

National Energy  
Board



Office national  
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Looking Ahead to 2010

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Natural Gas Markets  
in Transition

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An ENERGY MARKET ASSESSMENT • August 2004

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# ACRONYMS, UNITS AND CONVERSION FACTORS

## Acronyms

CBM	Coal Bed Methane
CIPEC	Canadian Industry Program for Energy Conservation
DSM	Demand-Side Management
EIA	U.S. Energy Information Administration
EMA	Energy Market Assessment
EPG	Electric Power Generation
LDC	Local Distribution Company
LNG	Liquefied Natural Gas
NEB	National Energy Board
NYMEX	New York Mercantile Exchange
NG3	NYMEX Natural Gas contract, average 3-day closing price
WCSB	Western Canada Sedimentary Basin
WTI	West Texas Intermediate

## Units

bbbl	barrel
Bcf	billion cubic feet
Bcf/d	billion cubic feet per day
GJ	gigajoule
m <sup>3</sup>	cubic metre
MMBtu	million British Thermal Units
MMcf/d	million cubic feet per day
MW	megawatts
Tcf	trillion cubic feet

## Conversion Factors

1 million m <sup>3</sup>	= 35.3 million cubic feet
1 GJ	= 0.95 MMBtu

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## FOREWORD

As part of its mandate under the *National Energy Board Act*, the National Energy Board (NEB or Board) is required to study and keep under review the outlook for the supply of all energy commodities (including electricity, oil, natural gas and natural gas liquids) and the demand for Canadian energy commodities in both export and domestic markets. The Board publishes reports on energy, known as Energy Market Assessments (EMAs), which examine various facets of Canada's energy markets. These reports include both long-term assessments of Canada's energy future and specific reports on current and near-term energy issues.

In addition, the Board has specific monitoring responsibilities pursuant to its regulatory responsibilities. The Board is required to monitor Canadian energy markets to ensure that markets are operating such that Canadian energy requirements are being met at fair market prices.

In developing this report, the Board held eight roundtable discussions in February 2004 with selected stakeholders in Toronto, Ottawa, Montréal, Fredericton, Vancouver and Calgary. The objective of the roundtable discussions was to solicit the perspectives of the various participants on how natural gas markets may evolve, including their views on potential actions that could be taken by regulators, governments, and market participants to facilitate a smoother transition to the end of the decade. The Board appreciates the views and comments it received during the consultative process and would like to thank all participants who contributed their time and expertise (Appendix 1).

If a party wishes to rely on material from this report in any regulatory proceeding, it can submit the material, as it can submit any public document. In such case, the material is in effect adopted by the party submitting it and that party could be required to answer questions on it.

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# EXECUTIVE SUMMARY AND POTENTIAL ACTIONS

In July 2003, the Board released a report titled *Canada's Energy Future - Scenarios for Supply and Demand to 2025*, which identified key issues and uncertainties affecting the long-term supply and use of energy in Canada. In particular, the scenarios in the report envisioned futures with limited potential to increase natural gas supply while the demand for natural gas was likely to increase. The scenarios suggested a tight balance would exist between natural gas supply and demand and implied that natural gas prices would likely be high and volatile over the medium term until further adjustments could be made to bring on new supply or reduce consumption.

Over the longer term, there are grounds to expect that additional sources of gas supply can be developed as more frontier and unconventional sources become available and import capacity for liquefied natural gas (LNG) increases. Also, with time, there is greater potential for significant adjustments in natural gas consumption and the implementation of new technologies to use alternative sources of energy. However, there are concerns about the transition period to the end of the decade, as the opportunities to develop new gas supply and significantly adjust demand may be more limited.

In February 2004, the Board conducted roundtable discussions (Roundtables) with selected market participants at eight sessions in six cities across Canada to examine how natural gas markets may evolve to the end of the decade and to identify potential actions that could be taken by regulators, governments, and market participants to facilitate a smoother transition. In particular, the Roundtables sought to examine the following issues in closer detail:

- What are the likely prospects for new gas supply, and the key issues and potential barriers in their development?
- What are the implications to natural gas consumers, and what adjustments in demand may be made to reconcile natural gas demand with available supply?
- What are potential actions that may help increase natural gas supply, promote more efficient use of natural gas, and mitigate the effects of high and volatile prices?
- Are there gaps in available information that, if filled, may lead to more effective energy decisions?

The Board invited a broad cross-section of interests and stakeholders to attend the Roundtables. These parties represented natural gas consumers, gas producers, regulatory agencies, government agencies, local distribution companies, pipeline companies, environmental groups, and various associations and service providers that were aware of and actively involved with natural gas issues. The large majority of invitees were able to attend and approximately 90 participants shared their expertise and specific insight on the natural gas market and the transition issues related to natural gas supply, consumption, and the impact of information and prices.



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Participants across the country widely agree that the balance between the supply and demand of natural gas is likely to remain tight until the end of the decade and that gas supply will be challenged to meet expected growth in gas demand. Canadian natural gas production is expected to be maintained at about 17 Bcf/d (481 million m<sup>3</sup>/day), with conventional production from the Western Canada Sedimentary Basin increasingly supplemented by unconventional gas such as coal bed methane (CBM). Participants also expect that it will be difficult to increase gas supply from other existing basins in North America and that additional gas supplies are likely to become available from the Mackenzie Delta and LNG. However, northern gas is not assumed to flow until around the end of the decade and the impact of LNG will be limited within this timeframe.

Given the unlikelihood of substantially increasing natural gas supply within this timeframe, adjustments in demand will be needed to balance with supply. As a result, competition for supply amongst end-users and the continued reduction in some segments of industrial demand is likely. The major challenges indicated by Roundtable participants revolve around managing the potential impacts of higher prices on the industrial sector and finding ways of using natural gas more efficiently.

It is widely accepted that a step-change in natural gas prices has occurred and that the market price reflects the tight balance in North American natural gas supply and demand. In this situation, North American natural gas prices are increasingly influenced by the cost of alternative fuels and the rising costs of finding and bringing new gas supply to market. Assuming that crude oil prices average in the range of US\$24 to \$35 per barrel, participants expect that NYMEX natural gas prices are likely to be in the range of US\$4 to \$6/MMBtu. In addition, changes in the structure of demand to a more weather-sensitive load and shorter-term contracting practices may leave the natural gas market more vulnerable to increased volatility in natural gas prices during this timeframe.

The key message consistently conveyed by participants is that clear and transparent price signals are required to enable market participants to make informed decisions, and governments and regulators should continue to emphasize market mechanisms as the fundamental approach to the operation of energy markets. The higher natural gas prices in today's market are seen as important signals that help to support development of new gas supply, enable investment in infrastructure, and encourage upgrades to energy efficient equipment and changes in consumption. Participants also noted that governments and regulators have a role in helping to overcome impediments to the effective operation of markets. It was suggested that regulators could clarify, streamline, and coordinate regulatory processes to reduce the costs and risks associated with new energy projects and that governments could play an important role in providing timely and complete Canadian energy information when it is not readily available.

## **Key Themes For Action Identified By Roundtable Participants**

Clear themes emerged from the Roundtables regarding issues and suggested actions that could be taken to facilitate a smoother transition in natural gas markets to 2010. The views and suggestions of participants provided invaluable input to the Board in its consideration of possible actions to enable more efficient market function.

### ***Continued emphasis on market forces and pricing***

A key message consistently conveyed by Roundtable participants was that policy makers and governments should continue to emphasize market mechanisms as the fundamental approach to the operation of energy markets. In particular, participants stated that clear and transparent price signals are required by market participants to make informed decisions, and, that governments and regulators

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have a role in helping to overcome impediments to the effective operation of markets. Improved price signals may be achieved through better information and by removing market distortions, such as price ceilings.

To support investment decisions for improving equipment, developing new supply, and expanding infrastructure, participants suggested that clear regulatory encouragement for longer-term contracts may help to align risks and support infrastructure development. Also, public confidence in market mechanisms and energy investment may be encouraged through provision of information and by providing fair returns that reflect changing risk.

In general, most participants emphasized that decisions on mitigation actions, such as using financial tools or investing in physical infrastructure, are best left to the market participants who will choose the best course of action based on their situation.

### ***Minimize unnecessary barriers to supply development***

Roundtable participants have suggested that by working together, regulators can minimize delays in regulatory processes, enabling more timely decisions and facilitating supply development. Specifically, regulators with different areas of responsibility were encouraged to work together to eliminate duplication and redundancy where there is overlapping jurisdiction and to provide clarity in other areas of unclear jurisdiction. Participants pointed out that this would reduce the amount of time and money currently spent on public and regulatory proceedings without compromising the objectives of the various regulations. Conversely, inefficient permitting and approval processes will take longer and the project would be exposed to higher costs and an increased risk of changing economics over that period.

Further to regulatory improvements, actions can be taken to improve the amount and availability of information to aid in the understanding of important energy issues and emerging sources of gas supply, such as CBM and LNG.

Other potential actions suggested by Roundtable participants concerning drilling incentives, royalty structure, provincial regulatory resources and drilling approvals are beyond the scope of NEB action and comment. These suggestions are, however, documented in Chapter 3 of this report for consideration by the appropriate parties.

