the Energy to Lead

Natural Gas Supply Technology

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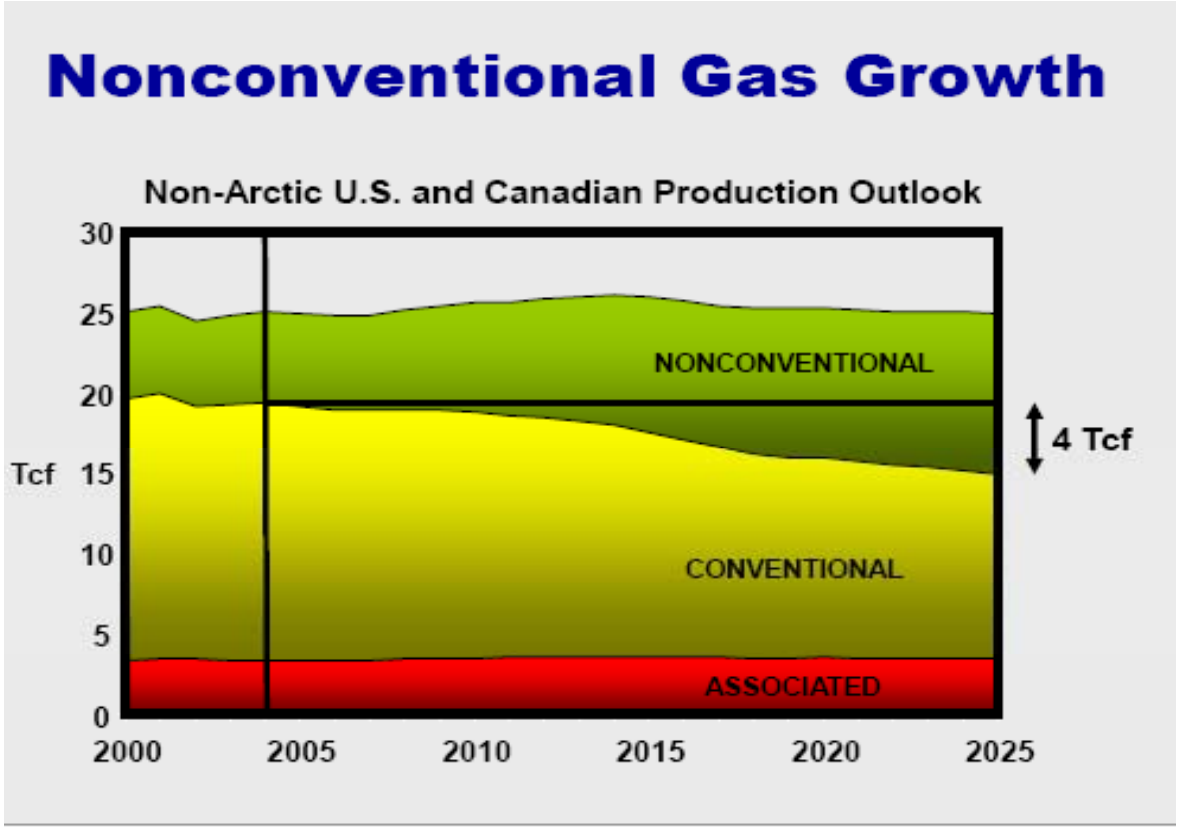
gti

