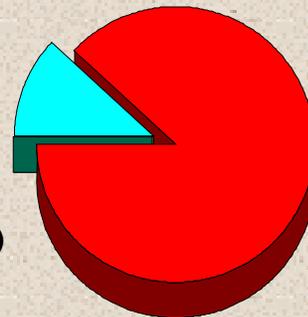
PRODUCTION

PRODUCTION



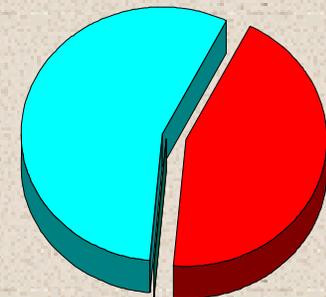
Rocky Mountains
3.5 Tcf (18%)

Total (2001): 19.8 Tcf



Rocky Mountains
1.4 Tcf (88%)

Total (2001): 1.6 Tcf



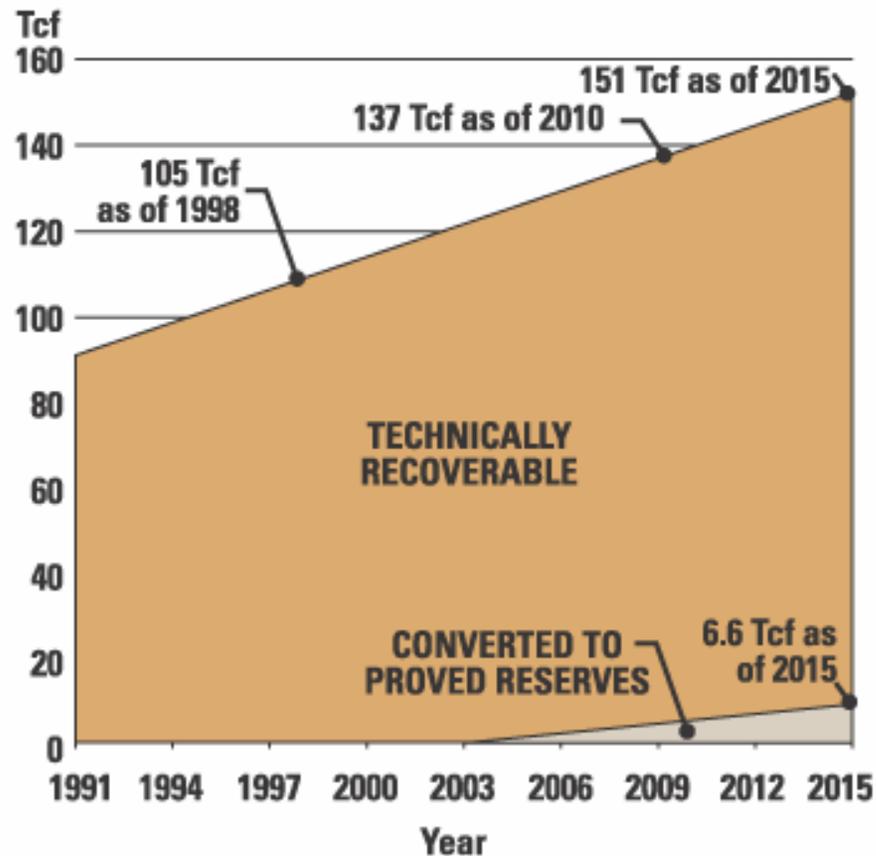
Rocky Mountains
498 Million Tons (44%)

Total (2001): 1.1 Billion Tons



Resource Growth Limited by Access

Figure 2. With progress in technology, tight-gas technically recoverable resources are projected to grow. However, without access to resources and markets, only a small portion—6.6 Tcf—is converted to proved reserves and production.



Source: National Petroleum Council, 1999.



