

Ontario Energy Board



Staff Report to the Board on the
2014 Natural Gas Market Review

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ACRONYMS

Bcf/d	billion cubic feet per day
CAD	Canadian dollars
GDAR	Gas Distribution Access Rule
MMBtu	million British thermal Units
GRAM	Quarterly Rate Adjustment Mechanism
STAR	Storage and Transportation Access Rule
Tcf	trillion cubic feet
USD	U.S. dollars
WCSB	Western Canadian Sedimentary Basin

Summary

This Report has been prepared by staff to summarize the information provided to the Board's [2014 Natural Gas Market Review](#) ("the Review") consultation, identify the implications and key issues arising from this information, and make recommendations for the Board's consideration in relation to further steps.

In its September 19, 2014 [letter](#) to stakeholders, the Ontario Energy Board (the "Board") described the context for the Review and initiated a consultation process to consider:

- the key factors affecting North American and Ontario natural gas markets, changes in these since the 2010 Review, and forecast natural gas demand, supply, and prices to 2020;
- natural gas market conditions and prices in Ontario over the 2013/14 winter months;
- the underlying drivers of the Quarterly Rate Adjustment Mechanism ("QRAM"¹), highlighting the cost and risk trade-offs of different gas supply planning parameters; and
- any regulatory implications arising from the Review and any other key issues that should be considered by the Board.

North American and Ontario Markets

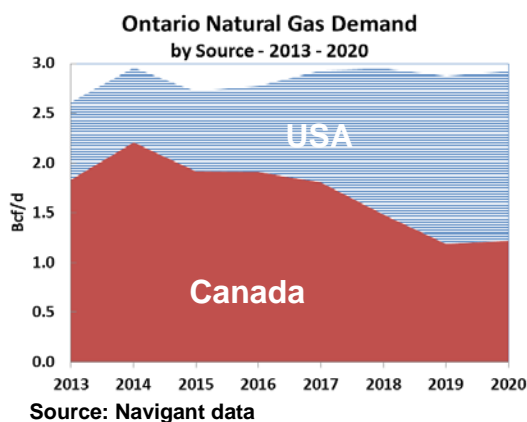
The objective of the Review overall is to identify and explain key influences on the Ontario natural gas sector over the next 3 to 5 years, highlighting any implications there may be for the Board's consideration. To this end, North American natural gas ("gas") market trends were the focus of a report prepared for Board staff by Navigant Consulting Ltd. entitled [2014 Natural Gas Market Review Final Report](#) (the "NGMR Report").

The *NGMR Report* identified a number of current trends likely to affect North American and Ontario markets to 2020:

Supply – Continued growth in North American natural gas production – 'shale gas' in particular – will be a moderating influence on market prices. The share of total Ontario

¹ Discrepancies between forecast vs. actual gas sales and/or wholesale gas prices result in variances (+ or -) between the revenue collected from consumers to recover the cost of gas supplied and the actual cost of gas procured. Each quarter, distributors use a QRAM application to adjust the price consumers pay for gas supply over the next quarter by an amount that will recover (or refund) the variance.

gas demand met from shale gas originating in the U.S. Marcellus region is expected to rise from 13% in 2013 to 41% in 2020.²



Demand – Gas-fired electricity generation and Canadian industrial (mainly oil sands) gas consumption will be key factors affecting North American and Ontario markets to 2020 and beyond. Compared to 2013 levels, Ontario natural gas consumption will rise about 11% by 2020, from 2.65 Bcf/d to 2.95 Bcf/d.³ Notably, Ontario power sector gas demand is expected to rise significantly thereafter as, among other things, portions of Ontario’s nuclear capacity are temporarily removed from service for refurbishment.⁴

Pipeline flows – Despite higher expected Canadian gas output, gas flows into Ontario on the TCPL system originating from the Western Canadian Sedimentary Basin (WCSB) will increasingly be replaced by Marcellus and Utica (U.S. Northeast) shale gas carried on expanded U.S./Ontario pipelines.

