

# DOE Office of Fossil Energy Natural Gas Infrastructure Program



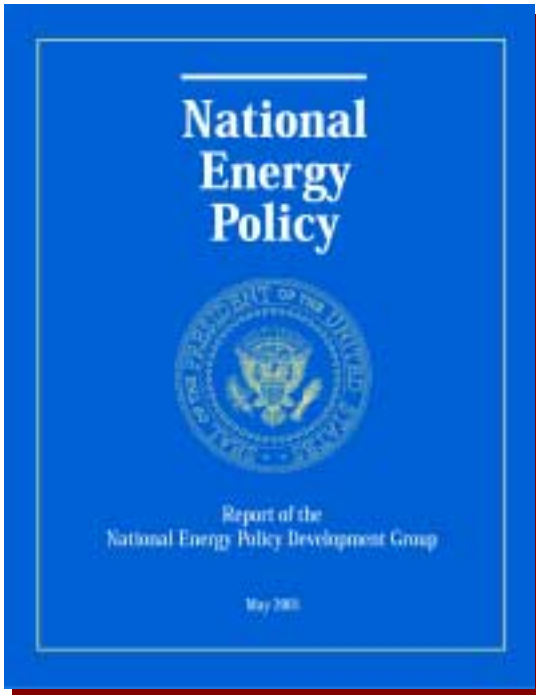
## *Pipeline Research and Development Forum*

*December 11, 2003  
Renaissance Hotel  
Washington D.C.*

**Guido DeHoratiis, Director of Research,  
Office of Natural Gas and Petroleum Technology**



# Government Role

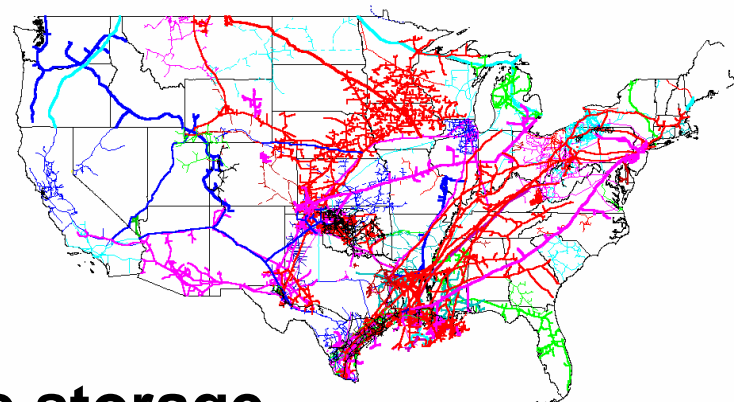


***“The federal government has an important role in ensuring and improving the safety of the nation’s energy infrastructure. New technologies need to be developed to improve monitoring and assessment of system integrity, improve data quality for system planning, extend the serviceability and life of the natural gas transmission and distribution network, provide safer transport of energy products, and lessen the impacts of the energy infrastructures on the environment.”***



# Infrastructure Drivers

- **Gas demand increase by 54% (to 36 tcf) by 2025 \***
- **Electric generators demand for gas to double (grow by 5 tcf \*)**
- **Increased demand requires more storage**
- **Aging infrastructure inadequate for future demand**
- **Deliverability from storage fields difficult to maintain**
- **Consolidation and competition limits gas industry investment in long-term public benefit R&D**
- **Distributed power drive infrastructure changes**
- **Gas *critical* for U.S. climate change strategies**