### ***Address the challenges of growing demand***

With respect to managing demand and enabling appropriate adjustments in consumption to reconcile with available supply, Roundtable participants stressed that the primary response should be to enhance reliance on market mechanisms wherever possible. Participants believed that market mechanisms can be improved by enabling consistent market-based rules across all energy markets and providing more timely and accurate energy price signals to the consumer.

In addition to improving and providing timely price signals to consumers, participants suggested that actions can also be taken to encourage energy efficiency, enhance awareness of energy issues, and to ensure consumers understand their consumption alternatives. Participants also suggested possible financial incentives to encourage upgrades to more energy efficient equipment and, changes to environmental regulation to provide more fuel alternatives to industries in order to reduce natural gas demand or provide more time for transition.

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Many of these suggestions are beyond the scope of the NEB. For completeness and consideration by the appropriate parties, these suggestions are documented in Chapter 4.

### ***Need for timely, objective and high quality information***

Participants across the country identified a need for more public information on all energy matters. Specifically, it was suggested that governments and regulators have a role in informing the public on key emerging energy trends and issues. The broad understanding of energy market trends and issues can be enhanced by providing access to complete, accurate, and timely data and by providing more in-depth and expanded analyses on important energy issues. Roundtable participants suggested that the various agencies that compile statistics convene to examine ways to improve the quality and provision of Canadian energy statistics. In particular, many participants indicated that facilitating access to integrated information and analysis through a central repository would result in more complete and consistent energy data and enable better understanding of Canadian energy demand and new sources of gas supply.

Participants also identified gaps and lags in current energy market information in Canada and areas where public agencies can assist in bridging these gaps. Specifically, most participants agreed that it is difficult to get detailed information and analysis of Canadian energy demand and fuel switching, and that such information would be very useful to understand the dynamics and trends in the Canadian natural gas market.

### **NEB Response And Action**

The potential actions identified during these Roundtables are not limited to the Board and may be aimed at other market participants, policy makers and regulators. Although, it can not be assumed that the Board endorses all of the views and suggestions made by Roundtable participants, the Board has noted areas where its current activities may align with participant suggestions. In addition, the Board has identified areas within its mandate where it is prepared to take specific action, or partner with others if there is broad support for their implementation.

The Board appreciates the views on the natural gas market provided by Roundtable participants. As new energy market assessments are undertaken on a variety of energy topics, the Board intends to consider the use of similar forums and other mechanisms to obtain the views of parties interested in the issues under review.

#### **1. *Improve regulatory effectiveness and efficiency***

Roundtable participants encouraged regulators and government agencies to work together to streamline the regulatory process by eliminating duplication and by providing clarity in areas of unclear jurisdiction. Toward this objective, the Board will take the following action:

- Continue to play a leading and proactive role to develop coordinated, clear and predictable regulatory processes, especially in frontier and other areas where there may be overlapping jurisdiction and a high potential for developing new supply;
- Consider changes to regulatory processes which may allow more efficient decisions without compromising the objectives of regulations; and,
- Support public confidence and education on energy issues and market mechanisms by providing factual and objective information on energy markets and emerging issues.

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## **2. *Improve the provision of energy market information***

Participants suggested that the broad understanding of energy issues can be enhanced by improving the quality and access to Canadian energy data and by providing more in-depth analyses on important energy issues. While the Board already provides a number of reports and analysis on energy markets, it is prepared to take further action, or partner with others, in the following areas:

- Play an active role to improve the provision of Canadian energy information
  - coordinate with other providers of Canadian energy data to ensure the provision of complete and timely energy information, and work towards providing information through a single window or point of access; and,
  - consider partnering opportunities with Statistics Canada, Canadian end-users, consumer associations, and other parties to provide detailed and timely information and analysis on energy demand in Canada.
- Provide in-depth analysis and information on specific areas of importance, including:
  - the issues and costs associated with energy alternatives to natural gas;
  - alternative methods of electricity power generation, including clean coal, wind power, and using methane from municipal waste; and,
  - emerging sources of new gas supply, such as LNG and unconventional gas.

## INTRODUCTION

In July 2003, the Board released a report titled *Canada's Energy Future - Scenarios for Supply and Demand to 2025 (Canada's Energy Future)*, which identified key issues and uncertainties affecting the long-term supply and use of energy in Canada. In particular, the scenarios in the report envisioned futures with limited potential to increase natural gas supply while the demand for natural gas was likely to increase. The scenarios suggested a tight balance would exist between natural gas supply and demand and implied that natural gas prices would likely be high and volatile over the medium term until further adjustments could be made to bring on new supply or reduce consumption.

Over the longer term, there are grounds to expect that additional sources of gas supply can be developed as more frontier and unconventional sources become available and import capacity for liquefied natural gas (LNG) increases. Also, with time, there is greater potential for significant adjustments in natural gas consumption and the implementation of new technologies to use alternative sources of energy. However, in the transition period to the end of the decade, these opportunities to adjust gas supply and demand were expected to be more limited.

In February 2004, the Board convened roundtable discussions (Roundtables) with selected market participants at eight sessions in six cities across Canada to examine how natural gas markets may evolve to the end of the decade and to identify potential actions that could be taken by regulators, governments, and market participants to facilitate a smoother transition. In particular, the Roundtables sought to examine the following issues in closer detail:

- What are the likely prospects for new gas supply, and the key issues and potential barriers in their development?
- What are the implications to natural gas consumers, and what adjustments in demand may be made to reconcile natural gas demand with available supply?
- What are potential actions that may help increase natural gas supply, promote more efficient use of natural gas, and mitigate the effects of high and volatile prices?
- Are there gaps in available information that, if filled, may lead to more effective energy decisions?

The Board invited a broad cross-section of interests and stakeholders to attend the Roundtables. These parties represented natural gas consumers, gas producers, regulatory agencies, government agencies, local distribution companies, pipeline companies, environmental groups, and various associations and service providers that were aware of and actively involved with natural gas issues. The large majority of invitees were able to attend and approximately 90 participants shared their expertise and specific insight on the natural gas market and the transition issues related to natural gas supply, consumption, and the impact of information and prices.

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A discussion document prepared by the Board to assist participants in preparing for the Roundtables is contained in Chapter 2. This information includes a general assessment of issues in natural gas supply, prices and demand (based on the analysis contained in the report on Canada's Energy Future) as well as a list of questions (Appendix 2) aimed at gaining a better understanding of natural gas market dynamics. Although Canadian and U.S. natural gas markets have evolved into an integrated North American market, the Roundtables focused primarily on Canada.

Participants across the country widely concurred with the Board's outlook and assessment that the natural gas market will continue to be tight to the end of the decade. In fact, many participants acknowledged that the days of easy increases in gas supply are likely behind us and believed that it is important for Canadians and policy makers to recognize this issue. One participant remarked that "the gas supply situation is unsettling". Another volunteered that "Canada is at a crossroads" with respect to the natural gas industry, noting that the choices and actions taken today will have a large impact on how Canada fares through the transition to 2010, and beyond. Finally, one participant underlined the urgency in making these choices and taking the accompanying actions with the assessment that "we've crossed the Rubicon" in reference to the bygone days of robust gas supply and relatively moderate prices.

This report provides an overview of the Roundtables and outlines the areas for potential improvement and possible actions as suggested by participants to facilitate a smoother transition in the natural gas market to 2010. The potential actions identified by participants are not limited to the Board and may be aimed at other market participants, policy makers and regulators. The key market issues and recommendations for action as expressed by participants during the Roundtables are documented in the following chapters.

Although, it can not be assumed that the Board endorses all of the views and suggestions made by participants, the Board has noted areas where its current activities may be expanded to align with these suggestions. In the executive summary, the Board has identified areas within its mandate where it is prepared to take specific action, or partner with others if there is broad support for their implementation.

## BACKGROUND INFORMATION PROVIDED TO ROUNDTABLES

### Natural Gas Supply

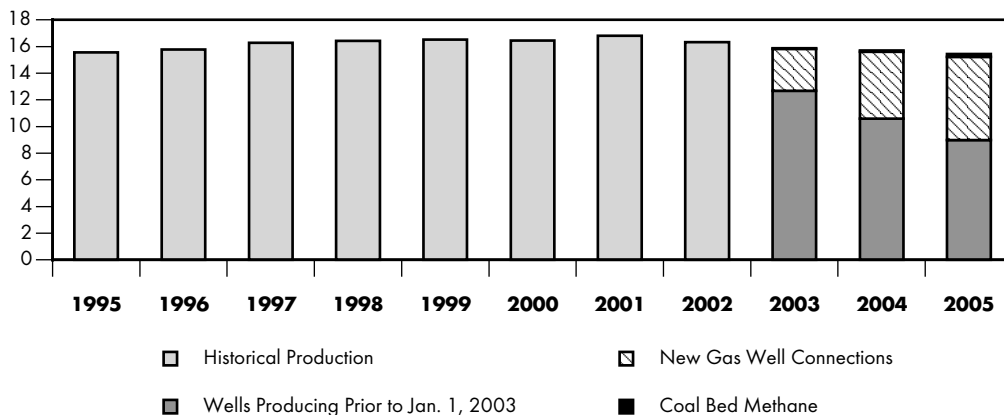
In 1986, Canadian natural gas prices were deregulated and freer access was provided to the U.S. market. Between 1986 and 1999 Canadian gas production more than doubled and exports to the U.S. more than quadrupled. During this period, Canadian gas exports satisfied about 75% of incremental U.S. demand. Canadian and U.S. natural gas markets have increasingly evolved into an integrated North America market. Natural gas can be bought from many supply sources and delivered to any market centre through an extensive North American pipeline grid. However, in the last three years, production from the Western Canada Sedimentary Basin (WCSB) has flattened out at about 16 Bcf/day (453 million m<sup>3</sup>/day) despite record levels of drilling activity.

