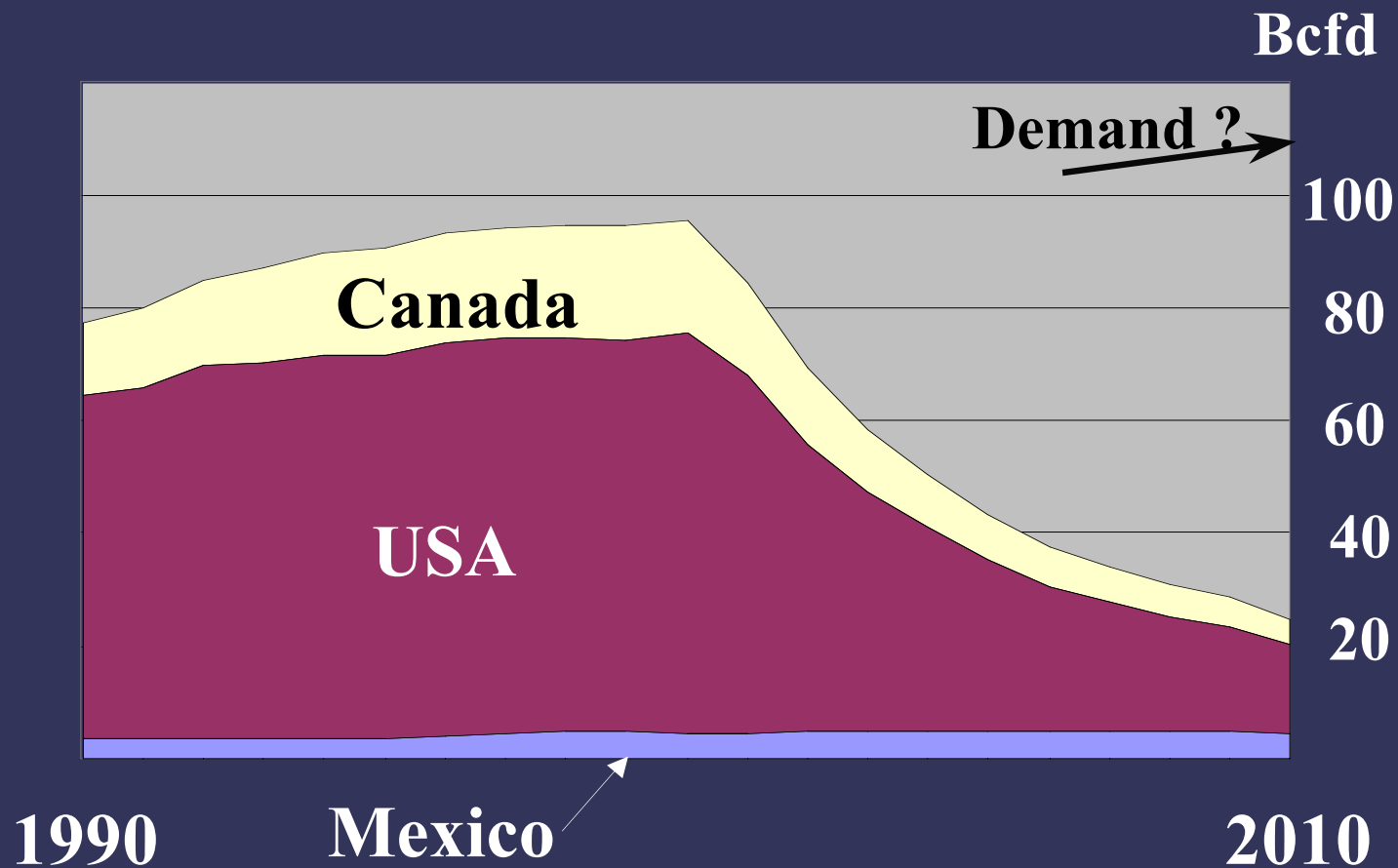
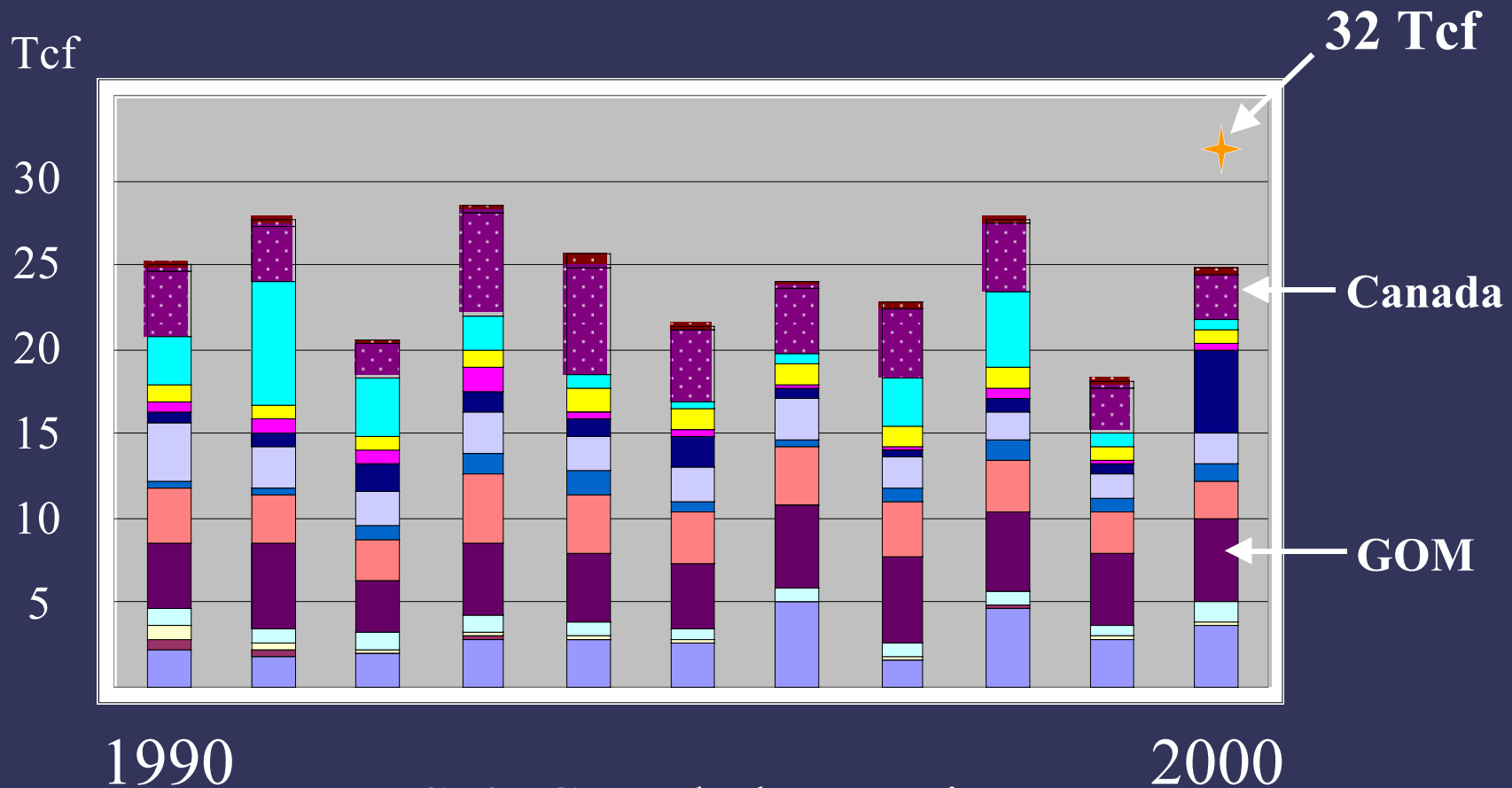


