

# BALANCING THE TECHNOLOGY ROLE

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**Natural Gas Technology – Investment in A Healthy  
U.S. Energy Future**

**May 14, 2002**

# Gas Technology Institute

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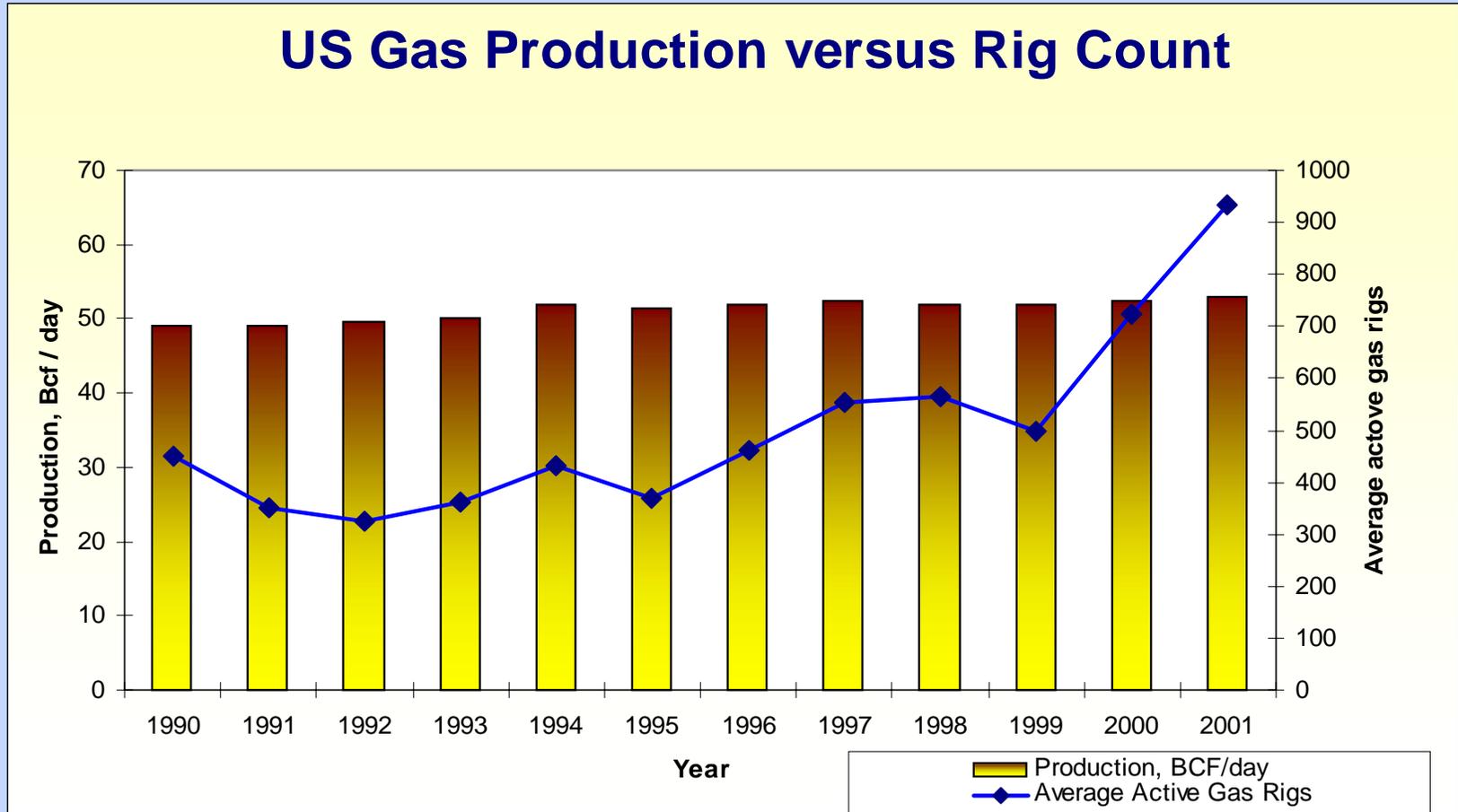
- **An independent, industry-led technology organization that provides research, technical services, education, and training on energy and environmental topics, with a focus on natural gas**
- **We create ‘technology solutions’ for the gas industry, energy consumers, and other customers**

# Growth of Natural Gas Demand

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- **Global natural gas demand is rising rapidly**
  - 82% increase over next two decades
- **U.S. gas consumption forecast to grow to 35 TCF by 2020, led by power sector**
- **Half-life of wells has fallen from average 40 months in 1990 to 24 months in 1999**
- **Despite increased drilling activity, Lower 48 production is declining**
- **Production in first quarter 2002 declined even faster than expected**

# Rig Count Up, but U.S. Production Is Flat



# Is History Repeating Itself?

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- In the 1970s and 1980s belief that North American gas resources were depleting
- Instead, production has risen and prices are lower
- Reason: technology advances in
  - 3D seismic
  - Hydraulic fracturing
  - Directional drilling
  - Coalbed methane
- But the U.S. is again at a crossroads . . . .

