The Story Of The
U.S. And Canada’s Natural Gas

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Presented By:
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BALANCING
NATURAL GAS
POLICY

Fueling the Demands of a Growing Economy

Committee on Natural Gas Presentation
to the National Petroleum Council

September 25, 2003
Natural Gas is Important to Our Economy

Average Annual U.S. Energy Use
97 TCF (equivalent)

- PETROLEUM: 38%
- NATURAL GAS: 24%
- COAL: 23%
- NUCLEAR: 8%
- HYDROELECTRIC & RENEWABLES: 7%
Demand is Diverse and Power Generation Will Drive Growth

- Canada
- U.S. Power
- U.S. Cogeneration
- U.S. Industrial
- U.S. Residential/Commercial
- Other

TCF

2% / YEAR GROWTH

1% / YEAR GROWTH


NPC
What A Difference 3 Years Made

1999 NPC Forecast
Underestimated Power Generation Needs:
“145,000 MW by 2015”
(1999)
220,000 MW by 2004
(Actual)

Continued Energy Efficiency is Important

Recommendation: Encourage increased efficiency and conservation through market-oriented initiatives and consumer education.
As Demand Has Grown, Flexibility Has Eroded

Fuel Substitution Capability

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>Today</th>
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<tbody>
<tr>
<td>Natural Gas and Oil-Based Industrial Consumption</td>
<td>26%</td>
<td>5-10%</td>
</tr>
<tr>
<td>Natural Gas and Oil-Based Power Generation</td>
<td>35%</td>
<td>20-25%</td>
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The Gas-Fired Generation Buildup Has Reshaped Demand

U.S. Power Generation Capacity, GW

- Renewables
- Natural Gas
- Oil/Distillate
- Coal
- Hydroelectric
- Nuclear

Dual Fuel

Year:
- 1995
- 2000
- 2005
- 2010
- 2015
- 2020
- 2025
Higher Prices Impact Industrial Growth

- CHEMICALS
- OTHER
- REFINING
- FOOD
- PRIMARY METALS
- PAPER
- STONE CLAY & GLASS

TCF


NPC
Future Supplies Come from Traditional and New Sources

- LNG
-阿拉斯加
-非北极加拿大
-麦肯齐三角
-科罗拉多
-戈尔德曼深水
-戈尔德曼架子
-其他较低的48
Finding: Traditional North American producing areas will provide 75% of long-term U.S. gas needs, but will be unable to meet projected demand.
North American Resource Base is Large and Diverse
North American Resource Base Was Comprehensively Reviewed

Technical Resource

- MEXICO
- CANADA
- ALASKA
- LOWER - 48

<table>
<thead>
<tr>
<th>Year</th>
<th>TCF</th>
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<tbody>
<tr>
<td>1992 NPC</td>
<td>1,000</td>
</tr>
<tr>
<td>1999 NPC</td>
<td>2,000</td>
</tr>
<tr>
<td>2003 NPC</td>
<td>3,000</td>
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Production History Confirms a Maturing Resource Base

Recovery per Conventional Gas Connection

BCF


LOWER - 48

WESTERN CANADA
The Rate of Production Decline is Increasing

Lower - 48 Decline Rate From Existing Wells

<table>
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<tr>
<th>Year</th>
<th>Rate</th>
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<tr>
<td>1992</td>
<td>-15%</td>
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<tr>
<td>1994</td>
<td>-15%</td>
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<tr>
<td>1996</td>
<td>-20%</td>
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<tr>
<td>1998</td>
<td>-25%</td>
</tr>
<tr>
<td>2000</td>
<td>-30%</td>
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Production Response from Increased Drilling Has Been Modest

Lower-48 Gas Production and Rig Count

- Gas Production
- Rigs

Year: 1990 - 2002

BCFD: Billion Cubic Feet per Day
GAS RIGS
Rockies and Deepwater Gulf of Mexico Production Must Grow
Nonconventional Production Must Grow
Keeping Supply Flat Takes “Many Moving Parts”

Indigenous Resources Are Not Fully Utilized

Technical Resource Impacted by Access Restrictions

- 21 TCF
- 125 TCF
- 69 TCF OFF-LIMITS
- 33 TCF
- 25 TCF
Worldwide Natural Gas Resources Are Vast

Global LNG Supply Facilities

- Existing
- Under Construction
- Proposed

Annual Global Consumption
< 2% of World Proved Reserves
Demand, as envisioned, cannot grow.

Keeping U.S. supply flat takes many successes.

High price has little impact on helping supply.

Drilling activity has to soar.

Urgent need to understand resource bases not now in use (North American OCS).

Global gas is hazier than meets the eye.
Final Observations

- Three years changed the outlook by 180°.
- Depletion is easy to ignore.
- Peaking of energy supply is easy to miss (until after the fact).
- No form of energy demand can ever exceed its energy supply.
Investment Bankers to the Energy Industry