# N. America Gas Supply Without Any Drilling or Development



# Natural Gas Reserve Adds Fail to Match Production



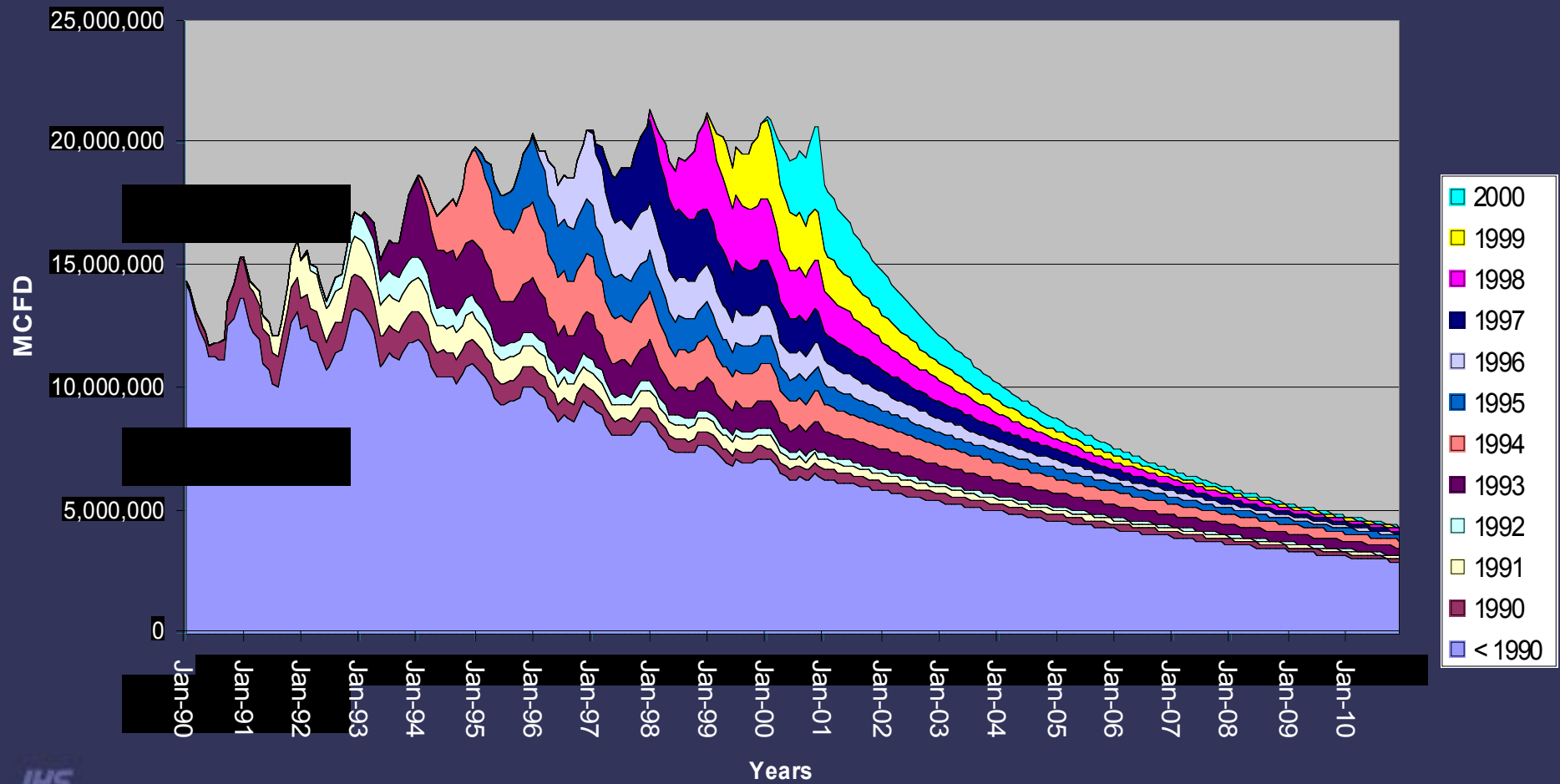
US & Canada by Region  
(32 Tcf Raw Prod. In 2000)