*\*Annual Energy Outlook 2003*

# Natural Gas Infrastructure

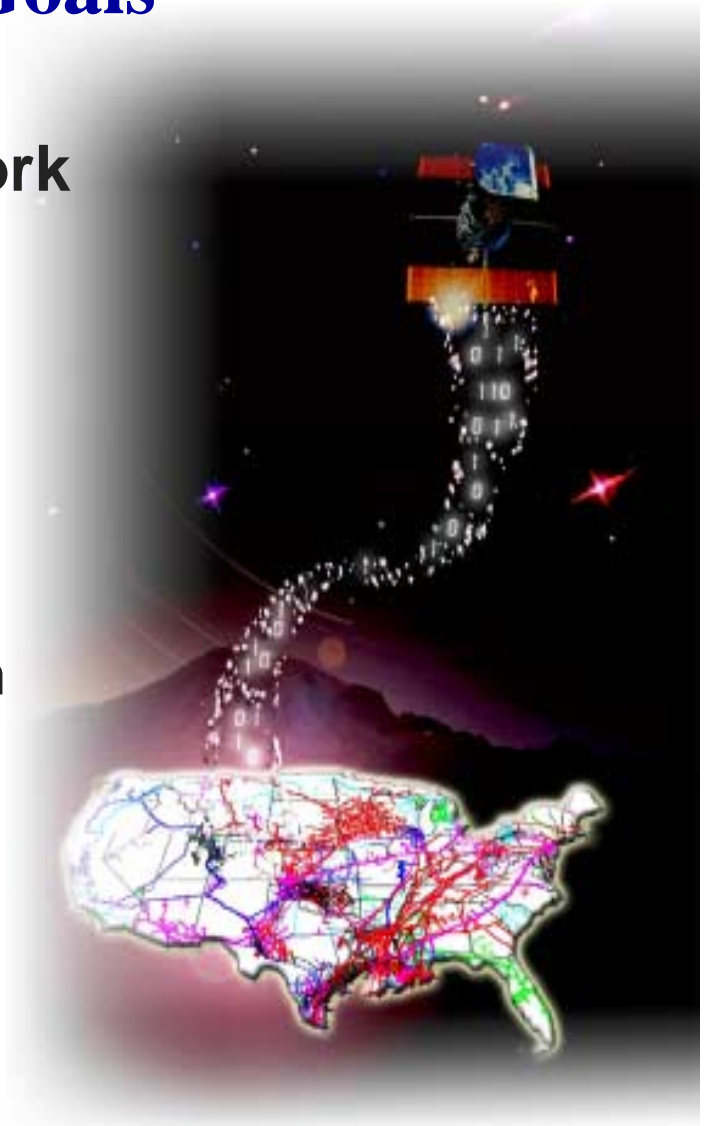


- **Transmission, distribution & storage**
- **Program goals:**
  - Maintain/enhance system reliability and integrity
  - Increase gas storage deliverability
  - Reduce environmental impact
  - Address gas & electric interdependencies
  - Develop new technology for future gas delivery system
  - Support infrastructure security
- **Budget:           FY04**
  - \$2 million storage technology
  - \$7 million infrastructure reliability



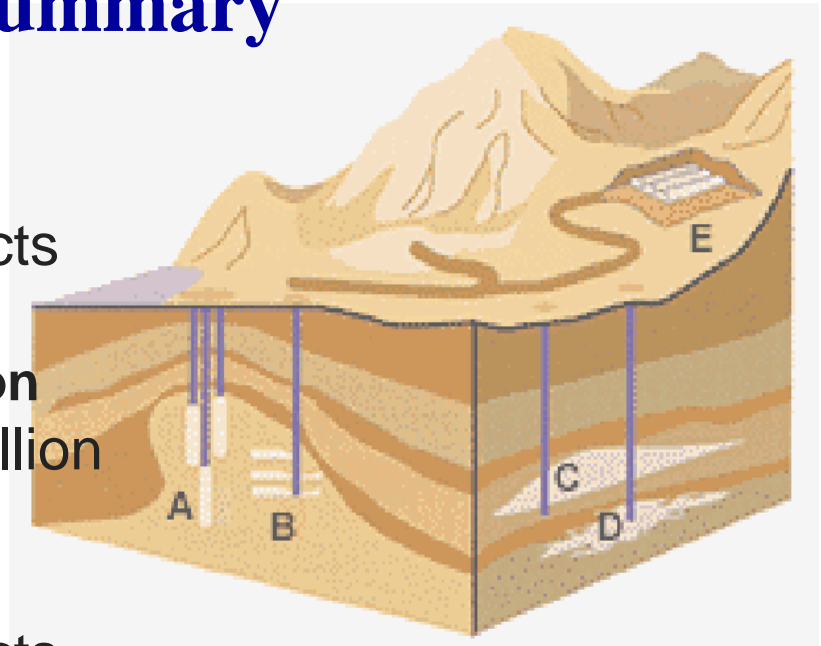
# Infrastructure Goals

- **Establish the technology framework for our Nation's future secure natural gas transportation and delivery and storage system**
  - Provide research and technology development
  - Focus Federal infrastructure program on public benefit R&D
  - Collaborate with private sector
  - Support infrastructure surety and assurance