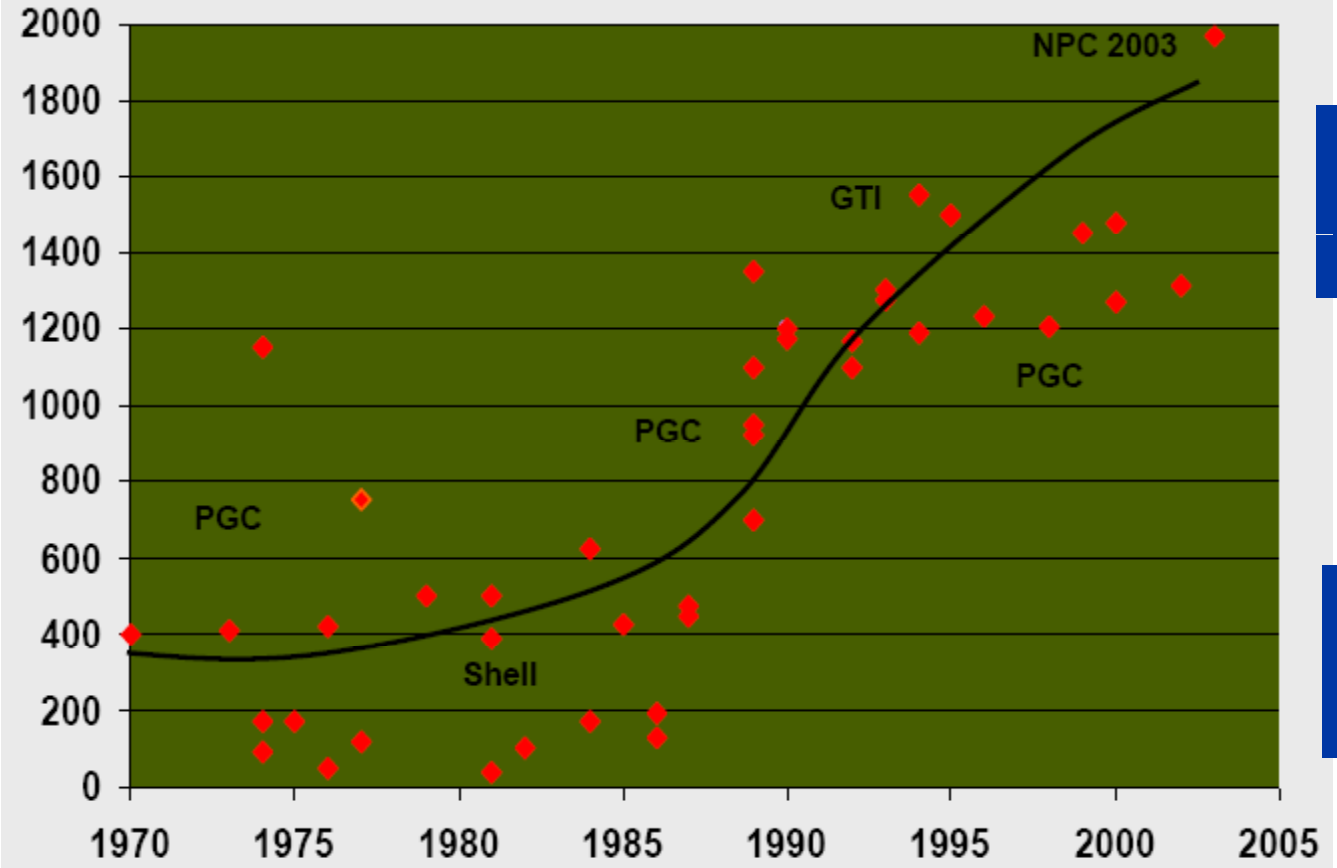
Natural Gas Supply

- Potentially ample resource
- Additional supply enabled by enhanced efficiency
- A sustainable and affordable domestic energy supply worthy of investment in technology and policy attention

Key to Gas Supply is Unconventional Gas



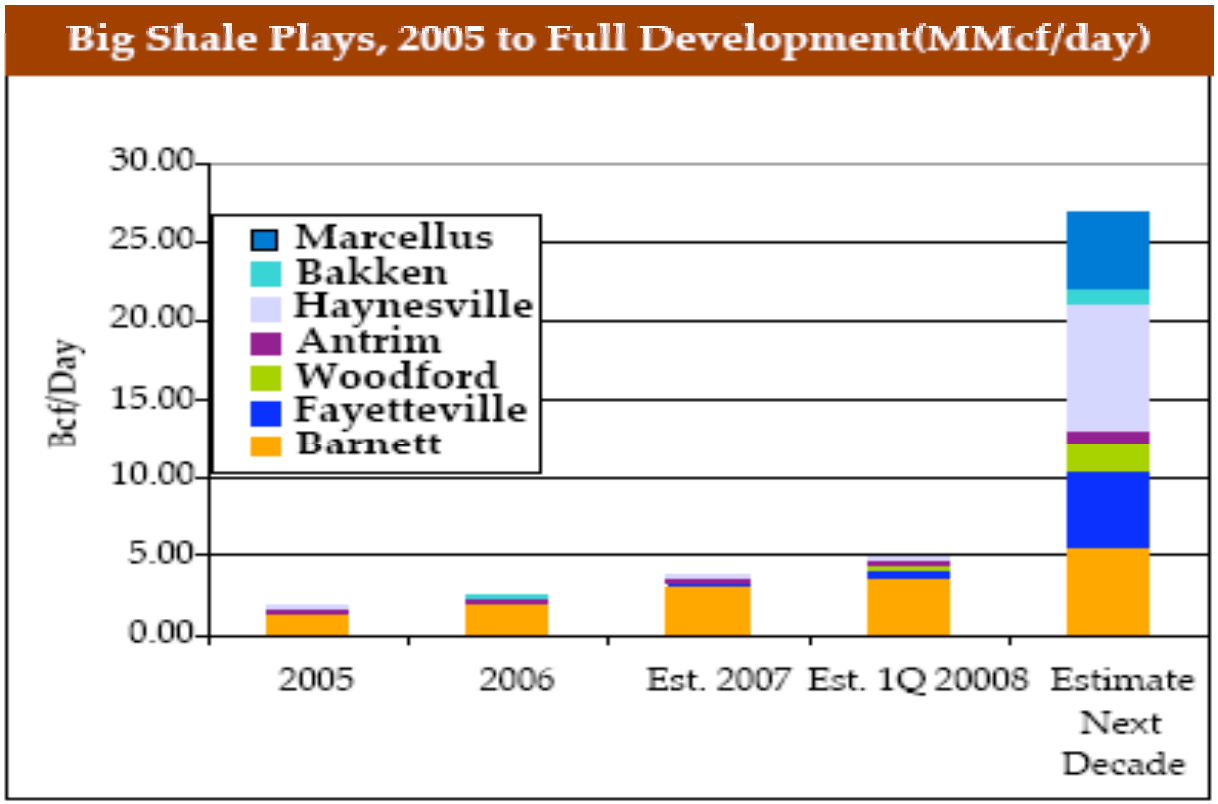
Evolving Views on Recoverable Resource (TCF)