# Paths & Pitfalls

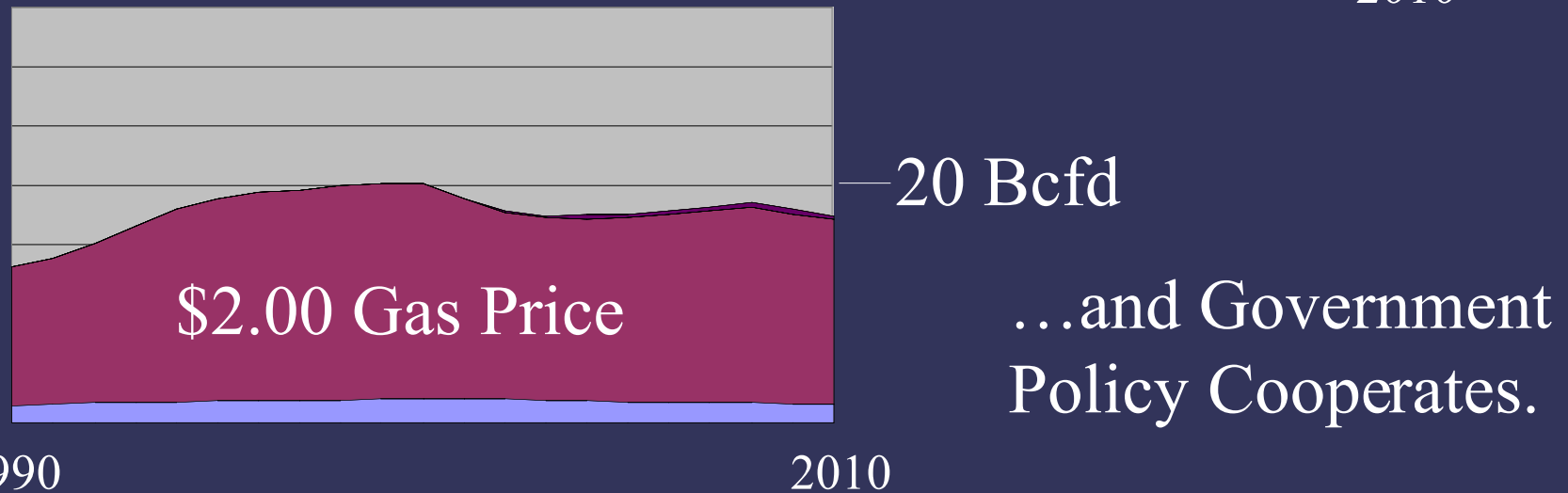
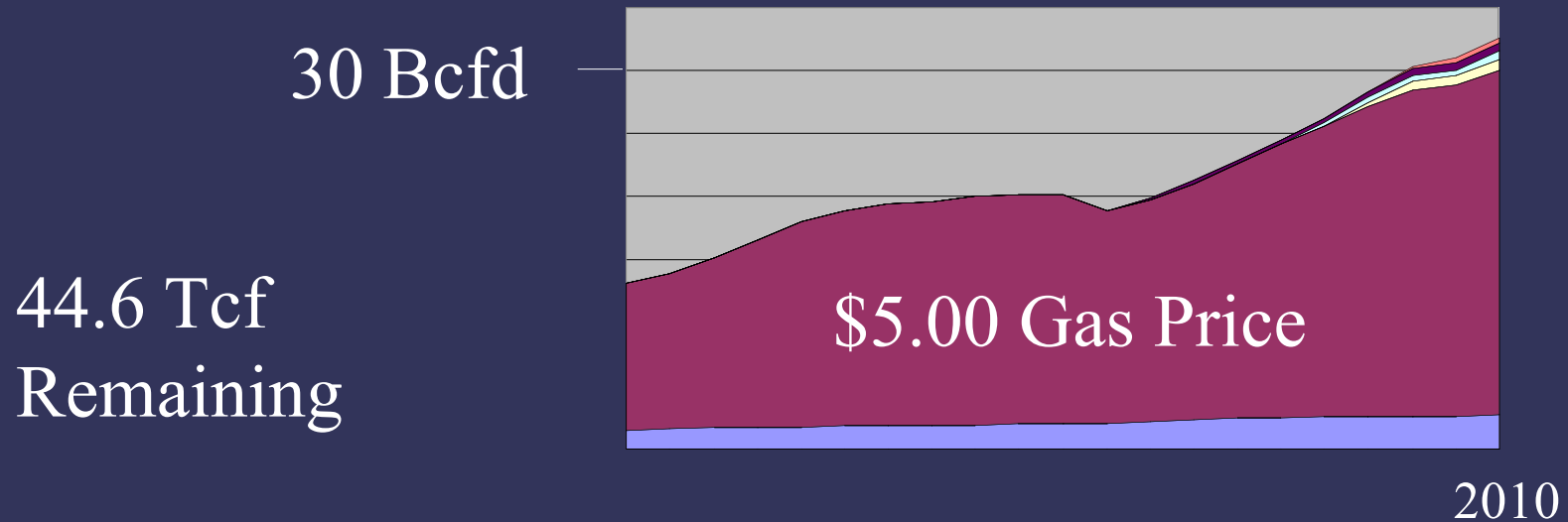
## Toward a U.S. 34 Tcf Market

- **EIA 2002 Outlook:**
  - 34 Tcf 2020 demand (2% avg. ann. Growth)
- **Are DOE supply assumptions realistic?**
  - Rockies + 2.67 Tcf
  - Canada + 2.0 Tcf
  - Gulf coast + 1.83 Tcf
  - Deepwater GOM + 1.4 Tcf
  - Appalachian + 1.26 Tcf
  - Mid-continent + 1.25 Tcf
- **Alternatives**
  - LNG imports + 0.8 Tcf