The NEB's outlook for deliverability from the WCSB over the next couple of years is for production to fall slightly. It appears that it will be a challenge to increase production from conventional sources in Canada. As a result, there will be increased reliance on developing new supply sources. There is considerable potential to grow production from unconventional sources, including coal bed methane (CBM) in the WCSB, and deep tight gas deposits in northeast B.C. and the Alberta Foothills. However, very little development of unconventional natural gas has occurred to date. Therefore, there is uncertainty associated with timing, cost and production levels. In the longer term, additional natural gas supplies from the Canadian north and potentially offshore Nova Scotia may be available. It will take at least five or six years to develop most of these new sources.

FIGURE 2.1

### WCSB Natural Gas Deliverability

Marketable Gas Deliverability, Bcf/d

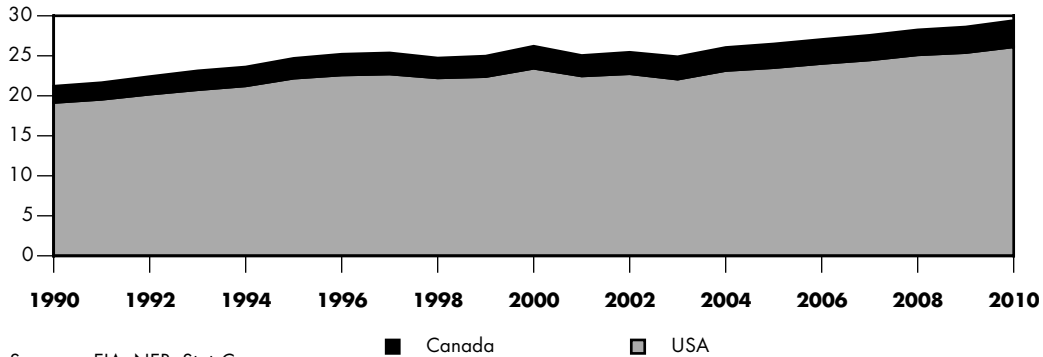


Source: NEB Short-term Natural Gas Deliverability from the Western Canada Sedimentary Basin (Dec. 2003)

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**FIGURE 2.2****North American Natural Gas Demand**

Annual Consumption (Tcf)



A similar pattern of flat to declining gas production has been observed in the United States as many of the conventional gas basins appear to be increasingly mature. An exception would be the Rockies, which has actually experienced sharp growth in production despite periodic infrastructure constraints. However, the Rockies only account for ten percent of total production.

While continental production is essentially flat, natural gas demand is expected to grow strongly with a recovery in the U.S. economy, rapid growth in gas-fired generation and, in Canada, the development of oil sands projects. In the face of growing demand and flattening supply, the market is faced with a major question - where will the gas come from to satisfy the demand to the end of the decade?

In order to address this supply gap, there has been a renewed interest in importing liquefied natural gas (LNG). In the U.S., all four existing receiving terminals are operating with a current capacity of about 2.5 Bcf/d (71 million m<sup>3</sup>/day). Further, numerous facilities and expansions of existing terminals have been proposed. A few of these projects are being considered for sites in Canada. There is a lag time of about five to six years to design, obtain approval and construct a new LNG terminal. Therefore, LNG can only make a limited contribution to closing the expected supply gas gap to the end of the decade.

**Natural Gas Prices and Demand**

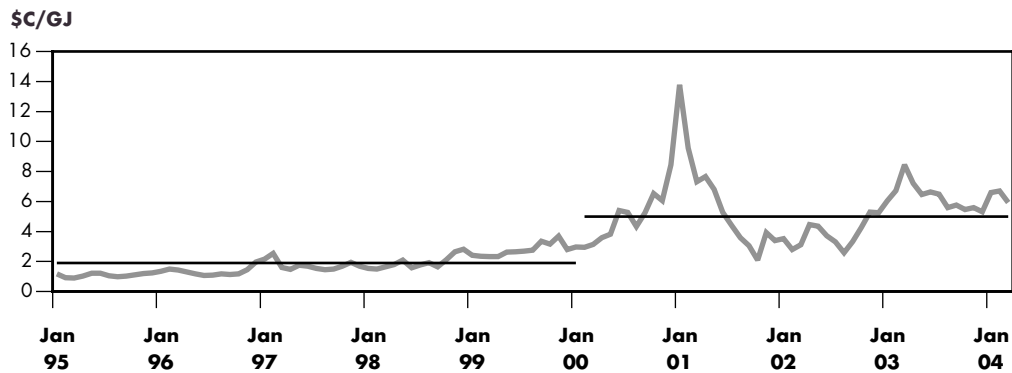
Throughout the 1990s, natural gas prices were relatively low. Over the last three years, natural gas prices have increased significantly as a result of tighter balances between natural gas supply and demand. In addition, they have exhibited severe volatility as shown on the following chart. Many analysts believe that there has been a step-change in the level of natural gas prices.

Although all end-users are impacted by higher prices and volatility, the implications and the responses differ for each sector. For example, considerable demand in the industrial sector was curtailed either by switching to other fuels, reducing industrial production and, in the extreme, shutting down production. It was during this time that the term “demand destruction” was coined.

There has been some fuel-switching and demand curtailment in response to higher prices; however, there is a lack of consensus on just how much capacity there is in the market to switch fuels and how



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**FIGURE 2.3****AECO-C Natural Gas Prices**

much of this capacity is permanent and how much is temporary. Similarly, it is not clear how much demand has been permanently “destroyed” and how much was only temporary.

Many market participants use financial instruments to minimize the risk of adverse price fluctuations. Following the demise of large marketers, there has been a considerable reduction in liquidity in natural gas markets. Many companies that were formerly active in trading have withdrawn from the market, thereby greatly reducing the number of counterparties in the market at any one time.

Significant capital investments will be required to bring on additional supplies to markets. Price volatility adds uncertainty, which increases risks and costs. This in turn affects investment decisions made by producers and consumers.

In summary, some of the key market developments in recent years include:

- continental natural gas production is flattening out
- natural gas prices have risen and have been very volatile
- high prices have had some strong impacts on gas demand
- the electric power generation sector has emerged as a major source of gas demand
- there has been a reduction in liquidity in the market
- natural gas is becoming a premium fuel.

**Outlook to 2010 - Transition Issues**

It appears that it will be difficult to meet the expected demand for natural gas in North America from indigenous production and the available LNG import capacity. Thus, many observers expect a continuation of the market conditions that have prevailed over the last few years, i.e. periodic tight market conditions, characterized by extreme price volatility and an ongoing need for adjustments on the consuming side of the market. Over the longer term, there are grounds for expecting that supply will be more abundant as more frontier and unconventional sources become available and LNG import capacity increases. However, there are concerns about the transition years to the end of the decade.

# NATURAL GAS SUPPLY

## Key Observations

- Canadian gas production is likely to remain relatively flat through to 2010.
- Conventional gas supply will likely decline although there may be potential to increase supply from northeast British Columbia.
- Unconventional gas supply, particularly production of CBM, is also likely to increase, but by how much is uncertain.
- Northern gas from the Mackenzie Delta is not assumed to flow much earlier than the end of the decade.
- No incremental supply is expected from the offshore east coast by 2010.
- Overall, it will be difficult to increase indigenous natural gas production.
- Imports to Canada, in the form of LNG, are possible by 2010, but there is significant uncertainty surrounding the proposed import terminals.

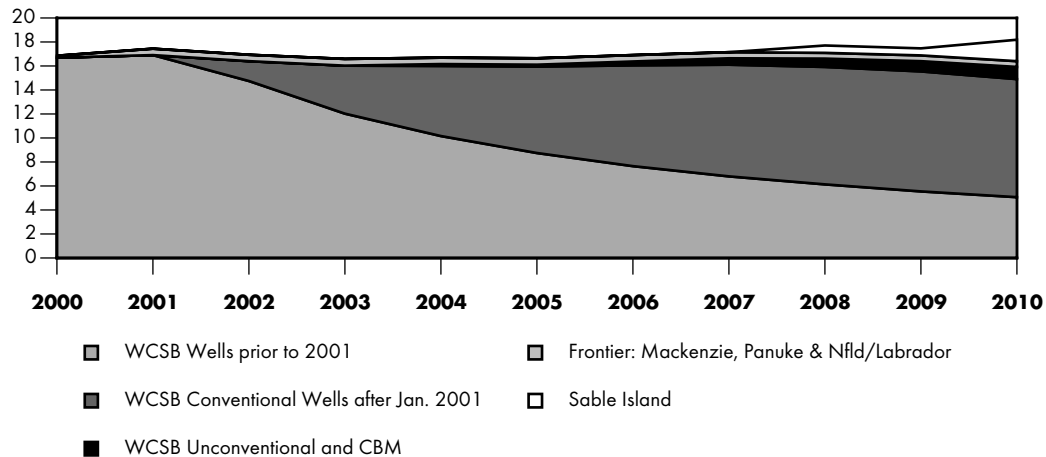
## 3.1 Outlook

In its report *Canada's Energy Future*, the Board's scenarios envisaged Canadian natural gas supply to exhibit a generally flat trend at about 17 Bcf/d (481 million m<sup>3</sup>/day) over the period to 2010 (see Figure 3.1). Further, the report indicated that conventional natural gas production from the WCSB

FIGURE 3.1

### Canadian Natural Gas Supply: Supply Push

Marketable Gas Deliverability, Bcf/d



Source: NEB - *Canada's Energy Future - Scenarios for Supply and Demand to 2025* (July 2003)

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would gradually decline and would need to be increasingly supplemented by unconventional gas and by other sources of gas. Of course, there is considerable uncertainty regarding the relative contribution by each of these components. Natural gas production from the WCSB, for example, is heavily dependent on drilling rates. While the long-term scenarios assumed stable and higher than historical drilling levels, there will be variations from year to year. In fact, should the record pace of drilling experienced to-date in 2004 continue, this activity would likely result in production increases over 2003 for the WCSB.