2006 PGC=1500
2008 ICF=1830
2008 NCI=2250

NCI view equal to 120 years of current use

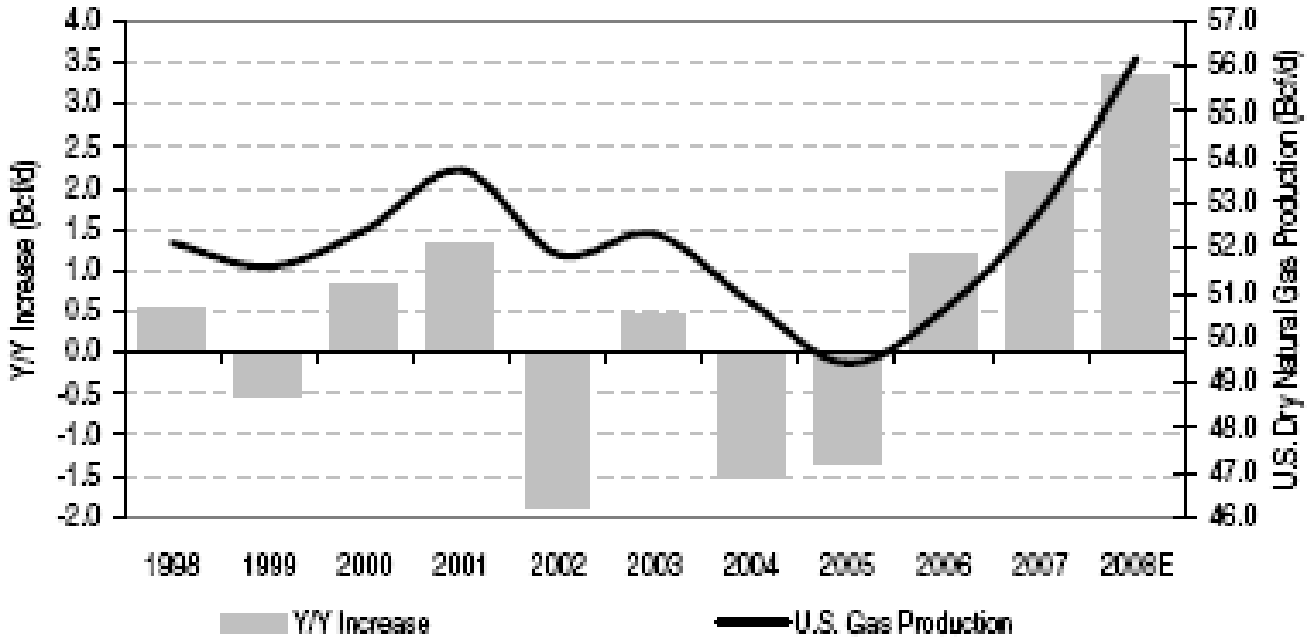
Potential of Extra 10-12 TCF Supply



Sources: Producer interviews, analyst estimates, NCI calculations.