# Western Canada Vintaged Daily Gas Production 1990 - 2010



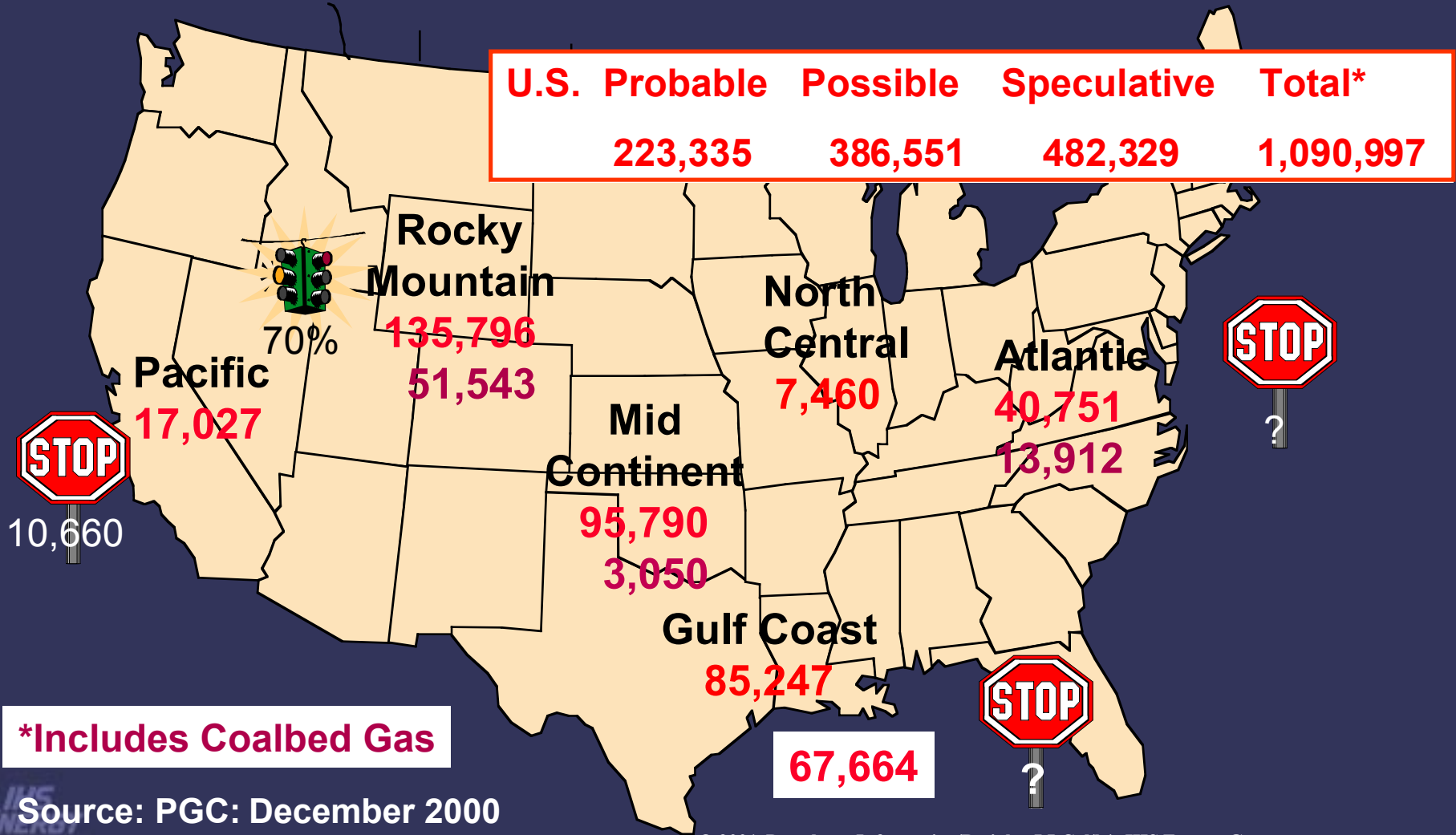
# Western Canada has Potential if the Price is Right ...



# Mean 2P Gas Resources Bcf

**AK - N. Slope**  
**77,572**

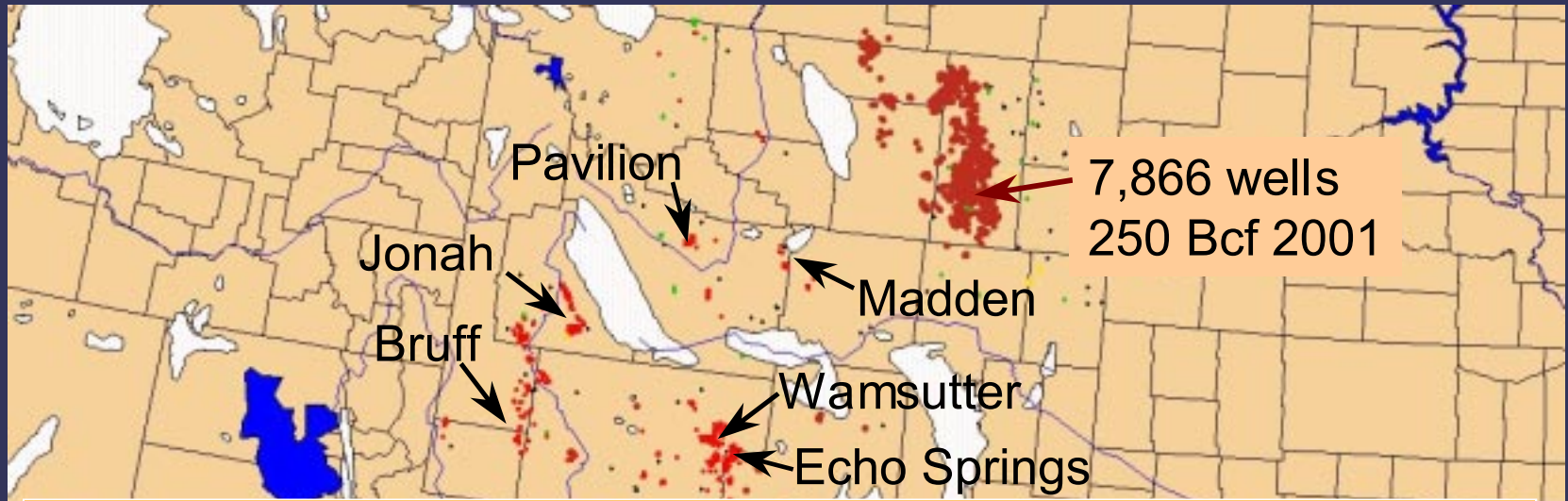
U.S. Probable	Possible	Speculative	Total*
223,335	386,551	482,329	1,090,997