## **3.2 Conventional Natural Gas Supply**

### ***Western Canadian Sedimentary Basin***

Participants across the country and across the spectrum of the natural gas industry, with few exceptions, concurred with the Board's general characterization of Canadian gas supply, specifically, the likelihood of declining supplies of conventional gas from the WCSB. A few participants, however, suggested a more optimistic outlook on the basis of a perceived upside from northeast British Columbia (and other basins in B.C. such as the Bowser), and deeper plays through the application of new technology. In the current price environment, producers are making record capital expenditures and drilling record numbers of wells. Producers have also been drilling more deep wells, which, while usually more costly, are also usually more productive. However, there is normally a longer lag, relative to conventional shallow wells, before incremental production materializes from these deeper wells.

It was widely acknowledged during the Roundtables that the WCSB will continue to be a major contributor to North American gas supply, but it is becoming increasingly mature and will be challenged to maintain or increase production. There was also recognition by eastern Canadian consumers that producers have been responding and trying to increase supply but that the supply response occasionally lags the market. Consumers in eastern Canada, including some distributors, were not seriously concerned about the supply profile for the WCSB; in fact, some distributors expressed confidence in the availability and access to increasingly diverse sources of supply in the broader continental market.

### ***East Coast***

The future gas supply from the offshore east coast was considered to be a major uncertainty by most participants. While the potential size of the gas resource is considered to be large, a recent string of unsuccessful exploration wells has been disappointing to producers and the market. The future use and growth of natural gas within the domestic residential and commercial sectors is particularly dependent on incremental gas supply. Notwithstanding the results from recent drilling, Roundtable participants remain hopeful that incremental supplies will be realized eventually from this relatively less-explored region. However, this was not expected to occur before 2010. Looking forward, participants expect offshore volumes to remain in the 400 to 600 MMcf/d (11 to 17 million m<sup>3</sup>/day) range during this period, with any incremental supply coming from LNG and onshore supplies.

There has been some success with onshore drilling at the McCully field in New Brunswick. In fact, commercial production of gas is already occurring with sales to a local potash facility. Access to the Maritimes & Northeast Pipeline system and accompanying access to larger markets would facilitate further investment and spur further development at this site, although the volumes would be small relative to the offshore.

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## **Northern Gas**

There was general consensus among Roundtable participants that northern gas from the Mackenzie Delta may have the potential to contribute to Canada's overall gas production by 2010. However, most participants believe that northern gas cannot be assumed to be on-stream much before the end of the decade in view of the significant time and resources required for the regulatory process and construction, if approved.

### **3.3 Unconventional Gas Supply**

The term *unconventional gas* typically refers to low-permeability reservoirs or "tight gas", shale gas, and CBM (increasingly referred to as natural gas from coal). In general, participants view that unconventional gas has the potential to increase overall natural gas production in the future. However, there is substantial uncertainty surrounding the economics and development of these resources in the period to 2010. The productivity of these wells are usually very low and a greater number of wells are needed to produce the gas since it tends to be found in deposits that extend over a large area.

CBM is considered by Roundtable participants to be a likely source of unconventional gas, with potential to contribute significant volumes and help offset the expected decline in conventional gas supply. There are currently about two dozen pilot projects to develop CBM across the WCSB and some participants noted that about 1,000 CBM wells will be drilled this year, resulting in an expected 100 MMcf/d (2.8 million m<sup>3</sup>/day) of production. While it is too early to accurately assess this emerging supply source, the Board's scenarios for CBM supply also indicate about 100 MMcf/d in 2004, consistent with actual production to-date. However, some participants indicated that the Board's scenarios, suggesting CBM production levels of about 1 Bcf/d (28 million m<sup>3</sup>/day) by 2010, may be low, depending on the degree of success experienced at the various projects. To-date, there has been mixed success. In attempting to develop CBM, some projects have experienced fresh or salt water production which presents additional challenges with water disposal and tends to increase costs and impact gas production. Other projects have focused on dry coals that produce gas with no water. Considering the variability of coals, the range of success amongst existing pilot projects, and the very early stage of CBM development in Canada, there is still significant uncertainty surrounding the future of CBM development.

The Horseshoe Canyon play in south-central Alberta was described as an example where developments have been positive. Ultimately, some 50,000 wells may be needed to recover the CBM from this area alone. The drilling risk in CBM development is relatively low due to the widespread deposits of known gas resources and drilling programs typically involve a large number of wells and high drilling density to achieve economies of scale. Several participants have characterized the exploitation of these resources as a "manufacturing process". At the same time, some concern was expressed by CBM producers over their ability to obtain timely regulatory approval for the large numbers of wells that may be required to develop CBM. It was suggested that a new regulatory framework may be beneficial, and that regulators could consider a "blanket approach" to approve drilling programs for this type of development.

### **3.4 Liquefied Natural Gas**

Looking at the overall North American context, participants generally believe that it will also be difficult to increase gas supply from other existing basins in the continent. As a result, there is tremendous interest to develop capacity to import LNG to North America. Across the country,

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participants were of the view that LNG would play a larger role in the future, particularly in the United States. Moreover, participants did not foresee the development of a world market price for LNG, similar to the world price for crude oil, prior to 2010.

During the Roundtables, three proposals were identified that would situate an LNG terminal in eastern Canada - one each in Quebec, New Brunswick and Nova Scotia. Although project proposals indicate that LNG could be received in Canada as early as by the end of 2007, many participants were of the view that there would not be any LNG development in Canada prior to 2010 and that it is unlikely for all projects to proceed.

Many LNG terminals have also been proposed for other locations in North America. Each proposed site has its own issues, including: concerns expressed by the local population regarding safety, environmental impact and land use; access to a nearby liquid market; availability of existing infrastructure to further transport the gas from the LNG terminal to markets; and the cost of transporting LNG to the specific sites.

The general consensus among participants was that out of about 40 current proposals for new LNG receiving terminals in North America, only two or three new LNG projects would likely be in service by 2010. These new projects would potentially increase total LNG import capacity in North America by about 3 Bcf/d (85 million m<sup>3</sup>/day) for a total capacity of approximately 10 Bcf/d (283 million m<sup>3</sup>/day). While this volume is significant, participants did not expect that the additional imports of LNG would reduce the need to develop unconventional gas or frontier resources in this timeframe.

Some participants noted that LNG may contribute to diversification and security of supply and may help to moderate prices in regions such as Quebec since that market is at the end of the TransCanada PipeLines system and currently has few gas supply alternatives available to it. As well, it was offered that without access to LNG or other incremental gas supplies, the future of gas-fired generation in the Maritimes would be in question.

### **3.5 Issues and Potential Action**

Roundtable participants were asked for their specific insight and to identify the issues and barriers in new gas supply development. Specifically, the Roundtables sought to understand what actions could be taken that would improve the prospects of developing gas supplies in the timeframe to the end of the decade.

A potential barrier to supply development that was identified at Roundtables across the country was the need to improve the regulatory processes surrounding a wide range of projects, including the challenge that some projects face in having to obtain approval from multiple jurisdictions. Participants suggested that the regulatory framework, which was largely developed over the 1960s and 1970s, may not have evolved in-sync with other changes in the market. Participants voiced the need for a clear, efficient, integrated and streamlined regulatory framework to enable more efficient regulatory processes and more effective decisions.

In areas of new supply such as frontier regions, the offshore east coast, and LNG development, participants indicated that longer regulatory timelines and the high cost of infrastructure are challenges that may reduce the attractiveness of these regions for investment as compared to other areas in the global portfolio of producers. Participants indicated that the regulatory framework and accompanying processes should be reviewed with the goal of eliminating duplication and redundancy and providing clarity where there is unclear jurisdiction. Participants pointed out that this may

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reduce the amount of time and money currently spent on public and regulatory proceedings without compromising the objectives of the various regulations. Conversely, inefficient permitting and approval processes will take longer and the projects would be exposed to the higher risk of changing economics over that period.