# Program Summary

- **58 active projects**
  - Delivery Reliability: 45 projects
  - Storage: 13 projects
- **Total program value > \$47 million**
  - Delivery Reliability: > \$29 million
  - Storage: > \$18 million
- **26 completed projects**
  - Delivery Reliability: 12 projects
  - Storage: 14 projects
- **Several projects near hand-off phase**
- **Industry supported field tests necessary**
- **Commercialization path still difficult**
- **Industry involvement required**



# Implementation Strategy

- **Focus on mid to long term, high risk, advanced, and leap frog technologies**
- **Strong industry participation**
  - Input to R&D priorities
  - Feedback on program & project status
  - Collaborations & cost sharing
- **Balanced R&D program**
  - Distribution, transmission, & storage
- **Most funding dedicated to private sector projects**
- **National laboratory efforts focused on innovation**
- **Some quick wins to demonstrate progress**





# Core R&D Areas & Issues

- **Inspection Technologies**
  - Robotic platforms
  - Sensors
  - Pigs
  - Automation
- **Remote Sensing**
  - 3<sup>rd</sup> party damage
  - Underground imaging
  - Leak detection
- **Materials**
  - Repair
  - Smart Pipe
  - Liners
- **Operational Technologies**
  - Compressors
  - Modeling
  - Corrosion
- **Deliverability enhancement and reservoir management**
  - Storage well deliverability
  - Storage resource efficiency
- **Metering and Measurement**
  - Accuracy and real-time measurement of both gas volume and energy content
- **Advanced Storage Concepts**
  - Storage alternatives
- **LNG**
  - Education
  - Safety
  - Transportation/storage





# Accomplishments

- **26 completed projects**
  - Delivery Reliability: 12 projects in 3 years
  - Storage: 14 completed projects in 9 years
- **5 technologies near hand-off status**
  - Plastic Pipe Underground Imaging- Cytterra
  - Pipe Explorer- NGA/CMU
  - Conformable Array- SwRI
  - Bishop LNG Heat Exchanger Process- Conversion Gas International Inc.
  - Multi-Mechanism Deformation Coupled Fractured Salt Cavern Model- RESPEC
- **DOT/NIST/MMS MOU**
- **State-of-the-Art Technology status assessments**
- **Industry recognition of DOE Infrastructure program**

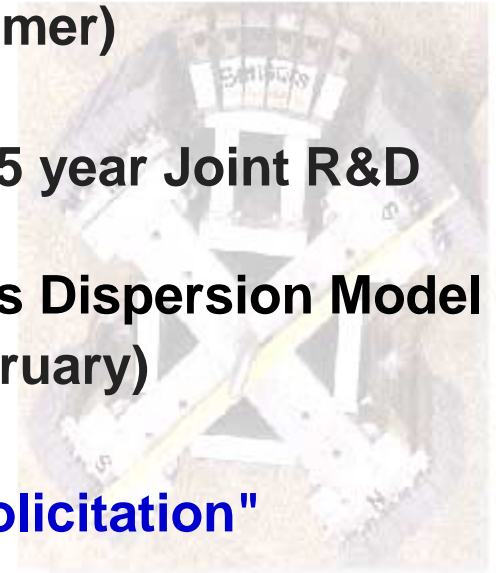


# FY04 Planned Activities

- Update Natural Gas Infrastructure Roadmap (February 2004)
- Gas hydrate storage demonstration (winter)
- Robotic platform demonstration (winter/spring)
- Inspection/remote sensing round robins (summer)
- LNG Heat exchanger field tests (spring)
- Continue collaboration with DOT/NIST/MMS)- 5 year Joint R&D Plan
- Initiate LNG studies- Education, Outreach, Gas Dispersion Model
- Broad-based solicitations (proposals due February)
  - Portfolio gaps and innovation

**"Oil and Gas Technologies Program Solicitation"**

<http://www.netl.doe.gov/>



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