**\*Includes Coalbed Gas**

Source: PGC: December 2000

# Central Rockies 2001 Wells



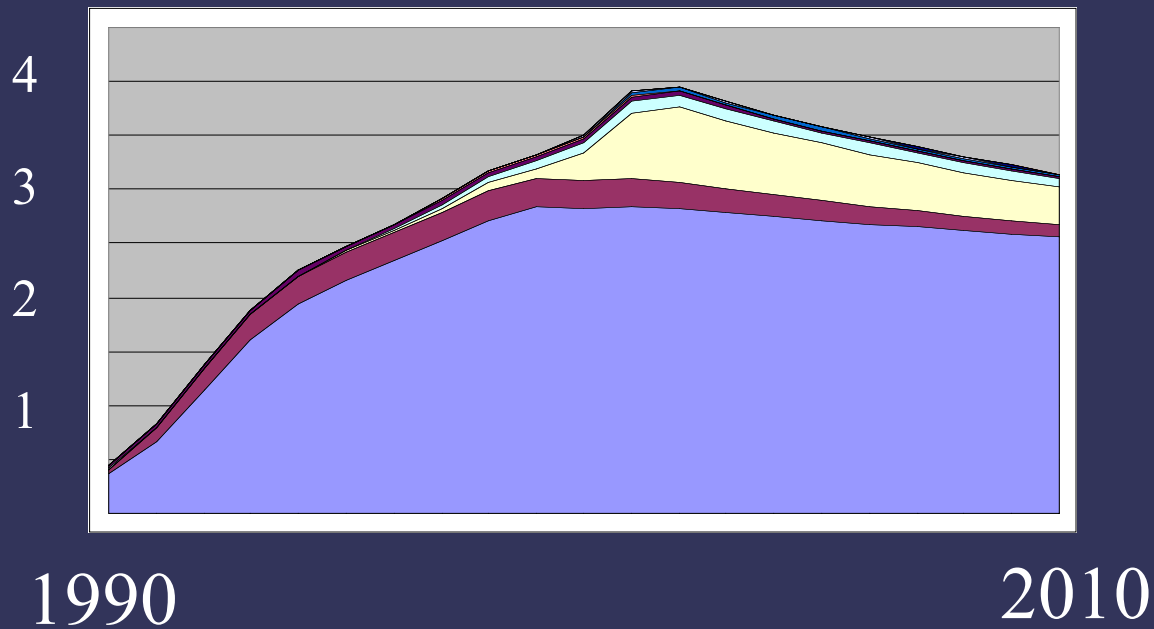
**EIA: 43% of Rockies gas – "unavailable for drilling due to environmental regulations, lack of pipeline capacity, or other barriers to development."**

Rocky Mountain Region Permits YTD August 9

	<u>2001</u>	<u>2002</u>	<u>March</u>	<u>July</u>
New	7,686	6,984	1,470	600
Abandoned		2,042		