Potential regulatory barriers may also exist in the development of CBM in Canada. In particular, some participants suggested that current regulatory processes and resources may constrain the ability of regulators to process the large number of drilling applications required to develop CBM. Despite the uncertainty of CBM development in Canada, a new regulatory approach for this type of development was suggested as a possible step to improve the regulatory process for this resource. Another barrier that was seen to be unique to developing certain CBM projects was the ownership of the gas. In other words, does the company that owns the rights to the coal also own the rights to the methane produced from the coal? In this situation, clarity in legal title may help to facilitate development of the resource.

Governments and regulators may also play an important role in providing the public with objective information on energy issues. For example, with the potentially greater importance of LNG and CBM in future natural gas supply, there is a need to improve the amount and availability of objective public information on issues concerning development of these emerging supplies. Suggestions include providing factual information on existing CBM developments and the performance record of LNG terminals and the LNG shipping fleet over the decades of their operation. In addition, there was a call for clarity on the jurisdiction of potential LNG terminals and the regulatory process to approve these facilities.

Similarly, the regulatory treatment of LNG terminals was raised with the concern that such facilities should not be regulated as cost-of-service facilities. Rather, it was stressed that, in order for LNG projects to be developed, these LNG terminals must not be required to be open-access facilities. In other words, some participants were of the view that the large investment needed to develop such a facility, along with the level of business risk, warranted proprietary access to the LNG terminal or the ability to negotiate and select contracts covering the capacity of the LNG terminal. In fact, such regulation was recently established in the United States.

Some participants also suggested that tax incentives or royalty relief for deep conventional, unconventional and frontier development could also be considered to encourage drilling and improve prospects for developing additional supplies in Canada.

In this connection, the province of Alberta has been discussing royalty issues with gas producers to better understand the economics associated with the development of CBM. At this time, CBM is governed by the same royalty system as all other natural gas production in Alberta. Also, the province of British Columbia recently launched several policy initiatives that provide incentives for oil and gas development, including specific initiatives to encourage summer drilling and deep well drilling. On the other hand, a number of participants suggested that the trend toward the formation of energy trusts, for tax purposes, may not help to promote increased exploration and supply development.

# NATURAL GAS DEMAND

## Key Observations

- *Demand for Canadian natural gas is expected to grow, due to growth in oil sands development, North American power generation, and general economic growth.*
- *Growth in gas demand for electric power generation (EPG) in Canada is less certain.*
- *There is an increasingly strong link between natural gas and EPG markets.*
- *There will be competition for available gas supplies and, in a tight market the EPG and core markets are likely able to bid gas away from the industrial sector.*
- *Mixed price signals introduced into the natural gas market that arise from regulated electricity prices can influence natural gas demand.*
- *Actions are required to enable more efficient use of natural gas.*

## 4.1 Introduction

Natural gas is primarily used by the residential and commercial sector as a source of space heating, by the industrial sector as a source of process heat and as a building block in chemical production, and by the EPG sector to produce electricity. The residential and commercial sectors have little ability to switch to other fuels when gas prices rise, whereas there is some fuel-switching capability in the industrial and EPG sectors. The pattern of consumption also varies across these sectors. Industrial use tends to be more constant throughout the year, whereas residential and commercial demand is weather-sensitive with peak consumption in the cold winter months. Gas demand for power generation is also weather-sensitive, with the peaks generally coinciding with the peaks in demand for electricity for cooling during hot summer months and for space heating during cold winter months.

## 4.2 Outlook for Natural Gas Demand

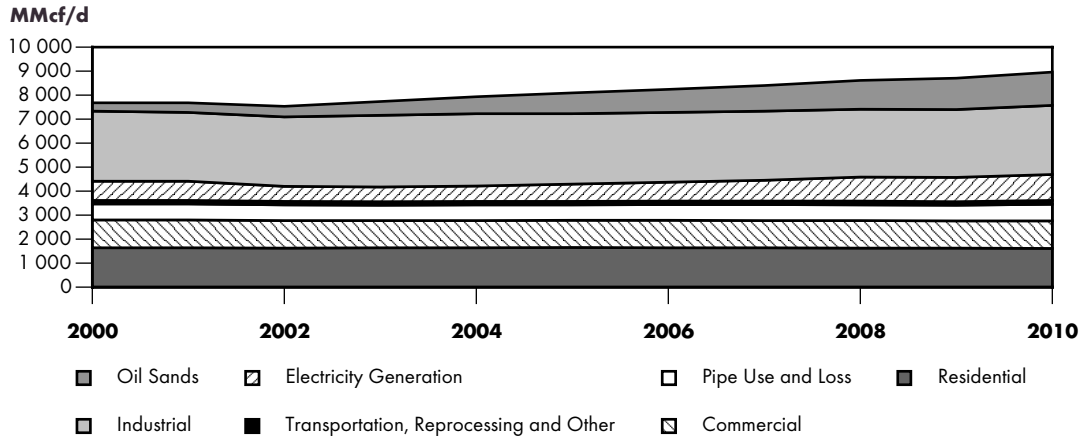
In its 2003 report *Canada's Energy Future*, the Board scenarios envisaged that Canadian natural gas demand could reach 9 Bcf/d (255 million m<sup>3</sup>/day) by 2010 (see Figure 4.1). The greatest increase was expected to occur in the industrial sector largely due to the growth in oil sands production. Natural gas demand for electricity generation was also projected to increase over the period to 2010; however, this outlook was based on relatively lower natural gas prices.

### **Oil Sands Development**

Natural gas is used by oil sands projects to produce electricity on site, to provide process heat in bitumen recovery, and to produce steam that is used in “in situ” recovery through steam injection

**FIGURE 4.1**

**Canadian Natural Gas Demand: Techno-Vert**



Source: NEB - Canada's Energy Future - Scenarios for Supply and Demand to 2025 (July 2003)  
 NEB - Canada's Oil Sands: Opportunities and Challenges to 2015 (May 2004)

processes. Natural gas is also an important source of hydrogen needed for hydro-cracking and hydro-treating in the upgrading of bitumen to higher quality synthetic crude oil. Scenarios for oil sands development indicate that the requirement for natural gas is likely to grow from the current 0.6 Bcf/d (17 million m<sup>3</sup>/day) to between 1.2 and 1.6 Bcf/d (34 to 45 million m<sup>3</sup>/day) by the end of the decade. Meanwhile, oil sands producers continue to examine ways to reduce their reliance on natural gas such as through the combustion or gasification of the bitumen itself, or through combustion or gasification of coal. Small scale nuclear power has also been raised as an alternative to gas. However, the general consensus of participants was that natural gas would continue to be the most economic and environmentally attractive fuel, at least until the end of the decade.

**Industrial**

The industrial sector accounts for almost half of the total Canadian natural gas demand. This demand is largely independent of seasonal weather patterns and is very stable throughout the year. Participants pointed out that the industrial demand is valuable to the market for two key reasons. First, the sheer size and stability of the load helps to keep pipeline utilization high, thereby supporting stable transportation costs to other end-users. Second, industrial demand tends to respond the most to price movements and thus helps to reduce price volatility by providing a buffer when demand rises in the other sectors.

Some industries have been able to mitigate higher gas prices by switching to other fuels. For example, many forestry operations are increasingly relying on hog fuel or wood waste. Other industries have switched to coal or fuel oil when it is available. However, some industries have found it necessary to reduce operations or temporarily shut-down in the face of high gas prices. Since 2001, considerable demand adjustments have occurred in the industrial sector. Most participants expect that the industrial sector would likely continue to bear most of the adjustment burden in a tight natural gas market.

In the mining sector, commodity prices are currently fairly high; therefore the sector has been better able to absorb the increases in natural gas prices. However, the industry is very concerned about the



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cost of natural gas and continues to take steps to economize on its use since commodity prices are very cyclical and could be considerably less on the world market in a few years.

In the Canadian petrochemical sector, ethane derived from natural gas is used as a chemical building block in the production of petrochemicals, primarily ethylene in Alberta. With the rise of natural gas prices in North America, this industry becomes less competitive with the rest of the world. However, participants suggested that plants in Canada will remain competitive with other North American gas-based crackers due to their efficiency in production processes. Participants also noted that the Canadian petrochemical sector will continue to use natural gas at about the same level for the remainder of the decade, but an increase in demand is unlikely.

Natural gas is also used to produce ammonia, a key input into the production of fertilizer. The fertilizer industry in North America is greatly affected by higher natural gas prices because the cost of ammonia is the largest component of its operating costs. Given the lower cost of natural gas in many places around the world, fertilizer companies may relocate production to locations where natural gas is plentiful and inexpensive and instead transport their product to North America. Fertilizer plants and other industrial plants that are located close to tidewater in North America are most vulnerable to overseas competition. Inland facilities that are located close to the markets are likely more competitive as transportation costs for their product are much lower.

### **Electric Power Generation**

There has been significant growth in gas-fired generation capacity within the past five years in North America. In this period, about 200,000 MW of gas-fired capacity has been added, largely for the following reasons:

- gas-fired plants can be built relatively quickly with lower capital costs, which reduces investment risk;
- gas-fired plants can be built closer to load centres, thereby reducing the need for investment in costly transmission lines;
- new cogeneration and combined-cycle gas plants are more efficient than older generation facilities using coal, oil or natural gas;
- natural gas had been relatively inexpensive throughout the 1990s, especially in the summer when gas supply and transportation costs are usually lower; and,
- natural gas is preferred for its clean burning properties, and there has generally been less public opposition to gas-fired plants than for facilities using alternatives such as coal, large hydro and nuclear energy.