Storage – With the expected rise in Ontario gas consumption and increased shift toward power generation use, storage will play an increasingly important role in ensuring gas supply is available to meet gas-fired electric generation requirements as and when needed.⁵

Prices – While expected to be “relatively less volatile”⁶ relative to recent years, Dawn Hub prices are expected to rise over the period to 2020 by about 18% in inflation-adjusted terms, climbing from an estimated annual average price of \$4.80/MMBtu in 2014 to \$5.68/MMBtu in 2020.⁷

The *NGMR Report* also identified recent market developments not fully anticipated in the 2010 Review, including much higher shale gas production; a more rapid and substantive reversal of U.S./Ontario pipeline flows into Ontario; and prospectively more LNG exports from North America than previously envisaged.⁸

² *NGMR Report*, p. 1.

³ Navigant data; see *NGMR Report*, Figure 33; p. 33.

⁴ See *NGMR Report* pp. 30; 33.

⁵ *NGMR Report*, p. 40.

⁶ *NGMR Report*, p. 40. This is due to the rising share of readily produced shale gas in total supply. For more details see *loc. cit.* pp. 5 – 6.

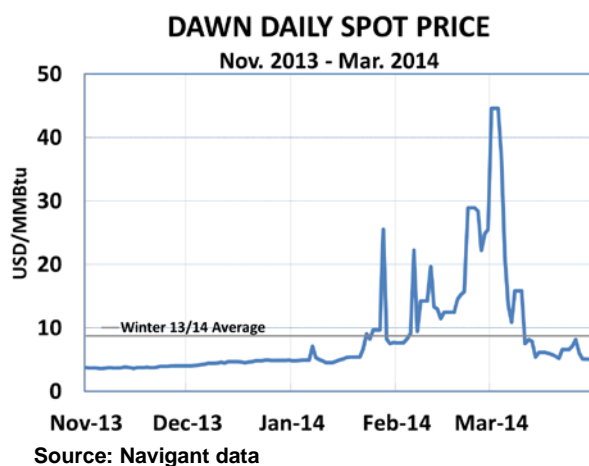
⁷ In the ‘Reference’ or base case forecast scenario; see *NGMR Report*, p. 41. All prices are USD unless otherwise indicated. Forecast prices are expressed in constant 2013 USD.

⁸ *NGMR Report*, p. 1

Winter 2013/14 Natural Gas Prices

Also of interest to the Board were Ontario market conditions over the winter (Nov. – Mar.) of 2013/14. Navigant’s [Winter 2013/14 Natural Gas Price Review](#) report (the “Winter Report”) examined the supply and demand-related factors that contributed to the unusually high and volatile prices experienced over that period.

Record demand – Extreme cold over an extended period and broad geographic market area drove Ontario gas consumption over the winter of 2013/14 almost 13% above the previous 5-year average, with industrial, residential and commercial demand up 7.8%, 17.6%, and 19.4% respectively. Notably, gas consumed for electric power generation purposes was 4% lower. Demand in the interconnected U.S. market was also high, at almost 15% above the previous 5-year average.



Regional market competition – Dawn prices rose in response to competition for gas from U.S. Midwest markets which, combined with U.S. Northeast sources provided Ontario with incremental supply over the winter.⁹

Storage capacity limitations – Increased storage withdrawals in November through January to meet rising Ontario demand led to rapid reserve depletion, and increasing reliance on imports to meet demand.¹⁰

Contractual obligations – Consumer purchases to meet contractually scheduled stored gas obligations coincided with already elevated spot market prices.¹¹

Pipeline tolls: The landed cost of gas supplied from western Canada was, with interruptible long-haul transportation tolls added in, uncompetitive with the cost of gas from nearby U.S. supply points.¹²

Implications for gas supply planning – the gas price drivers listed above are managed through a distributor’s gas supply plan, which matches levels of expected risk with the costs of planned purchases of gas supply, transportation and storage.¹³

⁹ *Winter Report*, p. 1.