Unconventional Gas Focus is Yielding Results

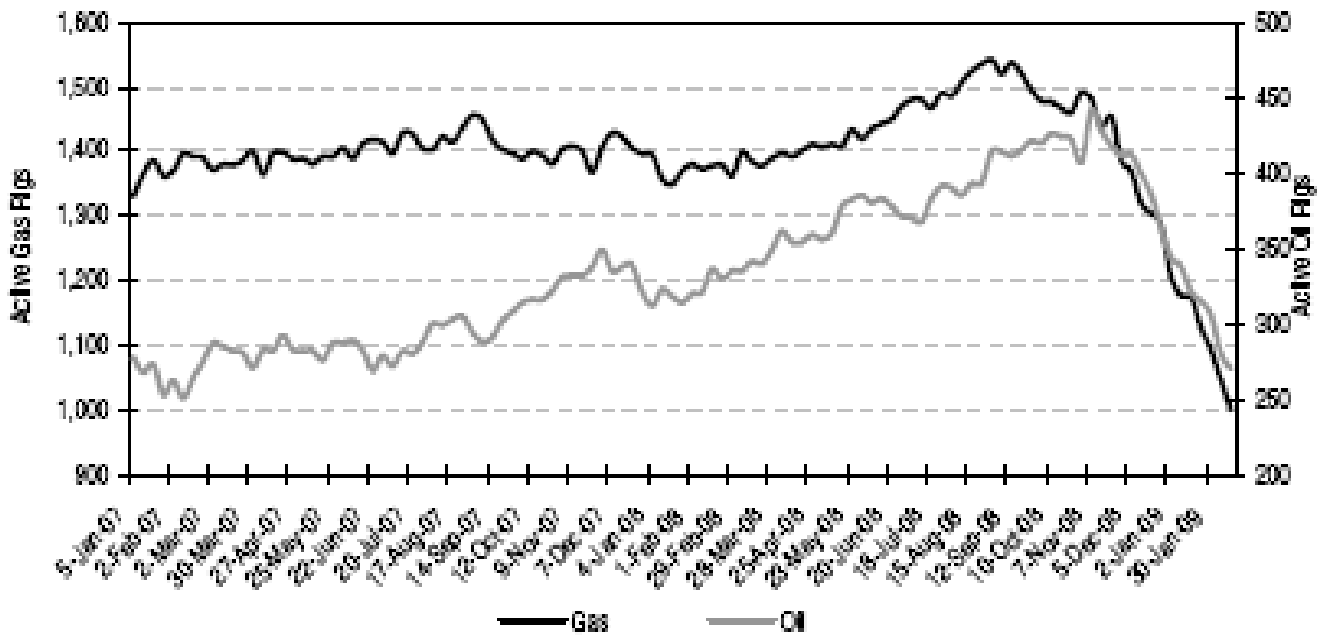
Exhibit 6. U.S. Natural Gas Production & Y/Y Change



Source: EIA, Baker Hughes and CIBC World Markets Inc.

Current Low Prices Slowing Activity

Exhibit 9. U.S. Active Land Rig Count



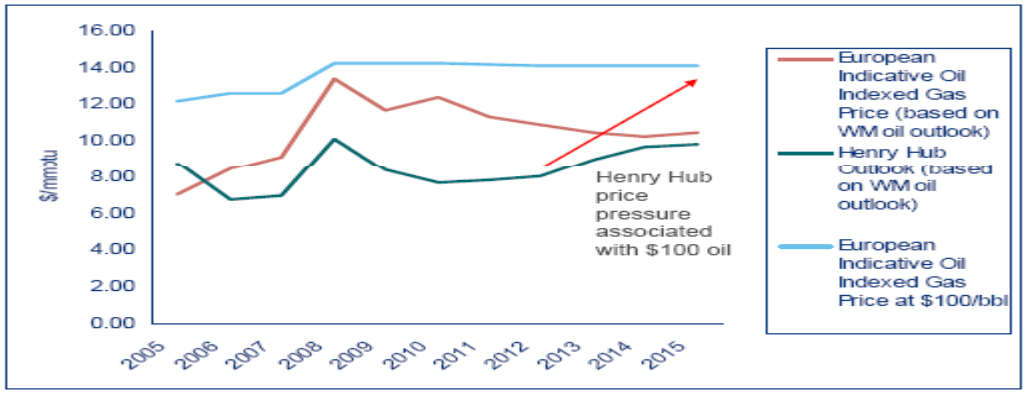
Source: Baker Hughes and CIBC World Markets Inc.

Gas Price Recovery Projected

www.woodmac.com

A Higher Oil Price Could Drive Up North American Prices After 2012

- WMs expectation for decline in oil prices dampens the absolute price increase associated with reconnection
- Competing for LNG in a higher priced oil world would require higher gas prices in North America



Wood Mackenzie

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Delivering commercial insight to the global energy industry

- Deutsche Bank - $6.50 in 2010; $9 in 2011
- CIBC projecting $7.50 in 2011 ($65 crude)
- Near-term over-supply has significantly widened the oil to gas price gap (Current equivalent price over $10)

Natural Gas: Cleanest Burning Fossil Fuel

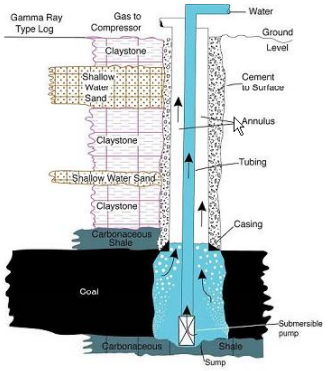
EXHIBIT 4: COMBUSTION EMISSIONS
(POUNDS/BILLION BTU OF ENERGY INPUT)