Industry R&D Shrinking

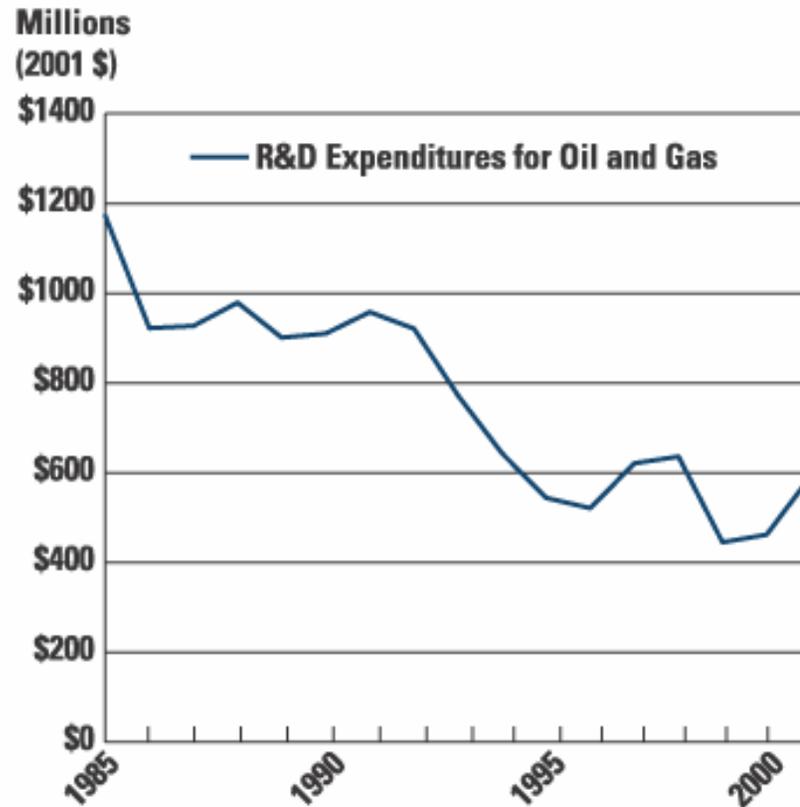


Figure 7. Energy industry R&D investments have been cut in half since 1985.

Source: Energy Information Administration, 2002, Performance Profiles of Major Energy Producers: 2000, DOE/EIA-0206 (00); and EIA, 1999, Performance Profiles of Major Energy Producers: 1997, DOE/EIA-0206 (97).



DOE Oil & Gas Technology Assistance



DOE/NETL Gas Supply Program

Supporting Rocky Mountain Region Gas Issues

Fostering Technology Development To Reduce Costs & Risks of Tight Gas/Deep Gas

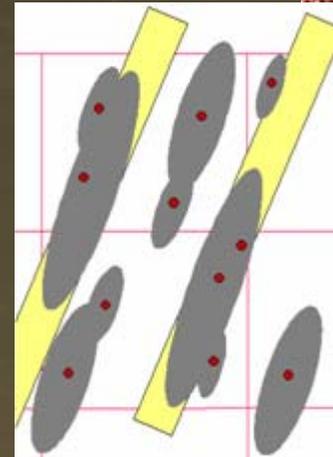
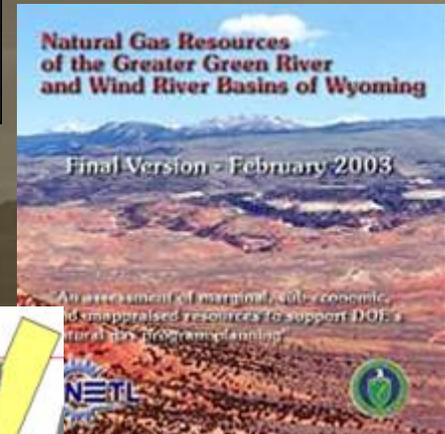
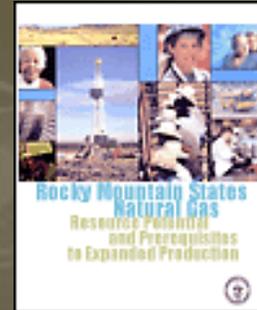
- Western tight gas sands program (1980s)
- Natural fracture detection, prediction, and diagnostics tools
- Adv. seismic to avoid water in basin-centered settings
- New materials to reduce deep drilling costs
- Ultra-high resolution vertical seismic profiling
- Deep horizontal drilling demonstration
- Infill drilling optimization (customized development patterns)
- Advanced drilling products



DOE/NETL Gas Supply Program (cont.)

Science-Based Information

- Rocky mountain gas issues publication
- Assessments of gas resources
- Green and Wind River Basins
- Uinta Basin – June 2004

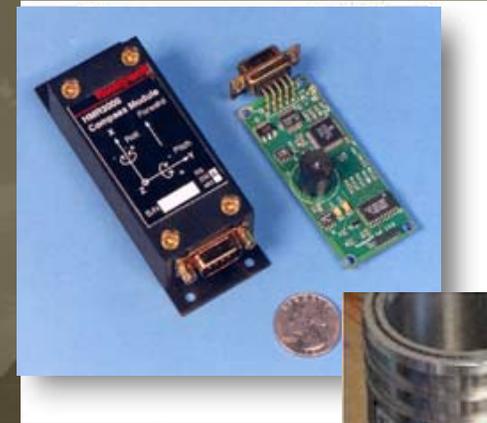


DOE/NETL Gas Supply Program (cont.)

Advanced Drilling, Completion, and Stimulation Products

Special Focus

- Fundamental breakthroughs in high temperature materials and electronics
- Leverage into integrated deep (20,000+ ft.) drilling system



Joint industry/government products

- Smart Drill Pipe – speeding data transmission by 100,000X
- Ultra-lightweight cement for CBM
- Composite Drill Pipe – 1/2 steel
- Aphron Drilling Fluid
- Downhole Mixing for Fracture Stimulation



Rocky Mountain Oilfield Testing Center

Operating Stripper Field – Teapot Dome, Casper, WY
Testing & Demonstration – Cost Share

- Drilling Tools & Techniques
- Operations & Production
- Environmental Technologies

Bridges Gap from Development to Commercialization



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