# Coal Bed Methane

BCFD

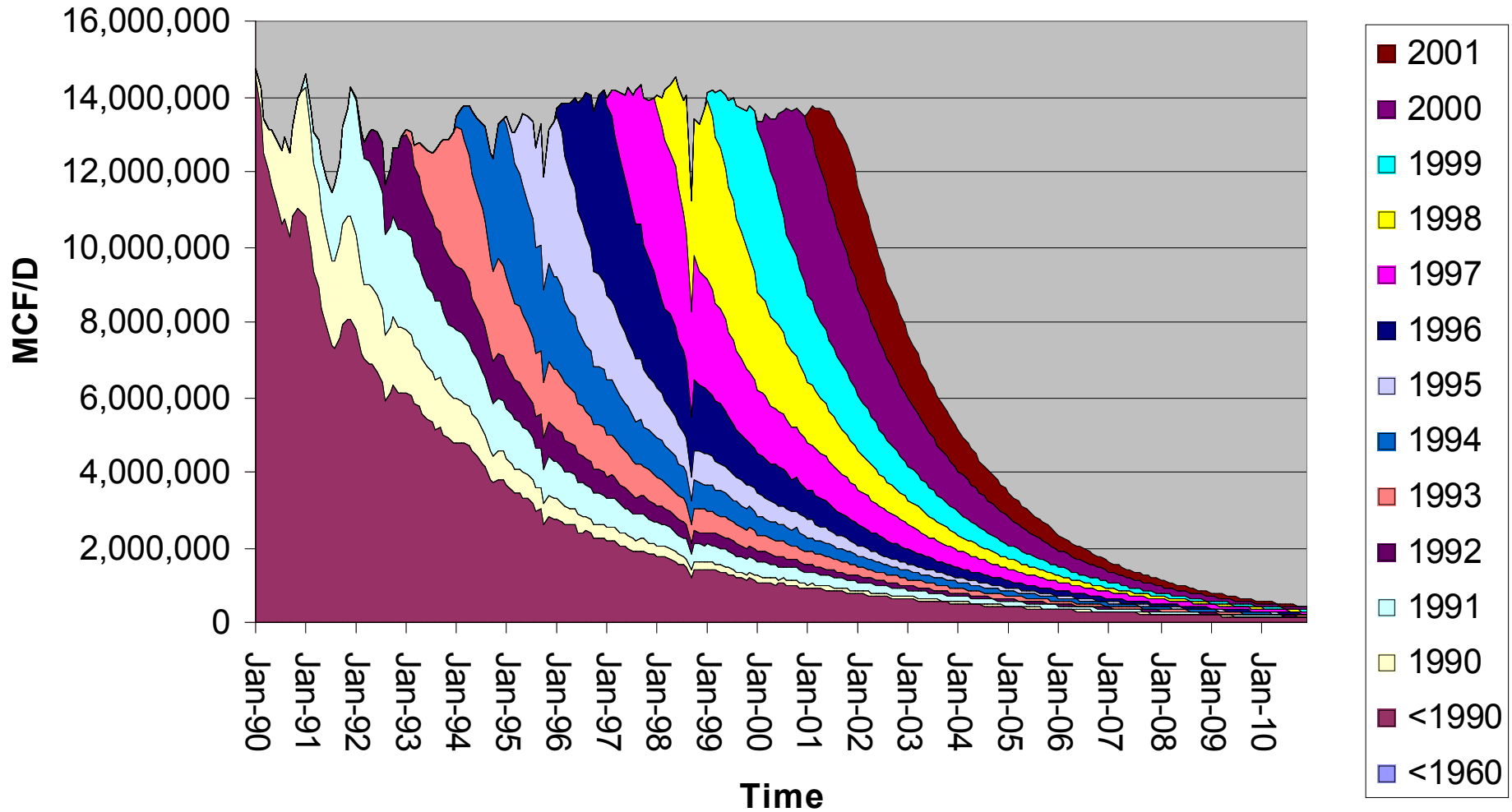


San Juan, Black Warrior, Powder River, and other US Basins



# Offshore GOM

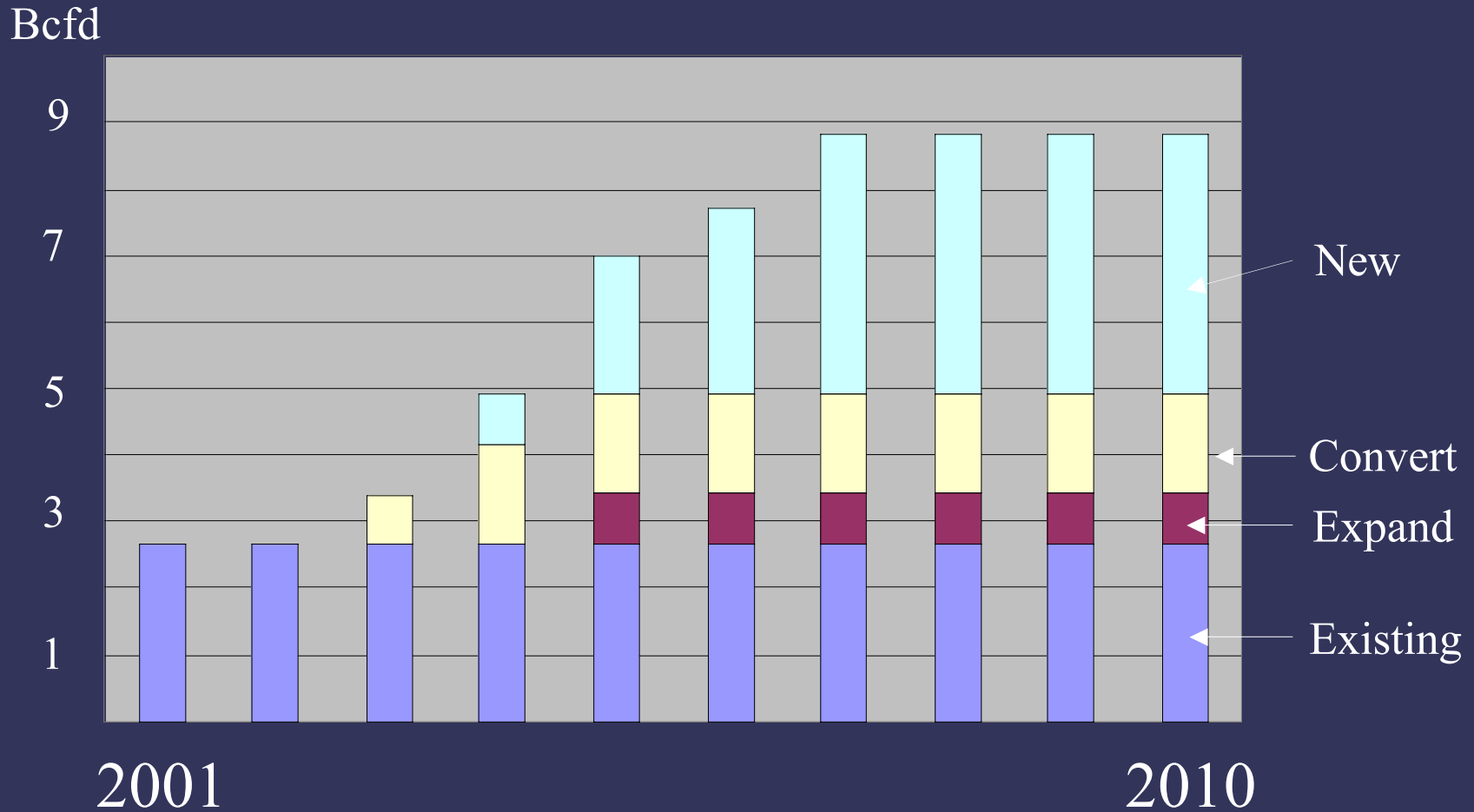
## Vintaged Daily Avg. Gas Production



# Alaska Gas Potential

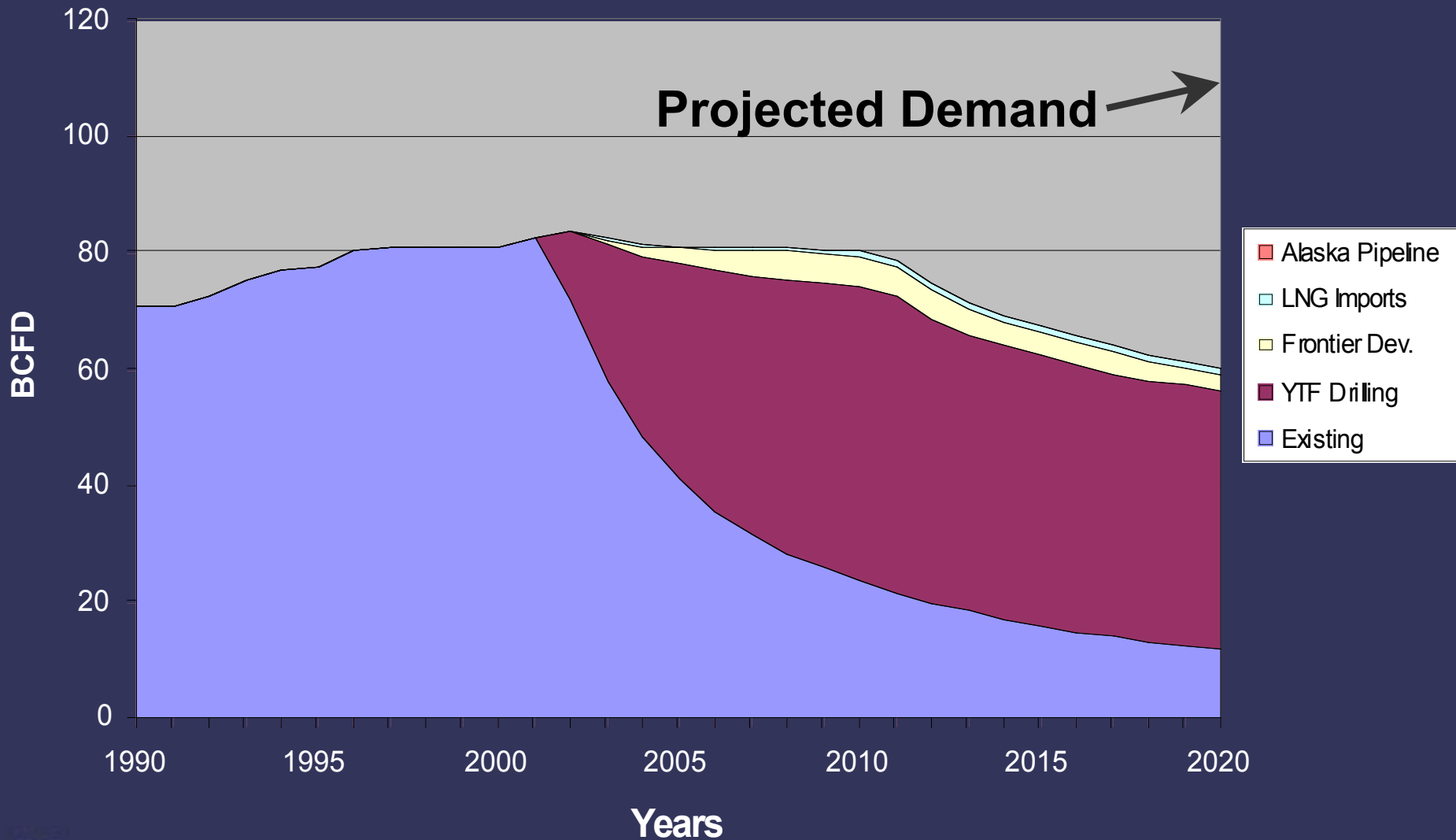
- **44.1 Tcf remaining reserves (41.4 on N. Slope)**
  - **Almost all used for pressure maintenance**