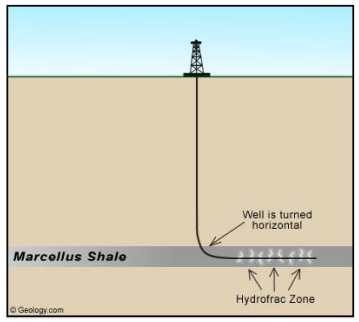
Air Pollutant	Combusted Source		
	Natural Gas	Oil	Coal
Carbon dioxide (CO_2)	117,000	164,000	208,000
Carbon monoxide (CO)	40	33	208
Nitrogen oxides (NO_x)	92	448	457
Sulfur dioxide (SO_2)	0.6	1,122	2,591
Particulates (PM)	7.0	84	2,744
Formaldehyde	0.750	0.220	0.221
Mercury (Hg)	0.000	0.007	0.016

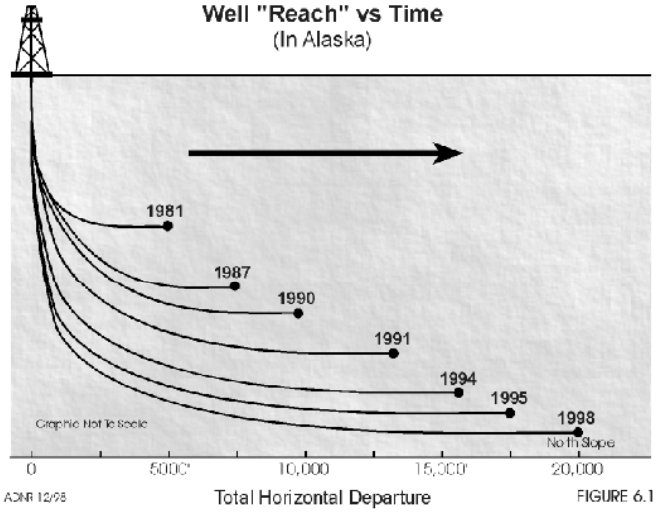
Sources: EIA, 1998

Technology Challenges

- Coal Bed Methane
  - Produced water
- Shale
  - Formation evaluation
  - Advanced well construction
  - Stimulation
  - Produced water/environmental footprint
- Tight Sands
  - Natural fractures
  - Sweet spots
  - Formation evaluation
  - Wellbore-reservoir connectivity
  - Environmental footprint
- All-Cost Reductions





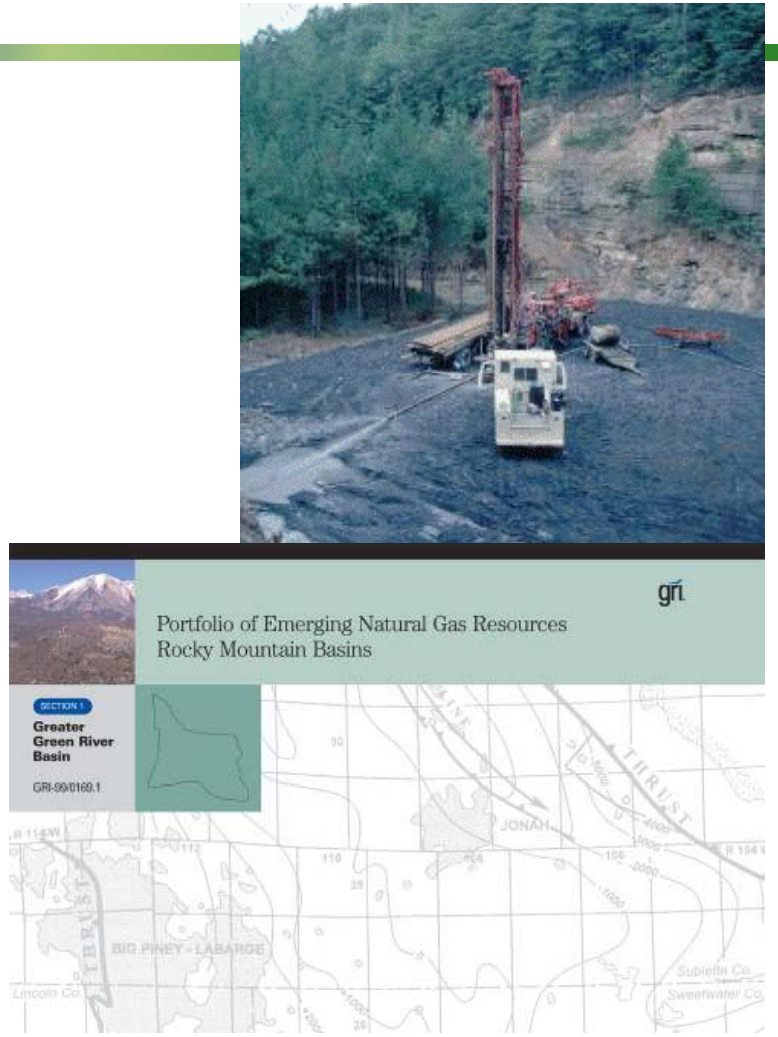


GTI E&P: Partial List of Products

- Cement Pulsation Tool
- Jet Assist Drilling Tool
- Through Casing Resistivity
- Through Casing Density
- Through Casing Pressure
- CrystaSulf Process
- Wellbore Stability
- Underbalanced Completions
- Lewis Shale
- Well Siting In Carbonates
- Cybergeologist
- Fracpro/Microseisimic
- S. Louisiana Deep Gas
- Single Well Seismic
- Azimvel Software Imaging
- Rocky Mountain Basins Portfolios
- Microseismic