¹⁰ *Winter Report*, pp. 15 – 18.

¹¹ *Winter Report*, pp. 22 – 23.

¹² *Winter Report*, pp. 20 – 21.

¹³ See examples provided in the *Winter Report*, p. 27 (bottom of page).

Stakeholder Input

This report summarizes the information and perspectives shared by stakeholders in presentations to and remarks during the 2014 NGMR Stakeholder Conference, and as provided to the Board in [written comments](#).¹⁴

Summary of Board Staff Recommendations

Based on the information collected in the course of the consultation, Board staff recommends that the Board consider:

- initiating a proceeding to review Board policy in relation to gas procurement and the assessment and approval of distributor gas supply plans, including but not limited to:
 - an analysis of the risk/cost trade-offs considered in the determination of each plan element;
 - the minimum information required for the Board’s review of a distributor’s gas supply plan;
 - the implications of the Board’s approval of a gas supply plan in relation to a distributor’s discretion in implementing the plan; and
 - the merits of the current (Alberta-based) ‘reference price’ relative to alternatives (including a Dawn Hub related price) when considered in the context of the west to east shift in Ontario’s gas supply mix.
- providing, as a basis for future sector stakeholder discussions information on:
 - the further development of the natural gas and electricity market relationship and the implications for the overall Ontario energy sector;
 - the adequacy of and access to the market information required to meet the needs of bulk gas purchasers; and
 - infrastructure developments that may affect Ontario access to gas supplies over the near or longer term.
- reviewing and providing further direction in relation to the Board’s regulatory instruments pertinent to the disclosure by gas distributors of information on pipeline and storage operations that may be required to facilitate gas/electric market coordination.

¹⁴ Stakeholder Conference [presentations](#) and [transcripts](#) can be accessed on the [consultation web page](#).

1 The 2014 NGMR Consultation

Purpose & Objectives

On September 19, 2014, the Ontario Energy Board (the “Board”) [announced](#) the commencement of its second [Natural Gas Market Review](#) (“NGMR”)¹⁵. As was the case for the previous (2010) NGMR, the purpose of this initiative is to review North American and Ontario natural gas market conditions and applicable natural gas related regulatory policies with a view to considering any potential implications for Ontario.

Increasing North American shale gas production, rising power sector demand for natural gas and changing inter-regional pipeline flows were some of the key trends identified in the 2010 NGMR as significant drivers of Ontario’s natural gas sector over the near term. At the conclusion of that consultation, the Board indicated its intention to reconvene stakeholders for NGMR purposes every fourth year to better track important gas market developments and gauge their implications for Ontario.¹⁶ The Board’s decision to hold an annual *Natural Gas Forum* (NGF) in between NGMRs beginning in 2015 was announced in opening remarks to the 2014 conference by Board Chair and CEO Rosemarie T. Leclair.

The scope of the 2014 NGMR includes:

- key factors affecting North American and Ontario natural gas markets, and forecast natural gas demand, supply, and prices to 2020;
- Ontario natural gas market conditions and prices over the winter 2013/14 period, during which Ontario market prices for natural gas were unusually high and volatile;
- the underlying drivers of the Quarterly Rate Adjustment Mechanism (“QRAM”¹⁷) and the cost/risk trade-offs inherent in different gas supply planning parameters; and
- key issues and implications arising from the consultation that should be further considered by the Board.

¹⁵ See the Board’s [2014 – 2017 Business Plan](#); August 21, 2014 p. 14.

¹⁶ See Board’s January 31, 2011 [Cover Letter](#) issued with the [Staff Report to the Board on the 2010 Natural Gas Market Review](#) ([EB-2010-0199](#)).

¹⁷ Discrepancies between forecast vs. actual gas sales and/or wholesale gas prices result in variances (+ or –) between the revenue collected from consumers to recover the cost of gas supplied and the actual cost of gas procured. Each quarter, distributors use a QRAM application to adjust the price consumers pay for gas supply over the next quarter by an amount that will recover (or refund) the variance.