  - **Gas in Cook Inlet exported as LNG to Asia**
- **Gas pipelines must traverse Canada**
  - **26.6 Tcf competing reserves closer to market**
- **Gov't support required for investment**
- **Bottom line potential – 4 to 6 Bcfd post 2010**

# LNG Import Potential



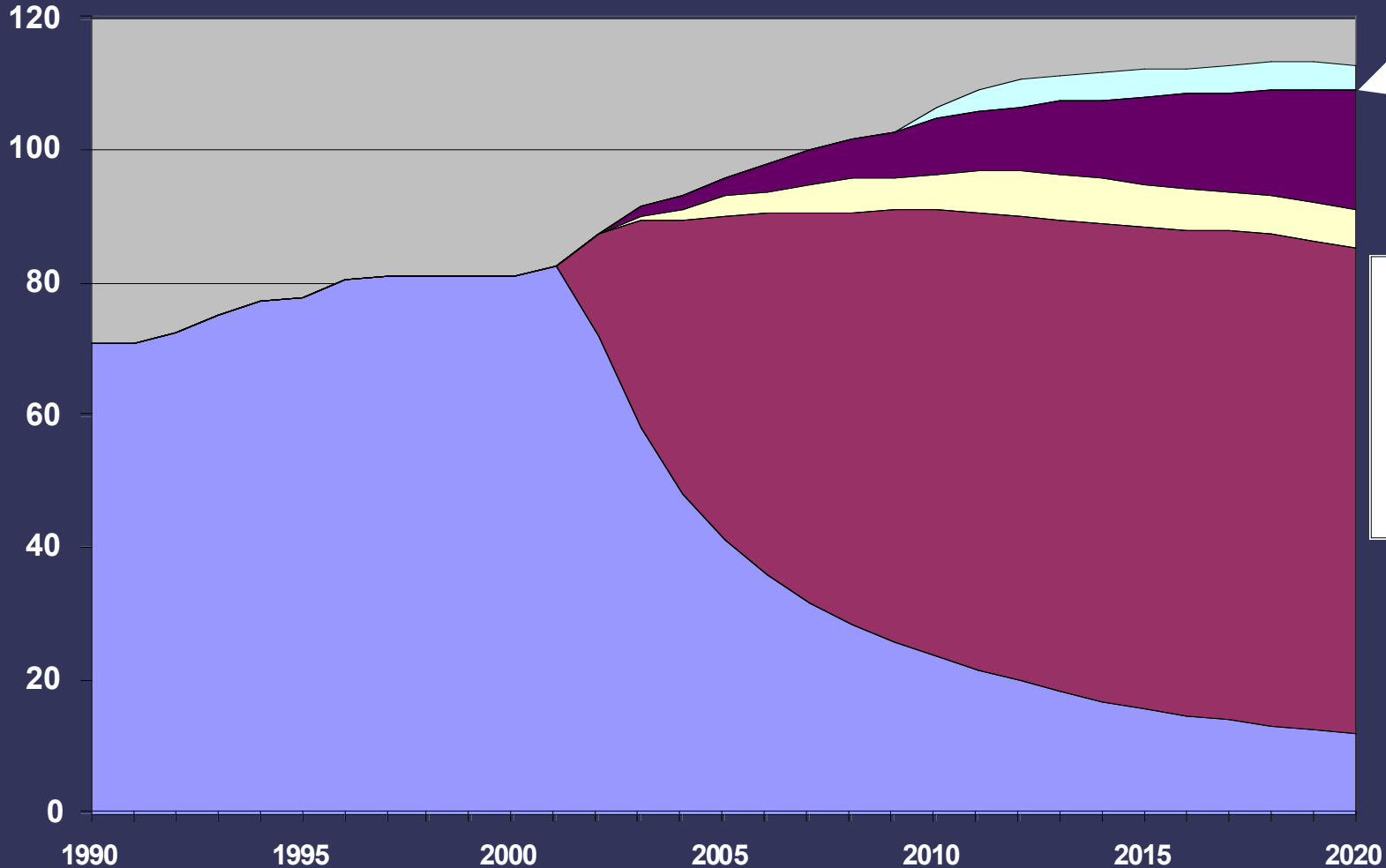
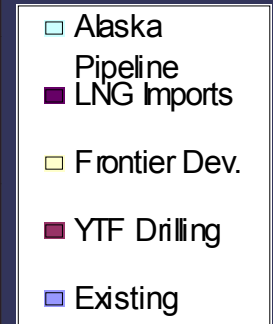
LNG valid in \$3.50 - \$5.00 Price Range