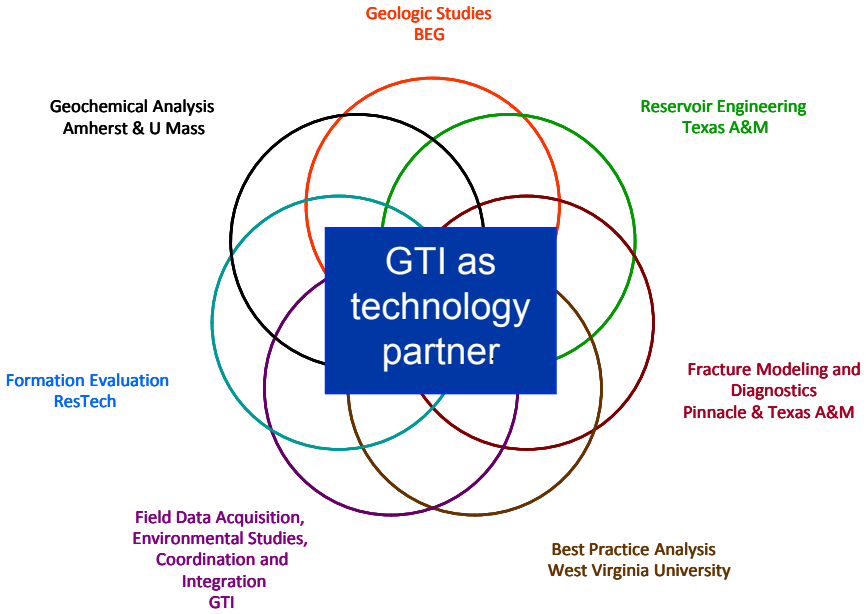
GTI Unconventional Activities

- 1990's
  - Resource assessment, modeling, and field work for CBM, shale and tight sands
- 2000's
  - Support first commercial Canadian CBM production
  - Support coiled tubing drill rig demonstration
  - Research Partnership to Secure Energy for America (RPSEA)



E&P Focus

> Be a catalyst for new technology commercialization by (1) leading consortia comprising industry service providers and universities, and (2) creating industry-supported technology development programs