Information and insight gained through this consultation will assist the Board to identify the potential need for modifications to the Board's regulatory framework/policies; and to review utility applications that affect the rates and quality of service to customers.

Stakeholder Engagement

The focal point of the consultation was a *Stakeholder Conference*, held in the Board's offices and webcast on December 3rd and 4th, 2014.¹⁸ At the Board's invitation, stakeholders provided input on the [conference agenda](#). Navigant Consulting Ltd. was engaged by Board staff to prepare two expert reports, which were posted in advance of the conference to provide participants with information on, respectively:

- market conditions and prices over the winter (Nov – Mar) of 2013/14; and
- market developments since the 2010 NGMR and key factors affecting demand, supply, and prices to 2020.¹⁹

Some 100 participants attended the conference, which included presentations by representatives of stakeholder groups, utilities, agencies and Board staff's consultants. [Written comments](#) were received from 16 stakeholders following the Conference.

This *Report to the Board* – which represents the final planned step in the 2014 NGMR – summarizes the information provided through the consultation process on the main subject areas within the scope of the 2014 NGMR noted above, including stakeholder views on the issues raised as conveyed in conference remarks and written comments.²⁰

Outline

The balance of this paper consists of five parts:

- Section 2 highlights recent North American natural gas market developments
- Section 3 looks at the roots of gas price fluctuations over the winter of 2013/14
- Section 4 examines the natural gas / electricity market relationship
- Section 5 focusses on the further development of natural gas markets to 2020
- Section 6 provides staff's recommendations for the Board's consideration.

¹⁸ Transcripts of Stakeholder Conference proceedings are available on the Board's [web site](#).

¹⁹ [Winter 2013/14 Natural Gas Price Review](#) (the "*Winter Report*"), and [2014 Natural Gas Market Review Final Report](#) (the "*NGMR Report*"). A preliminary version of the latter was posted prior to the conference. Unless indicated otherwise, market information provided here is from the Navigant reports, which should be considered authoritative in the event of any inconsistency.

²⁰ Stakeholder views on the 'Energy East' project proposal are being considered by the Board through the [Energy East Consultation](#) and are not addressed here.

2 Recent Market Developments

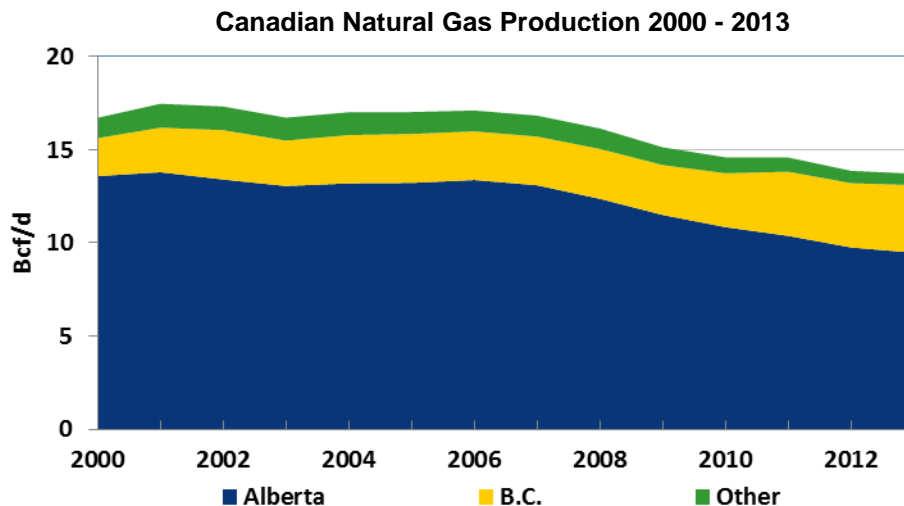
2.1 Supply

Ontario is a significant net importer of natural gas, historically reliant on the availability of supplies originating thousands of kilometers away, delivered by pipelines that traverse multiple jurisdictions *en route*.

