Gas Drilling and Supply Trends in Canada and the US

Dave Flint and Bob Dixon

March 5, 2007

Forward Energy Group Inc

Planning Investments

GOALS

STRATEGIES

TACTICS

Better information for strategic decisions
Gas Supply Regions in North America

WCSB
- Produces 6 Tcf per year
- Supplies over 23% of North American consumption
- Largest natural gas supply region in North America

LOWER 48
- Produces 19 Tcf per year
- Supplies over 72% of North America’s demand

Drilling and Gas Supply Trends

- Western Canada gas supply treadmill
- Challenge to sustain supply profitably
- Increasing effort for less rate and reserves
- Increasing costs have slowed drilling
- How has industry been meeting challenge?

- US drilling and production trends
“The treadmill’s a good machine for politicians because you run like hell and you get nowhere.” Ralph Klein

Compe[ing Forces

Production Lost
- Production Rate X Composite Decline Rate
  - Changing slowly
  - Low control

Rate Additions
- Wells X Rate Added per Well
  - Changing rapidly
  - High operator control

Investment Environment
- Profitability
- Gas prices
- F&D costs
- Capital efficiency
- Cash flow
- Alternative investments
- Portfolio
- New opportunities
- Technology
Gas Drilling and Supply Trends in Canada and the US

CERI Gas Conference March 2007

WCSB Rate Losses and Rate Additions

- Rate loss from decline increased from 2.5 Bcfd to 3.9 Bcfd in 2004
- Annual rate loss has averaged 3.7 Bcfd since 2001
- Net rate added has been decreasing
- 2002 correction may be a useful model for 2007

Supply by Period Onstream

- Total production grew by over 70% from 1990 to 2001
- Total gas production recovering slowly since 2001
- Wells onstream since 1989 produce 85% of gas
- Probable decline in 2007 due to reduced gas drilling

2006 production estimated at 17.0 Bcfd
Gas Drilling and Supply Trends in Canada and the US

CERI Gas Conference
March 2007

Rate Additions by Year Onstream

- Rate additions static but the number of connections has increased 69% since 2000 – this is the treadmill!
- Connections increasing more rapidly than rate additions

Rate Added per Connection

- Production replacement per foot drilled has decreased by 12% per year
- In 2005, the same event connected and foot drilled resulted in only 30% of the 1995 rate additions per unit
- Supply from previously-unprofitable, lower deliverability opportunities increased in response to higher prices and improved technology

Decreasing results for same activity is the consistent driver of F&D cost increase

Supply additions were 1.7 Bcfd in 1990, rising to 3.9 Bcfd in 2001,
- Rate additions averaged 3.6 Bcfd from 2001 to 2005
- Events are the new connections that provided the new rate additions
- Connections lag drilling

Connections lagging

Rate Added per Event

-10%

Rate Added per Foot Drilled

-12%
Drilling Cost per Foot

- Total drilling capital / Total feet drilled
- Cost per unit has been increasing at 9% per year since 1999
- Rapid cost increases in 2005 (14%) and continuing at least 15% into 2006

Cost inflation is accelerating, driving F&D costs

Gas F&D cost

- Gas-directed capital / extrapolated recovery in newly-connected zones
- Increasing at 21% per year since 1999
- Most of F&D cost increase is in lower EUR per well

- To sustain investment return, increasing F&D cost must be matched by increasing netback and therefore, increasing price

Increasing costs threaten profitability and investment
**Gas Price**

- Increased at > 22% per year between 1999 and 2005
- Commodity price increases supported projects despite increased F&D cost
- Estimated 20% decrease in price in 2006

- Rate additions at increasing F&D costs sustained by increasing prices
- Activity and rate adds will decrease when price decreases

**What happens when gas prices decrease?**

**Drilling Response**

- Active gas rigs dropped below 2005 levels in August 2006
- Dropped below 2004 levels in October
- Year to date 2007 active gas rigs are 70% of the comparable 2006 period

- Operators have announced reduced shallow gas and CBM programs
- Lower utilization rate of shallow rigs