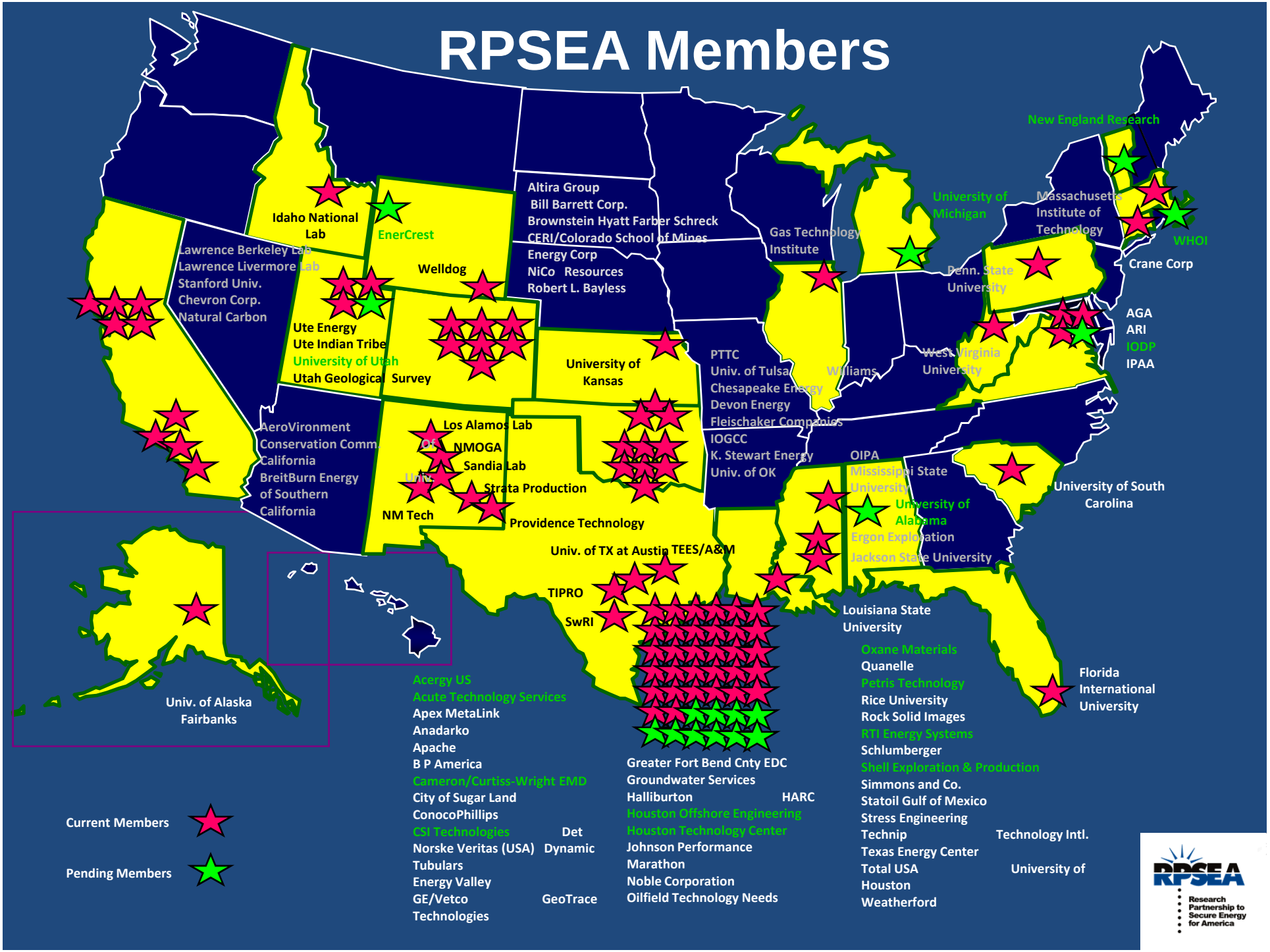


New Albany Consortium Example

Producer Participants

>Noble Energy
>CNX Gas
>Trendwell
>Rex Energy
>Diversified Operating
>Aurora Oil & Gas
>Southwestern Energy

RPSEA Members



RPSEA
Research Partnership to Secure Energy for America

Produced Water Solutions

- Barnett Water Management
  - Water Processing
  - Conservation
  - Public Outreach
- Appalachian program underway

Barnett Shale JIP

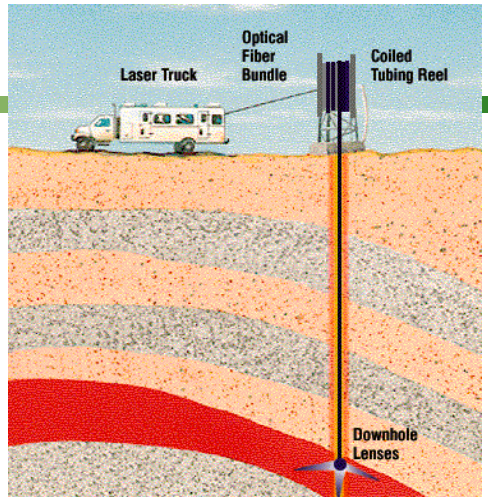
- Chesapeake Energy
- ConocoPhillips
- Denbury Resources
- Derrick Resources
- Devon Energy
- DTE Gas Resources
- Encana Oil and Gas
- Harding Co.
- Pitts Oil Co.
- Quicksilver
- Range Resources
- Sauder Land Co.
- Shell Oil
- Sundance Resources
- Williams Production
- XTO Energy

GTI Catoosa
Facility Description

- 80 acre, full-scale test facility
- Located near Tulsa, OK
- 2 drilling units with crew
- Past customers
  - Halliburton
  - Pathfinder
  - Schlumberger
  - GE
  - Weatherford
  - Grant Prideco
  - BP
  - Particle Drilling
  - Noble Technology
  - Mauer Engineering
  - Technology International
  - Validus International
  - Security DBS

Mission: Provide a low risk, cost effective environment to advance drilling and completion technology for technology focused companies to rigorously test new downhole tools, fluids and procedures.

Laser Applications

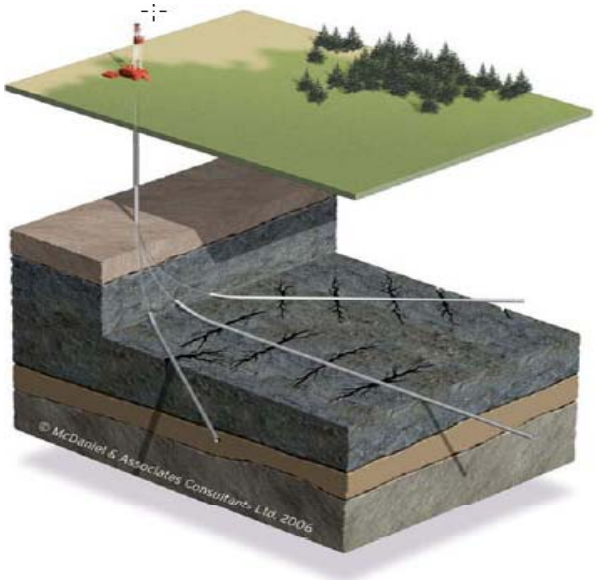


- GTI Laser Laboratory
  - 5kW doped fiber laser with robotic control
- Down-Hole Laser Applications
  - Relevant background IP
  - Focus on laser-rock and laser-steel interactions
  - Benefits
    - Eliminate explosives
    - Enhanced control
    - More effective well stimulation
    - Reduced costs