# North America Gas Production Forecast @ \$3.00



# North America Gas Production Forecast @ \$5.00

Projected  
Demand



# Natural Gas Going Forward

- Market shifting from demand-driven to supply-driven
- Industry will find it difficult to maintain flow
  - Canadian energy policy will have big influence
  - LNG imports increasingly important
    - Paradigm shift to imports outside of North America
  - Frontier Canada, Deepwater GOM, CBM and other projects share importance – all needed
- Bottom line: Fundamental upward pressure on gas prices

# Gas Supply & Policy Issues

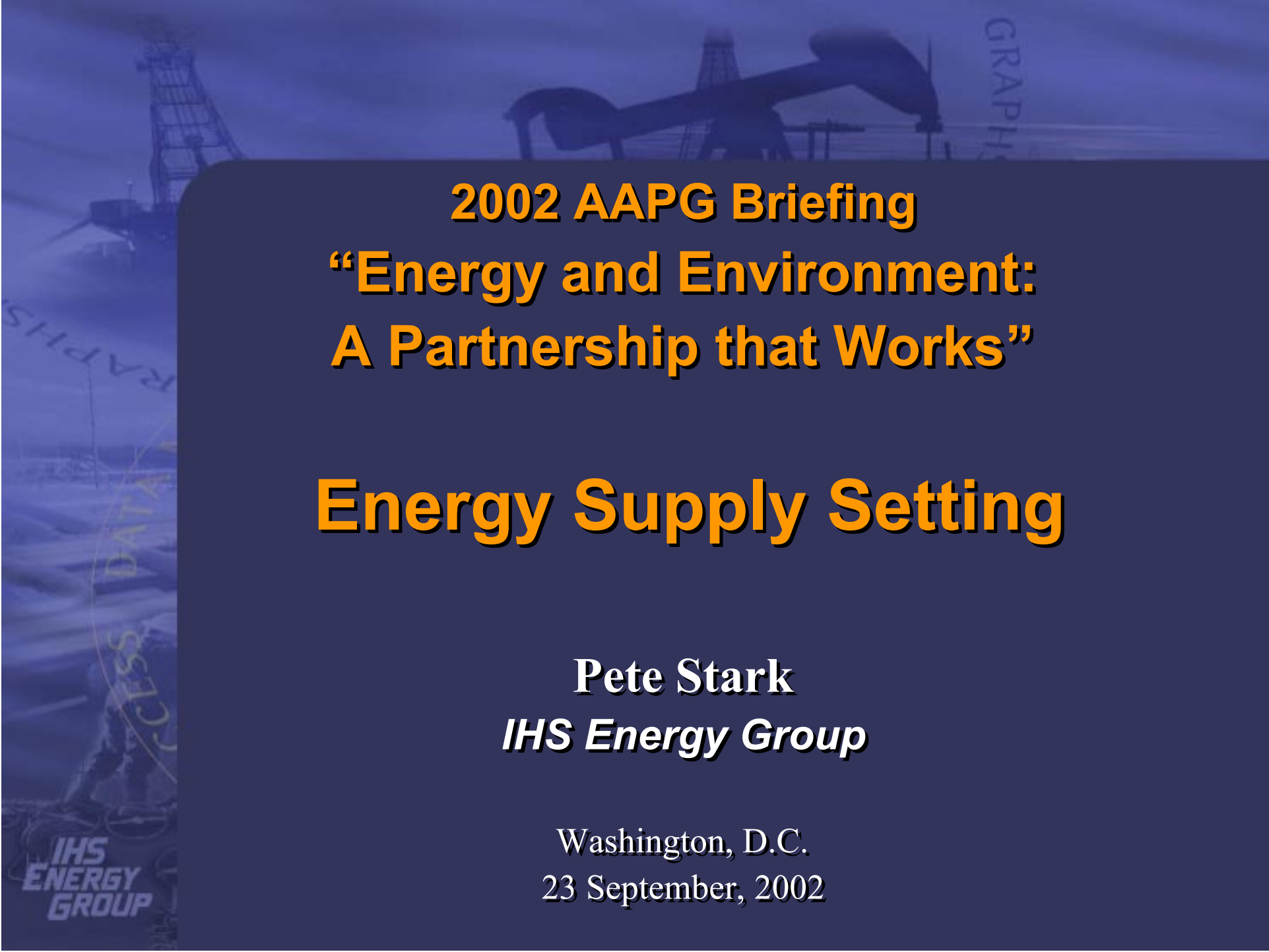
- **Gas supply issues more urgent than oil.**
  - **Drilling alone won't meet demand growth**
    - **Smaller reserves, steeper production declines**
  - **Price (volatility) not adequate to pull needed capital**
  - **5 + years to tap new supplies**
- **Policy principles same as oil:**
  - **Access to prospective lands**
  - **Investment incentives – tax credits, royalty relief**
  - **Efficient regulatory processes – reduce delays & costs**
- **Long term stability:**
  - **Arctic and LNG: price > \$4.00 Mcf**

# Global Oil & Gas Supply

## Critical Issue: Capital Requirements

- Oil: To achieve 119 Bbo demand in 2020
  - Need 42 MMbd new + 48 MMbd replacement
  - Estimate \$1 Trillion for oil E&P investment
- Natural gas: To achieve 162 Tcf demand in 2020
  - Need 180 Bcfd new capacity
  - Estimate \$2T overall investment (LNG & pipelines)





**2002 AAPG Briefing**  
**“Energy and Environment:  
A Partnership that Works”**

**Energy Supply Setting**

**Pete Stark**  
***IHS Energy Group***

Washington, D.C.  
23 September, 2002