Session 1 of the Stakeholder Conference presented and discussed information highlighting how a number of North American natural gas market developments in recent years have begun to alter significantly the historical pattern of supply to Ontario, with concomitant effects on prices, even while Ontario consumption patterns have remained relatively stable.

2.1.1 Production

Canadian gas production, primarily from the Western Canadian Sedimentary Basin (WCSB), peaked at 17.5 Bcf/d in 2001 and has continued the gradual but steady decline begun in 2007 and noted in the 2010 NGMR. As shown in the graph, total



Source: NGMR Report (Figure 3; p. 6)

Canadian production declined to 13.7 Bcf/d in 2013, almost 22% below 2001 output.²¹ The reverse is true for U.S. natural gas output, which rose more than 30% between 2006 and 2013, led primarily by shale gas production.²² The 2010 NGMR anticipated

²¹ Calculated from Navigant data; NGMR Report; p. 6.

²² See NGMR Report; Figure 5; p. 8.

increased U.S. shale gas output, but actual growth has far exceeded expectations, with 2013 production surpassing levels forecast to be achieved in 2020.²³

The *NGMR Report* also notes that, compared to conventional gas, the characteristics of shale gas reduce the risk and time associated with finding and producing new gas.²⁴ The important implication for markets is that shale gas production can therefore be likened to a “manufacturing” process: “managing the drilling and production process potentially allows supplies to be produced in concert with market demand requirements and economic circumstances.”²⁵

2.1.2 Pipelines and Storage

Shifts in Canadian and U.S. supply patterns have resulted, among other things, in increased ‘gas-on-gas’ price competition, which have in turn affected the direction and volume of gas flows to and through Ontario.²⁶

For example, gas volumes moved on TransCanada PipeLines’ (TCPL) Mainline continued the decline noted in the 2010 *NGMR*²⁷, dropping up to 41% between 2008 and 2013 on some line segments.²⁸ Over the same period, net flows into Ontario on various U.S. pipelines increased.²⁹

Observed declines in overall long-haul pipeline capacity utilization rates notwithstanding, a stakeholder pointed out in written comments that changes in supply sources have resulted in Eastern shippers using existing long-haul pipelines to ship gas over shorter distances, resulting in some segments of otherwise under-utilized long-haul pipelines being more fully utilized.

²³ *NGMR Report*, p. 8. See also [2010 Natural Gas Market Review](#) (“2010 Report”); ICF International Inc.; August 20, 2010.

²⁴ *NGMR Report*, p. 9.

²⁵ *NGMR Report*, p. 10. Navigant notes (p. 8) that this production manageability is the basis for their modelling assumption “that natural gas supply will respond dynamically to demand in a reasonably short time - months, not years.”

²⁶ *NGMR Report*, p. 35.

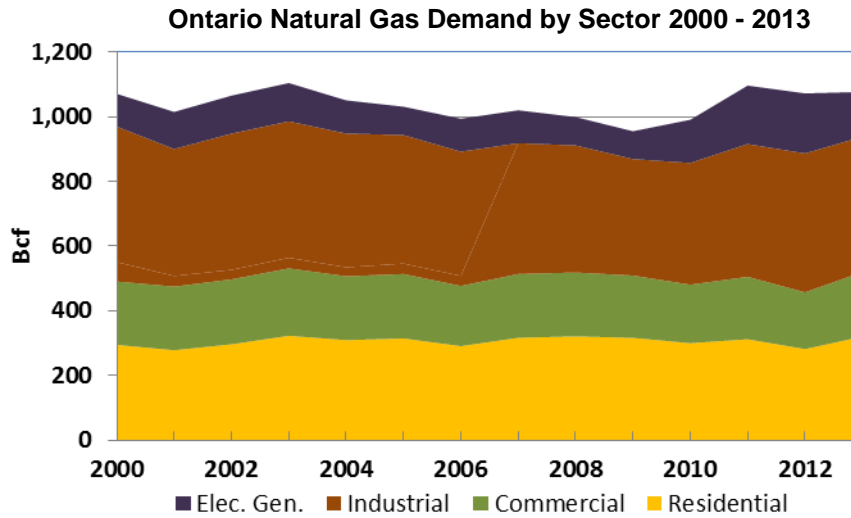
²⁷ See *2010 Report*, pp. 25 – 26.