# How Can We Meet 35 TCF Target?

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- **Imports from Canada**
  - But production profile similar to U.S.
- **LNG**
  - Siting issues
- **Pipeline from Alaska**
  - Political and economic challenges
- **Lower-48 Production**
  - Becomes more physically and financially challenging to find new supplies
  - Producers move to remote regions, deeper formations, offshore, sensitive offshore areas

# Technology is the Key to Meeting Gas Supply and Demand Challenges

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**But technology development must be balanced**



# Balanced Approach to Resources

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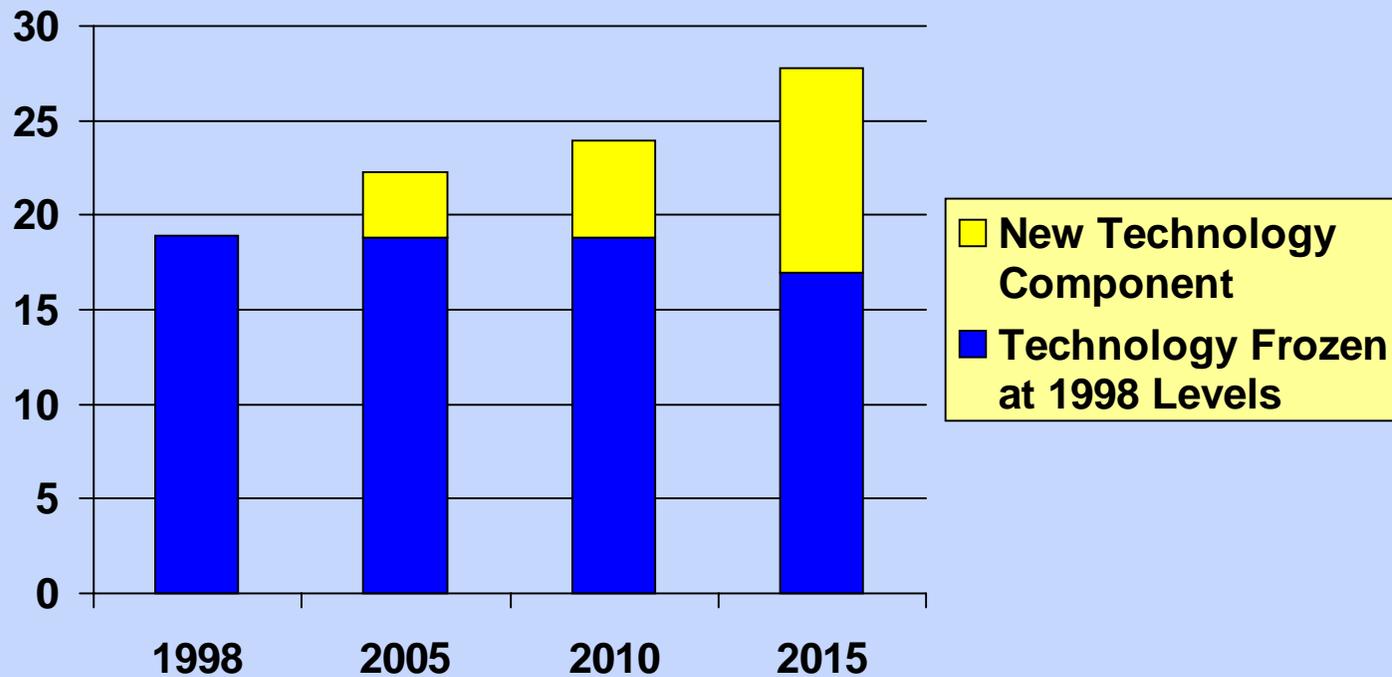
- **Develop conventional and unconventional gas resources**
- **Bring stranded gas resources to market**
- **Extend resource base through alternative fuels**
- **More efficient use of natural gas resources**

# Develop U.S. Conventional and Unconventional Resources

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- **NPC study concluded U.S. reserves sufficient to meet demand through 2010**
- **But up to half will come in part from successful and accelerated R&D investments in difficult production areas, such as ultra-deepwater and unconventional resources**
- **Without new technology, lower 48 production could decline 1 TCF by 2015**
- **With new technology, it could be 8 TCF higher**

# Impact of Technology Development on Lower-48 Gas Production



# Need to Balance Supply with Delivery and End-Use Technologies

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- **Upgrade the gas delivery infrastructure**
  - Expand capacity: 38,000 miles transmission, 263,000 miles distribution needed by 2015
  - Maintain reliability
  - Enhance efficiency of the entire chain
- **Improve the efficiency of gas use**
  - Reduces energy costs
  - Reduces emissions
  - Flattens load profile for more cost effective delivery
  - Helps extend gas supplies

# Need for Collaborative Approach to Technology Development

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- **Portfolio approach to address long-term challenges, not just near-term needs**
- **Importance of research collaboration to leverage financial resources, avoid duplication, and ensure R&D results match real-world needs**
- **Example: Coal-bed methane**

# In Developing Technology, We Need to . . .

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- **Balance roles of government and private sector in R&D**
- **Balance technology development with environmental protection**
- **Balance technology applications with security requirements**

# Conclusions

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- **Natural gas has a vital role to play in U.S. and world energy future**
- **Supplying resources to meet 35 TCF demand poses a serious challenge**
- **But technology can rise to this challenge, as it has done in the past**
- **An opportunity for cooperation by industry, government, and research organizations**