**Rapid response after a record first half of 2006**
**Gas Drilling and Supply Trends in Canada and the US**

**CERI Gas Conference March 2007**

---

### Drilling Response

- Connections and completions flat 2004 to 2006
- CAODC and PSAC forecasts 2007 gas completions down 20% to 25%
- We assume a 10% decrease in activity

**Drilling Response**

- Decrease in rate added depends on rate added per new event

---

### Profitable Production Replacement

- F&D costs have been increasing rapidly
- Decreasing rate additions and reserves per well has been the major driver of increased F&D costs
- Cost inflation has been a recent contributor
- Increased gas commodity prices supported investment at the increased F&D costs until 2006
- Current slowdown in drilling will result in lower supply, higher gas prices and, in time, lower input costs
- Operators must select investments where profitability is sustainable through volatile commodity price cycles and inflationary cost pressures
Meeting the Challenge: Growing sources of supply

- Low deliverability zones
- New pools
- New areas
- Unconventional gas
- Technology

Activity by Deliverability Class

- Extraordinary growth in the number of low rate (<0.5 MMcf/d) connections since 1995
- The number of connections in the higher rate classes has remained relatively constant until 2002
- Connection activity of low deliverability zones decreases when gas price decreases

Growth in activity is all in low deliverability wells
Gas Drilling and Supply Trends in Canada and the US

CERI Gas Conference March 2007

Rate Additions by Deliverability Class

- Ninefold increase in rate adds from the lowest deliverability class
- Rate additions from low deliverability events (<2.0 MMcfd) increased from 37% to almost 80% of annual rate additions in 2005
- High deliverability zones (>4 MMcfd) maintained relatively constant additions until 2002

Growth in overall rate additions has come increasingly from low deliverability wells

Deliverability Class: 0 to .5 MMcfd
Low Deliverability: 37% of rate additions
42,370 zones connected

Low deliverability zones connected everywhere
Highest density in SE Alberta – SW Sask
Gas Drilling and Supply Trends in Canada and the US

CERI Gas Conference
March 2007

Rate Added per Township, MMcfd
- 32 to 59 (9)
- 16 to 32 (21)
- 8 to 16 (46)
- 4 to 8 (59)
- 2 to 4 (24)
- 1 to 2 (5)
- 0.5 to 1 (1)
- 0 to 0.5 (0)

High Deliverability:
15% of rate additions
242 zones connected

Deliverability Class: 4 MMcfd and Greater
- Rate Added per Township
- Events Onstream 2003 - 2005, MMcfd

Natural Gas Supply Trends

High deliverability zones along located in Foothills and in deeper reservoirs

US Production and Drilling Trends

- Total production declined over 4 Bcf/dm from 2001 to 2005
- Total gas production recovering in 2006
- Active gas rigs count has more than doubled since May 2002

Where is the supply response to increased drilling?
Where is the drilling response to decreased price?
Gas Drilling and Supply Trends in Canada and the US

CERI Gas Conference
March 2007

US Production by Region

- Production from the Gulf of Mexico declined 6 Bcf/d in 6 years
- Texas sustaining with 2 Bcf/d growth since 2004
- Rockies growth 2 Bcf/d in last 6 years but seems flat recently
- Slow decline in other states and Louisiana

US Marketed Gas Production by Region

Offshore declining, onshore growing

US Land Drilling by Region

- Both gas and oil directed rigs in these counts
- Texas dominates growth in active rigs but stable for last 6 months
- Rockies and Oklahoma active rigs have each declined 10% since September
- Louisiana flat, other states growing

Early signals of drilling response to prices and costs
Summary

• WCSB is important supply source for North America
• Challenge to sustain production profitably
• More feet drilled for less gas production and reserves
• Supply costs and F&D costs are increasing
• Sustaining WCSB production will require higher prices and activity to exploit more low deliverability gas
• Uncompetitive costs and economics for WCSB gas projects will reduce reinvestment
• Watch for US drilling and supply trends by region