²⁸ Calculated from Navigant data; see *NGMR Report*, Figure 18; p 17.

²⁹ *NGMR Report*, Figure 39; p. 37. WCSB gas also enters Ontario through U.S. pipelines. Monthly flows at Niagara flipped from net imports to the U.S. to net exports to Canada as of late 2012. See *NGMR Report*, Figure 38; p. 36.

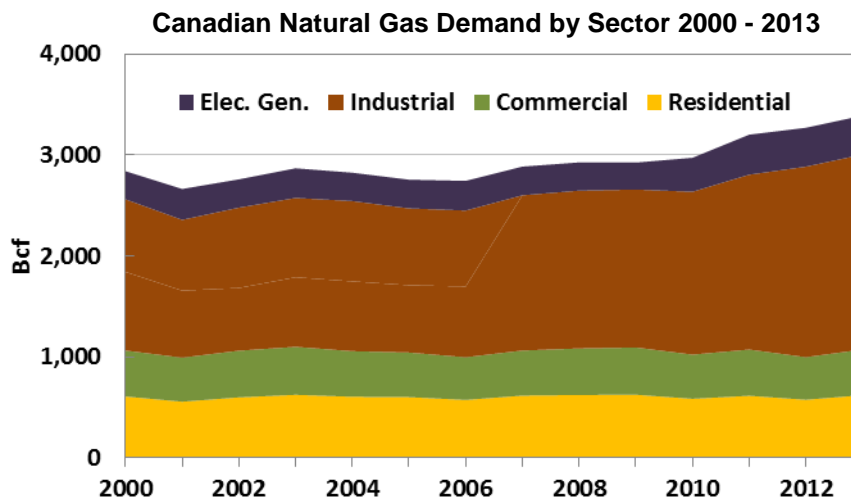
2.2 Demand

Annual natural gas consumption in Ontario – which at 1.1 Tcf in 2013 accounted for about 1/3 of national demand – has been comparatively stable for a number of years, with residential and commercial demand relatively flat and industrial demand declining over the period from 2000 to 2013.



Source: *NGMR Report* (Figure 12; p. 13)

Electric power sector gas demand, on the other hand, has grown with the rising contribution of gas-fired generation to Ontario’s electricity supply mix. As electricity generated using gas rose from 7% of Ontario’s generation mix in 2008 to 11% in 2013,³⁰ gas demand for electricity generation rose from 87.6 Bcf to 138.7 Bcf over the period, an increase of 58%.³¹