In Canada, there has been relatively less investment in gas-fired generation than in the U.S., although a number of plants have been built in Alberta and Ontario. It had been assumed for many years that most incremental electricity generation would be natural gas based. However, participants noted that the relatively high level and volatility of natural gas prices have been a concern to investors and developers of natural gas-fired facilities. As a result, gas demand for this sector in Canada remains an uncertainty and may be less than was previously envisaged in the Board's *Canada's Energy Future* report because of higher natural gas prices.

Participants indicated that the greatest uncertainty for the EPG sector is in the province of Ontario where the provincial government has announced plans to replace 7,500 MW of coal-fired generation. If this were to happen, natural gas demand in Ontario could potentially increase by about 1.2 Bcf/d

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(34 million m<sup>3</sup>/day). Overall, participants were of the view that natural gas demand growth for power generation as projected in the Board's report on *Canada's Energy Future*, would remain largely unchanged to 2010 given the long lead times required for other fuels. Looking out beyond 2010, this sector will continue to consider alternative technologies and other fuels such as clean coal, renewables, hydro and nuclear energy.

### **4.3 Issues and Potential Actions**

Within the timeframe to the end of the decade, many participants indicated that reducing demand would be the primary means to keep the market in balance. Therefore, the major challenges revolve around managing the potential impacts of higher prices on the industrial sector and finding ways of using natural gas more efficiently. The Roundtable participants offered the following views when asked to identify the key issues and possible actions to improve the efficiency and the manner in which natural gas is consumed in Canada.

#### ***Industrial Sector and the Economy***

Participants noted that Canadian industry has historically had access to lower cost energy than many of its overseas competitors and that this was now changing, with potentially large costs to the Canadian economy. It was noted that many towns in Canada are dependent on a single large industry and that plant shutdowns could have wide-ranging social and economic impacts, including the loss of well paying jobs.

The companies that have an ability to switch from natural gas to fuel oil are also being impacted by the implementation of new environmental standards that limit their ability to switch fuels. Some participants suggested that these new environmental requirements could be phased-in over a longer time horizon, particularly in more remote communities where air quality may be less of an issue.

Participants from the industrial sector clearly indicated their support for market-based policies and emphasized that it does not expect special action or intervention by governments in the market pricing of natural gas to subsidize particular industries. However, these industrials also urged that consistent market-based rules be applied to all sectors of the economy. Participants believed that competition for natural gas supply will be high to the end of the decade and urged the EPG industry to give careful consideration to all alternatives for new generation. Many of the industrial participants are of the view that natural gas is a highly valued fuel that is not easily substituted in industrial processes, but may be more easily substituted in EPG.

#### ***Energy Efficiency***

Since energy costs comprise such a large part of operating costs, the industrial sector has a strong incentive to implement efficiency measures; in fact, it has a strong track record of continuously improving energy efficiency. Participants suggested that squeezing out further efficiencies, however, may now be more difficult as easily attainable improvements may have already been made. As well, investments in major new processes based on energy savings can be very risky. In the past, energy prices have been cyclical and a sharp fall in prices can render a large investment in an efficiency program uneconomic.

Nevertheless, participants agreed that continued improvement in energy efficiency in this sector is required and needs to be encouraged. In particular, participants lauded the efforts of the Canadian Industry Program for Energy Conservation's (CIPEC) Energy Innovator program and other private

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initiatives such as Inco Limited's award winning "Power Play" program. These were cited as excellent examples of improving awareness and outreach to champion cultural change for energy efficiency and prudent energy consumption across all sectors and parts of organizations. Continued efforts along this line may not only reduce a company's overall gas demand and energy costs, but will also help to improve the competitiveness of these businesses. Through these types of efforts, CIPEC participants have demonstrated an average annual improvement in energy efficiency of 2.4 percent between 1990 and 2000.

Commercial gas users also have an incentive to seek out energy savings due to the high energy requirements they have for space heating for commercial buildings. However, it can be very expensive to retrofit existing buildings. Natural Resources Canada, through the Office of Energy Efficiency, operate a number of programs, such as the Energy Innovators Initiative or the Commercial Building Incentive Program, which may provide financial incentives to help commercial businesses and public institutions plan and implement changes to improve the energy efficiency of their buildings.

Participants suggest that residential gas users may have the smallest incentive to invest in energy efficiency measures because heating costs are typically only a small part of the average homeowner's overall budget. Further, homeowners may balk at the cost of making an up-front investment in more costly equipment, such as a new more energy efficient furnace or windows. Accordingly, some participants believed it may be necessary to provide incentives to homeowners to encourage these investments. In the past year, Natural Resources Canada has implemented a program to provide rebates to residential gas users who purchase high efficiency natural gas furnaces. It is noted that changes to new building and equipment design may be an important way to achieve efficiency gains. However, other measures to encourage improvement in existing homes and equipment can also have a significant impact.

Most participants agreed that private and public programs to increase energy awareness and promote prudent energy use and energy efficiency should be encouraged. Also, some participants suggested that the federal government could consider incentives to further encourage investments in energy efficiency, such as allowing more rapid depreciation or improvements to the capital cost allowances for new energy efficiency equipment.

### ***Pricing Mechanisms to Encourage More Efficient Energy Use***

A number of parties suggested that the first place to look to encourage more efficient energy use is to market-based mechanisms. There was considerable interest expressed in demand response programs which are targeted at providing better pricing signals to consumers to reduce natural gas demand and ensure that natural gas is allocated to its most optimal use.

Participants noted that an effective way to reduce demand may be to support improved performance standards for energy equipment and encourage demand response programs such as the introduction of time-of-day pricing in the commercial and residential sectors. Time-of-day pricing is already effectively used in the electric power sector to reduce peak load demand in the industrial sector in several provinces and many participants felt that time-of-day pricing can be feasible in the residential and commercial sectors, especially with government support in deployment of technological improvements in metering. Participants indicated that demand response programs, which help to reduce peak demand for electricity, also lowers the peak demand for natural gas, thereby reducing the severity of natural gas price extremes. Conversely, it was also noted that consumer rebate programs on energy prices may interfere with market price signals and encourage over-consumption.

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## **Convergence of Electricity and Natural Gas Markets and Prices**

An issue that came up repeatedly through the Roundtables was the relationship between the natural gas and electricity sectors. Several participants noted that electricity prices in many Canadian provinces are regulated and tend to reflect long-term average costs, while natural gas prices are market-based and can be very volatile. It was noted that these different pricing mechanisms can introduce some distortions into the market, including a bias to consume electricity instead of natural gas.

As an example, during the natural gas price spike in January 2001, it was reported that some homeowners in Vancouver bought baseboard electric heaters and turned off natural gas furnaces. These residential consumers were switching from natural gas to electricity based on the price signals they were receiving. However, much of the peak electricity was being generated from natural gas and this electricity was converted into heat in baseboard heaters at a lower efficiency than if the homes were heated directly with natural gas. In line with the suggestion to rely on market mechanisms, the majority of participants identified a need for more consistent approaches to pricing in these two energy markets to ensure efficient consumption decisions are made.

All participants encouraged governments to continue to rely on markets and market pricing to enable market participants to make the best economic decisions. More specifically, many participants suggested that provincial governments should be encouraged to allow electricity prices to more closely reflect their market value. Participants were of the view that this would increase understanding of total cost and lead to better and more informed decisions.

## **Demand-Side Management**

Demand-side management (DSM) generally refers to non-pricing mechanisms that encourage more efficient use of energy. These mechanisms to a large extent are based on education and improving awareness. Participants discussed the possibilities for improving the efficiency of natural gas use in the residential and commercial sectors through DSM. Most major natural gas local distribution companies (LDCs) have had DSM programs in place for several years, and they indicated that these programs have helped reduce demand below the levels that would otherwise have occurred.

Discussion around DSM programs recognized that it is difficult to induce behavioural changes in energy use patterns if there are no strong price incentives. Further, it is generally very difficult to measure the success of DSM programs because it is difficult to assess the impact of a program against the changes that would have occurred in the absence of a program.

B.C. Hydro and Manitoba Hydro's "Power Smart" programs were cited by participants as examples of successful DSM programs in the electricity sector. While participants advised a cautious approach to DSM, most agreed that consumer education programs were definitely worthwhile. Most LDCs are required by their provincial regulators to provide educational material to residential customers in their bills. As mentioned previously, Natural Resources Canada also has an incentive program in place to encourage residential consumers to install more energy-efficient furnaces.

# NATURAL GAS PRICE AND VOLATILITY

## Key Observations

- *A closer relationship is expected between the price of natural gas and distillate fuel oils. Most participants expect North American natural gas prices in the range of US\$4 to \$6/MMBtu, given a West Texas Intermediate (WTI) oil price of about US\$30/bbl.*
- *The expected tight balance between North American natural gas supply and demand and increased weather sensitivity of demand will lead to volatile natural gas prices.*
- *While tools exist to help mitigate the effects of price volatility, increasing costs and lower availability of these options in the future may limit their use.*
- *Clear price signals are important to enable both suppliers and consumers to make appropriate decisions concerning their energy use and investment.*

## 5.1 Outlook

In its 2003 report, *Canada's Energy Future*, the Board scenarios suggested that competition between natural gas and petroleum products would continue and a closer relationship would exist between the price of natural gas and lighter crude oil products such as distillate heating oils. Relative to crude oil, natural gas prices were assumed to rise and approach parity by 2010. However, energy price scenarios in that report were based on an average crude oil price assumption of US\$22/bbl, significantly lower than the prevailing prices observed in the market today.

