23rd IAEE North American Conference

Mexico
October 19 - 21, 2003

Paul Ziff, CEO
Ziff Energy Group

www.ziffenergy.com

Houston                          Calgary
North American Gas Supply Sources
North American Gas Basins and Production

Source: Ziff Energy, Sempra
North America Supply Outlook

North

WCSB 25%
Rockies 15%
Continental SW 26%
Gulf Region 34%

Gulf Region

LNG

Bcf/d

LNG

North 7%

Continental SW
U.S. & Other

WCSB, East Coast

Rockies

Tcf/yr
Ultimate Potential of Natural Gas (Tcf)

Source: Various NEB Reports
Canadian Gas

North Slope Alaska

Mackenzie Delta

WCSB

Tight Gas

Coalbed Methane

East Coast

SOEP
Canada: Drilling is *Not* Increasing Gas Production
Average Productivity of New Gas Wells (1995, 2002), MMcf/d/well

- **Shallow**: 0.5 MMcf/d/well ('95: 0.5, '02: 0.5)
- **Medium**: 1.1 MMcf/d/well ('95: 1.1, '02: 1.1)
- **Deep**: 2.7 MMcf/d/well ('95: 2.7, '02: 2.7)

**Locations**:
- **B.C.**
- **Alberta**
- **Sask.**
Average Gas Well Production
(WCSB)

1990 - 95 Average: 0.34 MMcf/d/well
Decline 7% / yr
Since 1995

MMcf/d/well

0.4

0.3

0.2

0.1

0.0


Gas Wells
(000's)

0

25

50

75

100

Average Gas Well Production
Gas Wells (000's)
WCSB Gas Production Outlook
Canadian Reserve Replacement
Top 30 Companies

% Replacement

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<th>Year</th>
<th>Revisions / Improved Recoveries</th>
<th>Discoveries and Extensions</th>
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Large Producers $ Migration from Western Canada

- Mackenzie Delta
  - Producers Group
  - Explorer Group
- B.C.
- Alberta
- Saskatchewan
- East Coast Offshore
  - Newfoundland (oil)
  - Nova Scotia (gas)
- International
  - Large
  - Growing
- Near North
- Tar Sands/Oil Sands
  - Tar Sands (Syncrude, Suncor)
  - SAGD
Tight(er) Gas Region

- Alberta
- Greater Sierra
- Cutbank Ridge
- Deep Basin
- B.C.
- Sask.
Potential WCSB Coalbed Methane Regions

- Mountain & Foothills
- Shallow Plains Coals
- Deeper Plains Coals
- Other Coal Areas
- Gas Pipeline

Cross Section:
- Rockies
- Upper Cretaceous Coals
- Lower Cretaceous Coals
- Shale
- Paleozoic

Regions:
- Cross Section
- Alberta
- B.C.
- Sask.
- West
- East
Canadian Gas Exports

Tcf/yr

Bcf/d

Rapid Growth

Regulated Pricing

Price Deregulation

Plateau 17 Bcf/d

Import to U.S.  Canadian Markets

03e

PGT Exp.

NB Exp.

Alliance

Iroquois

62 65 70 75 80 85 90 95 00 03e
Gas Requirements for Oil Sands
(50% of Projects @ 80% LF)

Kyoto Accord effects
1. Decreases Number of Projects by 50%
2. Defer post 2005 Projects by 2 Years

100% of Projects

Bcf/d

Bcf/yr

Synthetic Mining
Bitumen In Situ
Potential Mining
Potential In Situ

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East Coast Development

- Proven Reserves:
  - Nova Scotia: 8 Tcf
  - Newfoundland: 10 Tcf

- Close to Markets

- M&NE completed '99

- Current Production:
  - NS: 520 MMcf/d
  - Nfld: 250 MMcf/d (100% re-injected)

- Deep Panuke (1 Tcf)
  “Time-out to strengthen economics/reserves”
East Coast Development

Earliest for Deep Panuke is 2007

Fall 2003 first Tier II field
Mackenzie Delta Gas

- Proven Reserves: 9 Tcf
- Potential Reserves: 64 Tcf
- Delta Producers Group & APG proceeding with “project definition” phase

- Issues:
  - APG Financing
  - Accommodation of Explorer volumes
  - Inclusion of pipeline(s)
  - Filing of PIP: 2nd Q 2003
  - Full NEB Appl’n: Late 2003/04
  - In-service: mid-2009
Alaska Gas

- Proven Reserves: 31 Tcf
- Potential Resource: 99 Tcf
- North Alaska currently produces: 8 Bcf/d
- Initial pipeline capacity: 2.5 Bcf/d
- Ultimate capacity: 4.0 - 4.5 Bcf/d
- Earliest in-service date: 2012
- Govt. / fiscal: U.S. + Alaska
# Potential Northern Gas Timetable

## Mackenzie Delta + Alaska

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Standard Gas: LNG Costs have Declined Significantly

$/MMBtu – 2,500 mile voyage (Before feedstock prices)

Lower costs can improve netbacks or open additional markets, especially with higher U.S. gas prices

1980’s LNG costs

Current LNG costs

Liquefaction 0.49 1.54 2.53
Transportation 0.50 Total
Regasification

Liquefaction 0.35 1.75
Transportation 0.40 Total
Regasification

30% decline of into pipeline costs

Source: Tractebel - 2003 NAGS Conference
Conclusion:

- No Quick Solutions
- Prices High & Volatile
- Demand Destruction

Expand/New LNG Terminals

L48/Canada

Mexico

Exports?

Mack.Delta Gas

Alaska Gas

2003  2005  2007  2009  2012+
For more information Visit
North American Natural Gas Strategy Conference
November 3/4, 2003
Calgary, Canada

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