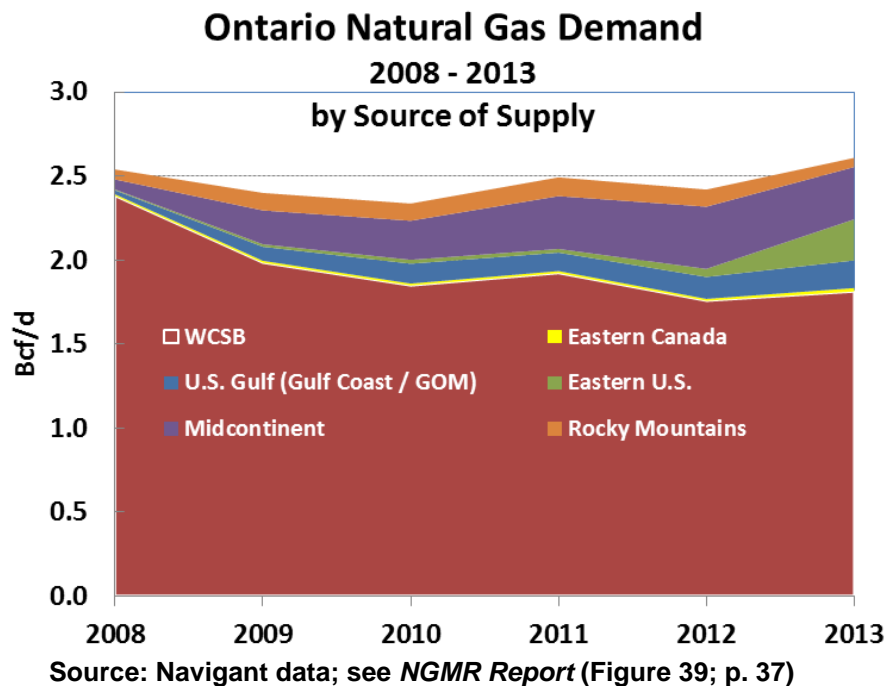


Source: *NGMR Report* (Figure 15; p. 15)

³⁰ Calculated from Navigant data; see also *NGMR Report*, Figures 13 & 14; p. 14.

³¹ Calculated from Navigant data; see also *NGMR Report*, Figure 12; p. 13.

Nationally, demand for natural gas grew to 3.4 Tcf in 2013, driven primarily by Alberta oil sands-led industrial sector consumption. Alberta industrial demand accounted for about 1/3 of total Canadian gas consumed in 2013.



This trend has contributed to the declining supply of gas from the WCSB to Ontario – Alberta has absorbed local gas that, including the cost of transportation to U.S. delivery points with access to shale gas supplies, is decreasingly price-competitive.³²

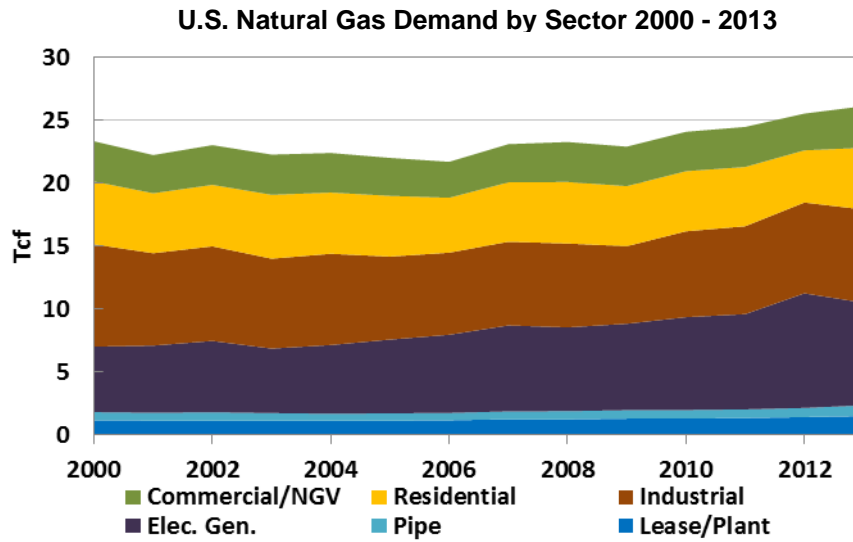
While U.S. overall natural gas demand is about 25 times that of Ontario's, U.S. consumption growth by sector is similar to Ontario in recent years, with the U.S. electric power sector even more distinctly leading growth over relatively stagnant industrial, commercial and residential demand.³³

For various reasons, including the supply growth-induced price competitiveness of gas over coal in recent years, the share of gas-fired electricity generation in total U.S. electricity output rose from about 22% to almost 28% between 2008 and 2013. The overall change in the contribution of gas-fired generation to U.S. energy output is about 26%, significant but somewhat less notable than the change in Ontario gas-fired output over the same period (see above).³⁴

³² *NGMR Report*, p. 15.

³³ *NGMR Report*, p. 11.

³⁴ *NGMR Report*, Figure 9 (p. 12).