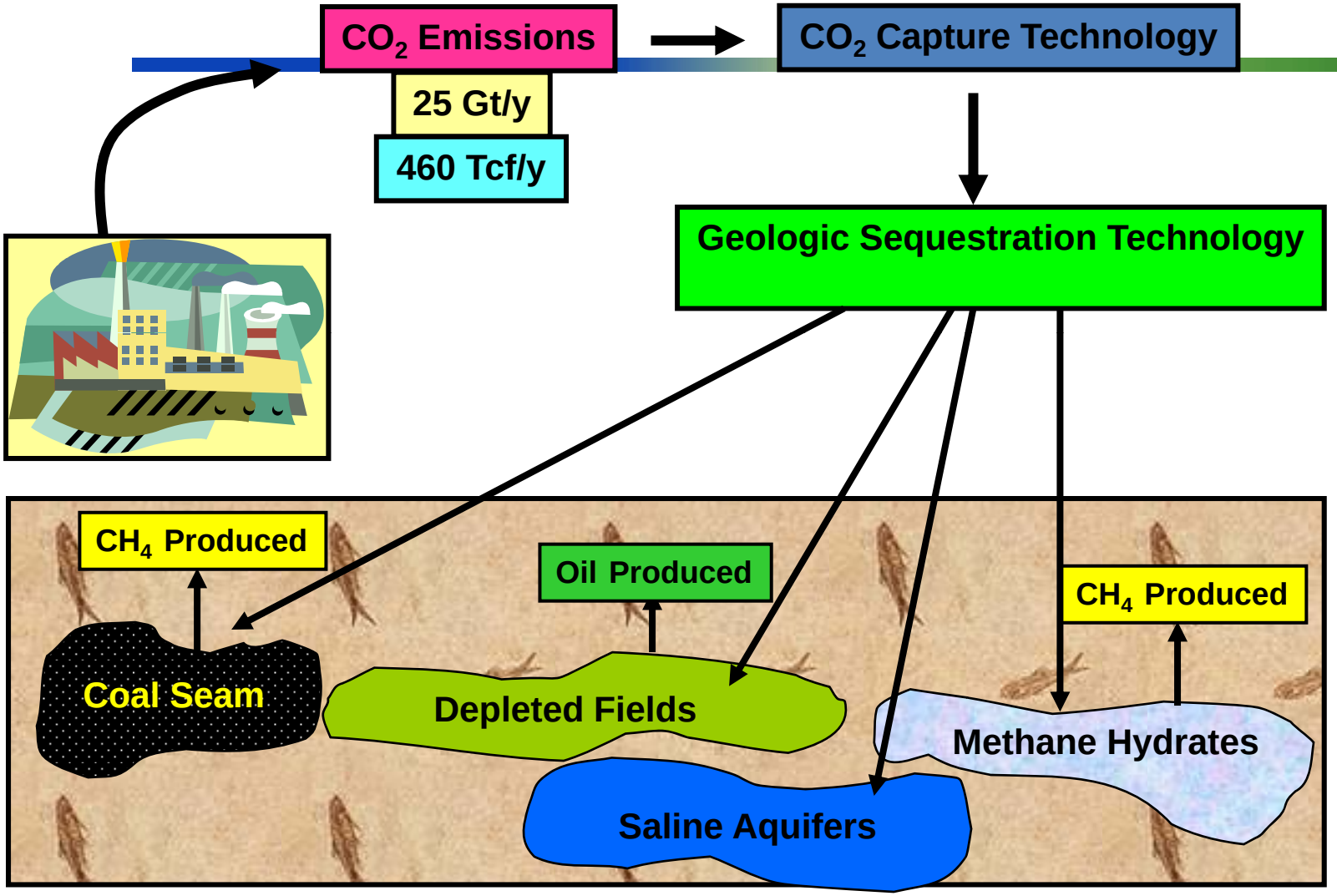
Fit for Purpose Well Construction

Portable Coiled Tubing Directional Drilling

- > Continuous coil and downhole directional tools
- > Portability = accessibility
- > 30% cost savings
- > Environmental benefits
- > Safer operations
- > Platform technology



CO_2 Storage Options



* 1 billion metric tons CO_2 ~ 19 Tcf.

Enabling Sustainable Energy

- Unconventional gas is a critical resource
  - Domestic and cleaner burning
  - Affordable and potentially abundant
- New technology required
  - Reduce costs
  - Reduce environmental footprint
- GTI working in partnership to develop and deploy vital E&P technologies