## 5.2 Natural Gas Prices and Volatility

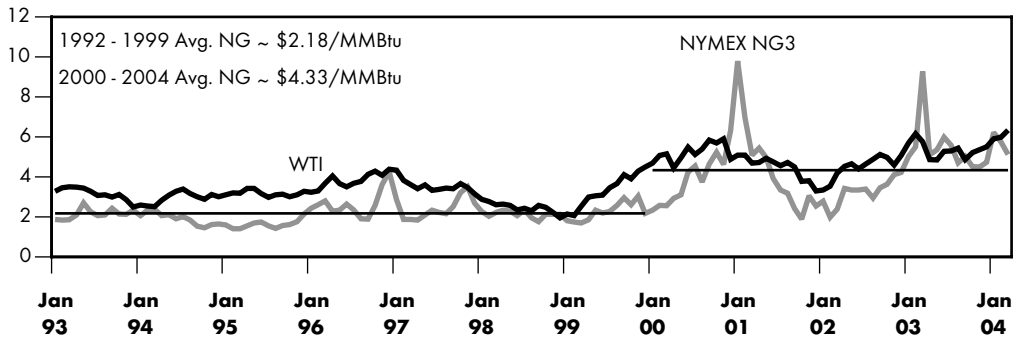
### **Natural Gas Supply-Demand Fundamentals**

Participants agreed that there has been a step-change in the level of natural gas prices and that the market price reflects a tight balance in North American natural gas supply and demand. In this situation, participants suggested that North American natural gas prices are increasingly influenced by the cost of alternative fuels and the rising costs of finding and bringing new gas supply to market. In the period to 2010, North American gas production is expected to be rather flat, while North American natural gas consumption is projected to continue to grow (see Chapter 3, Natural Gas Supply and Chapter 4, Natural Gas Demand). As a result, a tight balance between natural gas supply and demand will influence natural gas prices for the remainder of the decade.

Energy markets are also more inter-related and the price of natural gas is increasingly influenced by the price of crude oil. Assuming that crude oil prices average in the range of US\$24 to \$35 per barrel, Roundtable participants agreed that NYMEX natural gas prices are likely to be in the range

**FIGURE 5.1****Natural Gas Price and Volatility**

US\$/MMBtu



Source: NEB - Canada's Energy Future - Scenarios for Supply and Demand to 2025 (July 2003)

of US\$4 to \$6/MMBtu. North American imports of LNG, while increasing, are not expected to have a significant impact on natural gas prices within this timeframe as most participants expect those volumes to be relatively small.

Changes to environmental specifications and restrictions on the use of traditional alternatives to natural gas, such as coal and heavy fuel oils, may further increase the demand for natural gas. Roundtable participants cautioned that reducing the capability to use these traditional fuels without a readily available replacement will limit fuel options, increase natural gas demand, and help support higher natural gas prices closer to the range set by lighter distillate fuel oils. This range is a significant increase from the past decade where natural gas prices tended to be bound by the price of coal and high sulfur heavy fuel oils.

**Market Structure and Natural Gas Prices**

Roundtable participants indicate that the evolving structure of the natural gas market and the increasing weather sensitivity of demand will tie natural gas prices more closely with electricity markets. New electric power generation not only has fewer alternative fuel options, but is more weather-sensitive than industrial consumption. Participants suggested that aligning weather-sensitive power and natural gas loads could potentially mean greater peak demand and higher natural gas and power prices during these peak periods. This introduces additional volatility from power markets and will also alter seasonal consumption and the role and opportunity of using storage to mitigate natural gas prices. Specifically, continuing growth in summer electricity demand for air conditioning will lead to higher natural gas demand and higher prices during the warmest summer months, leaving a greater burden on the milder but more unpredictable shoulder months to replenish storage levels for the winter heating season.

The price sensitive industrial load contains much of the current dual and alternate fuel use capability employed within the consuming sector. Many participants suggested that these industries have been faced with rising energy prices for a number of years and that much of the easily attainable gains in energy efficiency and cost reductions have already been made. As a result, participants indicated that the additional pressures from sustained high natural gas prices and volatility may result in substitution to another fuel or further reduction of this segment of demand in North America. While this may help to balance the overall level of demand to supply, the loss of the dual or alternative fuel capability is expected by participants to reduce the physical flexibility of the natural gas market to rapidly adjust demand in response to changing prices.

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Furthermore, some participants believed that reduced liquidity in long-term gas sales and purchase transactions has also affected natural gas price volatility and the ability of parties to manage prices. Participants noted that the exit of many of the large energy marketers, concerns over the veracity of U.S. pricing indices, greater credit requirements, and the higher costs of hedging, have all contributed to a reduction in the level of transactions and in the opportunity to engage in long-term contracts. Participants suggested that the resulting reliance on short-term contracts and pricing presents less opportunity to manage long-term prices and may contribute to more volatile natural gas prices.

### **Managing Natural Gas Prices**

Being the most price-sensitive and among the more sophisticated consumers, the large industrial sector may employ the greatest number of tools to help mitigate the effects of volatile prices. These include both physical and financial tools to respond to temporary or seasonal changes in gas supply and demand. Physical tools may include the use of storage, alternative fuels, or temporary production adjustments in response to energy prices. Financial tools are also used, especially for parties with few physical options. These tools may include contracting practices and financial hedges to manage the risk of uncertain and volatile prices. While these tools may help mitigate the effects of price volatility, they do not necessarily reduce the overall cost of natural gas. Rather, these tools may be viewed as insurance, where a premium is paid in exchange for more stability or certainty in price. Most participants also believed that the costs for physical protection or financial insurance against volatile prices will become greater in a market of sustained tightness in natural gas.

The residential, commercial and smaller industrial users, in aggregate, represent a very important part of Canadian energy demand and could play a very important role in influencing future energy prices. Because these consumers have limited fuel options available to them, the Roundtable participants suggested that clear natural gas price signals may provide the impetus to enable concerted action to reduce the aggregate demand of this consumer segment. To these smaller users, physical options include making choices, where available, to use other forms of energy (e.g. natural gas, fuel oil, wood, electricity) or simply conserving during times of high prices. Financial or commercial options are more limited, and include the choice of supplier and service/payment options to help smooth the impact of fluctuating energy prices.

## **5.3 Issues and Potential Action**

In addition to understanding the views of Roundtable participants on future natural gas prices, participants were also asked to identify any potential actions that could be taken to help mitigate the effects of high or volatile prices.

### **Natural Gas Price Volatility**

In light of the greater sensitivity of natural gas prices to weather and the electricity market, participants suggested that any encouragement and action that could enable a response from residential and commercial consumers to reduce gas demand during peak periods can have a meaningful and significant effect on short-term prices. Although these responses may not greatly change the overall level of consumption or the average price of natural gas, even a slight reduction in peak consumption through the aggregate response of these consumers could considerably moderate peak prices and reduce the volatility in short-term natural gas prices.

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To illustrate this point, some participants referred to a recent situation in Toronto and New York that occurred in January 2004. Cold weather and regional infrastructure constraints resulted in a short-term spike in natural gas price up to US \$70/MMBtu. However, the peak prices were driven by only a very small volume of consumption in the market. Participants suggested that providing timely and meaningful price signals directly to the end-user during such situations may be sufficient to encourage a small reduction in regional gas consumption. And, in this particular situation, the small reduction in demand could have had a considerable impact in moderating the short-term extremes observed in natural gas prices.

Participants also debated whether an LDC may be better positioned and therefore could be empowered to use financial tools or invest in regional infrastructure on behalf of the smaller gas consumers. It was noted that this raises other issues and would require changes to the mandate, cost recovery, and returns to the LDC if it were to perform this expanded function.

In general, most participants emphasized that decisions on mitigation actions, such as using financial tools or investing in physical infrastructure, are best left to the market participants who will choose the best course of action based on their level of tolerance and sensitivity to prices. It was suggested that removal of measures that contribute to inconsistent and mixed price signals, such as price ceilings, might allow suppliers and consumers to respond more effectively and swiftly to pricing changes.

### **Market Price Signals**

There was wide agreement amongst participants that clear price signals are very important in a market-based economy to generate the appropriate responses across all market sectors. Participants pointed out a number of situations where mixed or unclear price signals may lead to less decisive and short-term responses, often with opposing actions and results. For example, timing delays in metering and billing, direct intervention in the form of price ceilings, and regulated prices may send unclear price signals and lead to less optimal decisions.

There was also consistent feedback across all Roundtable sessions that governments and regulators should resist the temptation to intervene in the market and instead should focus on enabling energy markets to function more efficiently. While recognizing that there are many challenges from high and volatile prices, Roundtable participants believed that timely and clear pricing signals are needed to enable suppliers and consumers of energy to make appropriate decisions in spending and in use of energy. Participants stressed that the high natural gas prices in today's market reflect the balance in the supply and demand of natural gas. Participants emphasized that these prices provide important signals that help to support the development of new and unconventional sources of gas supply, enable investment in infrastructure, and encourage improvement in consumption technology and adjustment in demand through equipment upgrade and conservation.

To support investment decisions for improving equipment, developing new supply, and expanding infrastructure, participants would also welcome actions that may help to provide long-term certainty in energy prices. For example, some participants suggested that clear regulatory encouragement for longer-term contracts may help to align risks and support infrastructure development. Investment may also be encouraged by ensuring confidence in the market through provision of information and by providing fair returns that are reflective of changing risk.



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***Timing and Quality of Pricing Information***

Roundtable participants indicated a high level of confidence in the reliability and quality of the major Canadian natural gas pricing indices, which are based on actual trades from electronic platforms. Nevertheless, some participants suggest there are still opportunities to improve the timing and quality of public information related to energy prices for each consuming sector.

# INFORMATION NEED

## Key Observations

- *Need to re-affirm an energy policy framework based on freely functioning markets.*
- *There is no single source for Canadian energy information. Unbiased, timely and coordinated energy data is desired.*
- *There is a need for objective analysis and more information on Canadian energy demand (e.g., information on market structure, storage deliverability, fuel switching).*
- *Most parties believe that sufficient information is available on natural gas prices.*
- *There is scope for public education on new supply sources (i.e., LNG, CBM) and new end-use technologies.*

## 6.1 Energy Policy Framework

It was widely acknowledged during the Roundtables that the issues surrounding natural gas could not be dealt with in isolation from other energy commodities. As such, many participants suggested that governments need to reaffirm an energy policy framework, based on freely functioning markets that encompass all aspects of energy choices and is not solely focused on a single fuel. Participants also urged governments and regulators to resist the temptation to intervene in energy pricing and indicated that fiscal and regulatory frameworks to foster the development of alternative sources of energy and technologies should be strongly encouraged.

## 6.2 One-Window Access for Canadian Energy Data

Roundtable participants strongly agreed that information on natural gas prices is widely available, accepting that some regional markets may not be as liquid as others. Beyond prices, however, other types of energy information for Canada are widely dispersed across various providers including: the provinces, the Board, Statistics Canada, Natural Resources Canada, and private data sources to name a few. Contrast was made with the U.S., where the Energy Information Administration provides a convenient single source for most energy information. The vast majority of participants suggested that a central repository for Canadian energy information would be very useful in helping market sectors and governments make timely and informed decisions.

A “one-stop shop” or single window for energy data not only facilitates access to relevant information but also would yield more consistent data for all energy forms. It was suggested that there is a need for an objective party to step forward to lead and coordinate activities to provide a single window for Canadian energy information.

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To explore the merits and assess the feasibility of a single source for Canadian energy data, it was suggested that the various agencies that compile statistics convene to examine ways to improve the quality and provision of Canadian energy statistics. In particular, many participants indicated that having access to integrated information and analysis will enable a better understanding of Canadian energy demand and new sources of gas supply.

### **6.3 Availability of Timely Data and Analyses**

The broad understanding of energy market trends and issues can be enhanced by providing access to more complete, accurate, and timely data and by providing more in-depth and expanded market analyses. While a large amount of data and analysis can be purchased, many participants identified the need for reliable and timely data and analyses from a credible and unbiased source. Participants expressed particular interest in information on reserves, detailed Canadian demand data, and analysis on storage and peak deliverability. For example, participants indicated that it was difficult to get a good understanding of Canadian energy demand and the level of fuel switching and demand adjustments and suggested that better public information and analysis on end-use markets would be desirable.

Participants also suggested that there are numerous providers and sufficient information on energy prices and price formation. For NEB reports and market analysis, it was suggested that studies, which look out three to five years, correspond better with corporate planning horizons.

### **6.4 Public Information**

Participants across the country identified a need for more public information on all energy matters. Specifically, it was suggested that governments and regulators had a role in informing the public on key emerging trends and issues. Some participants suggested it would be relevant for an authoritative organization such as the NEB to provide public forums with the aim to increase public awareness and understanding on energy matters. Keeping in mind the potential greater importance of LNG and CBM to Canada and North America, participants across the country acknowledged the need for more public and consumer information regarding specific topics, such as CBM development, emerging technologies, and safety of LNG. Some feel that currently the sole information source for the public is often a project promoter or special interest groups and that there is a need for an objective voice to improve public awareness on important gas market trends and issues.

### **6.5 Research**

Recognizing the growing importance of new technology in the development of gas supply and effective management of energy demand, participants acknowledged the role and importance of research as a means to ensure sustainable markets beyond 2010. Technological developments were seen as key to increasing long-term energy supply and using natural gas more efficiently. Broadening the application of alternative energy was seen to be part of the solution. In this connection, some participants suggested there could be a coordinated approach for research on new upstream and end-use technologies and on the development of alternative sources of energy.

## ROUNDTABLE PARTICIPANTS

Organization	Participants
Agrium Inc.	Chris Tworek
Alberta Department of Energy	Colin Carrigy
Alberta Department of Energy	Barry Rodgers
Alberta Energy and Utilities Board	Jim Dilay
Association québécoise des utilisateurs industriels d'électricité	Luc Boulanger
ATCO Pipelines	Bruce McRae
Atlantic Institute for Market Studies	Dr. Thomas Tucker
B.C. Ministry of Energy and Mines	Stirling Bates
B.C. Ministry of Energy and Mines	Ines Piccinino
BP Canada Energy Company	Stan Penchuk
British Columbia Utilities Commission	Brian Williston
Calpine Canada	David Sterna
Canadian Association of Petroleum Producers	Greg Stringham
Canadian Association of Petroleum Producers	Mark Pinney
Canadian Chemical Producers Association	David Goffin
Canadian Electricity Association	Hans Konow
Canadian Energy Research Institute	Paul Mortensen
Canadian Energy Research Institute	Matt Ayres
Canadian Gas Association	Bryan Gormley
Cargill Power & Gas Markets	Mark Stach
Central Heat Distribution Limited	John Barnes
CIBC World Markets Inc.	Andrew Potter
Consultant	Julie Girvan
Consumers' Association of Canada - Alberta Chapter	James A. Wachowich
Corridor Resources Inc.	Norm Miller
Direct Energy Marketing	Tony Zaremba
Direct Energy Marketing Ltd.	Pascale Duguay
Dofasco Inc.	Paul Smith
Domtar Inc.	Josée Latreille
Duke Energy	Denis Marcoux
Duke Energy Gas Transmission	Greg Staple
Duke Energy Gas Transmission	Troy Adams
Emera Energy Inc.	Ian Johnston

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Enbridge Gas Distribution Inc.	Dave	Charleson
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Enbridge Gas New Brunswick	Shelley	Black
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EPCOR	Glen	Hensbergen
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Inco Limited	John	LeMay
Industrial Gas Consumers Association of Alberta	Norm	MacMurchy
Irving Oil Limited	Mark	Brown
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Maritimes and Northeast Pipeline Management Limited	Ian	Leadley
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Ministère des Ressources naturelles, faune et parcs	Ronald	Richard
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Natural Gas Steering Committee	Daniel	Potts
Natural Resources Canada	John	Foran
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New Brunswick Department of Energy	Jim	Knight
NB Power	Michael	Bourque
NB Power	Rick	McGivney
NB Power	Bill	Marshall
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New Brunswick Board of Commissioners of Public Utilities	Doug	Goss
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Norsk Hydro Canada	Michel	Brouillette
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Nova Scotia Department of Energy	Bill	O'Halloran
Nova Scotia Power Inc.	Angela	Trenholm
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Ontario Energy Board	Mark	Garner
Ontario Energy Board	Hima	Desai
Ontario Ministry of Energy	Dr. Bryne	Purchase
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Terasen Gas Inc.	Doug	Stout
TransAlta Corporation	Will	Bridge
TransCanada Pipelines Limited	Hank	Petranik
TransCanada Pipelines Limited	Bill	Langford
Union Gas Limited	Steve	Baker
Union Gas Limited	Mark	Isherwood
West Fraser Timber Co. Ltd.	Dave	Humber
WPS Energy Services, Inc.	Claude	Morneault

## QUESTIONS FOR ROUNDTABLE DISCUSSION

In preparing your participation, you may wish to consider the following questions:

1. How do you see the market unfolding to 2010? Do you concur that it is highly likely that there will be a tight natural gas market?
2. What do you see as the prospects for:
  - natural gas supply developments?
  - patterns of natural gas consumption?
  - natural gas pricing and contracting practices?
3. How do you see natural gas transportation and delivery infrastructure evolving?
4. What actions should be taken to improve the prospects of developing additional supplies of natural gas to the end of the decade?
5. How can the efficiency and the manner in which natural gas is consumed be improved?
6. How can the effects of natural gas price volatility be mitigated?
7. Are there any information gaps in the market and, if so, how might these best be closed?

In addressing the actions that could be taken with respect to the above questions, please consider the role of the various market participants, including producers, pipeline companies, distribution companies, large and small end-users, provincial and federal governments, and provincial, and federal regulatory agencies.