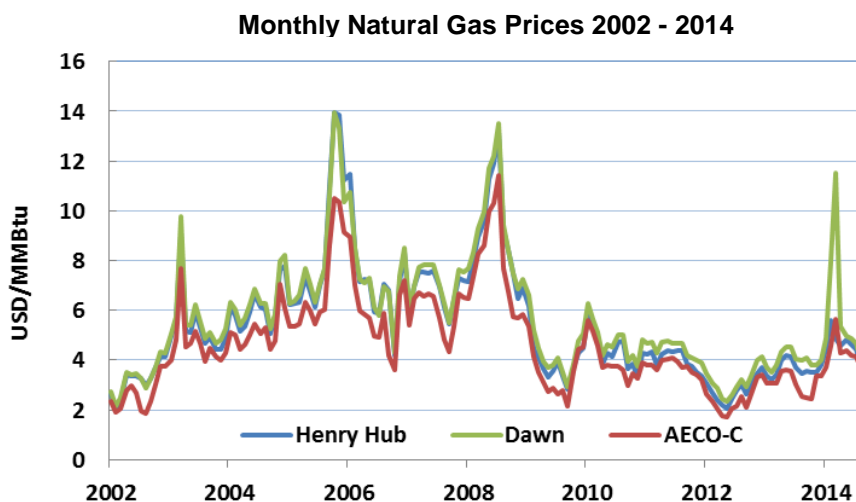


Source: *NGMR Report* (Figure 7; p. 11)

2.3 Prices & Tolls

2.3.1 Market Prices

As noted in the *NGMR Report*, with occasional exceptions North American natural gas price movements tend to be synchronized across market hubs, “reflecting the interconnected nature of the North American market”.³⁵ Accordingly, the ups and downs – or ‘volatility’ – of prices at the Dawn Hub in Ontario closely track those at Louisiana’s Henry Hub and albeit less so, Alberta’s AECO-C Hub.



Source: Navigant data; see *NGMR Report* (Figure 2; p. 5)

³⁵ *NGMR Report*, p. 5.

With the exception of the 2013/14 period, when Dawn prices in particular spiked upwards over the winter, price volatility has dampened in recent years, reflecting the rising share of shale gas in overall supplies (see section 2.1.1).³⁶

One of the implications of this trend for present purposes is that the greater the contribution of shale gas to North American supply, the more predictable especially longer-term market prices should be at any given location. Reduced uncertainty could have an impact on pipeline infrastructure investment, which in turn could lead to an expansion of the natural gas market more generally.³⁷

2.3.2 Pipeline Tolls

While prices in different markets tend to move together, as noted above, gas prices differ between market centres at any given time. Industry refers to this differential as the ‘basis’ between two market locations. Generally, the higher pipeline charges are between two locations relative to the basis, the less financially attractive it is to purchase and move gas from one point to the other. Consequently, charges for pipeline services can have an impact on a shipper’s choice of gas supply source location, as well as the delivery route.

According to the *NGMR Report*, due to declining capacity utilization (see section 2.1.2 above), TCPL Mainline tolls “increased steeply, further impacting the Mainline’s competitiveness in a worsening spiral.”³⁸ More recent NEB decisions on toll adjustments include:

- a March 2013 decision to fix tolls from Empress to Dawn through 2017 at a rate 45% below what otherwise would have applied and grant TCPL discretion over prices for interruptible and short-term firm service products;³⁹ and
- a November 2014 decision to approve Mainline rates for the 2015 – 2020 period that raised long and short-haul tolls by 18% and 52%, respectively.⁴⁰

³⁶ Dawn Hub prices, specifically the unusual market conditions experienced over the Winter 2013/14 period are the subject of section 3 (below).

³⁷ The *NGMR Report* discusses the impact of shale gas on these inter-relationships; see pp. 5 – 6.

³⁸ *NGMR Report*, p. 17.

³⁹ NEB case number RH-003-2011. See *NGMR Report*, p. 17. The influence of tolls on winter 2013/14 prices is considered in the *Winter Report*, pp. 20 – 21. See also section 3.2 below.

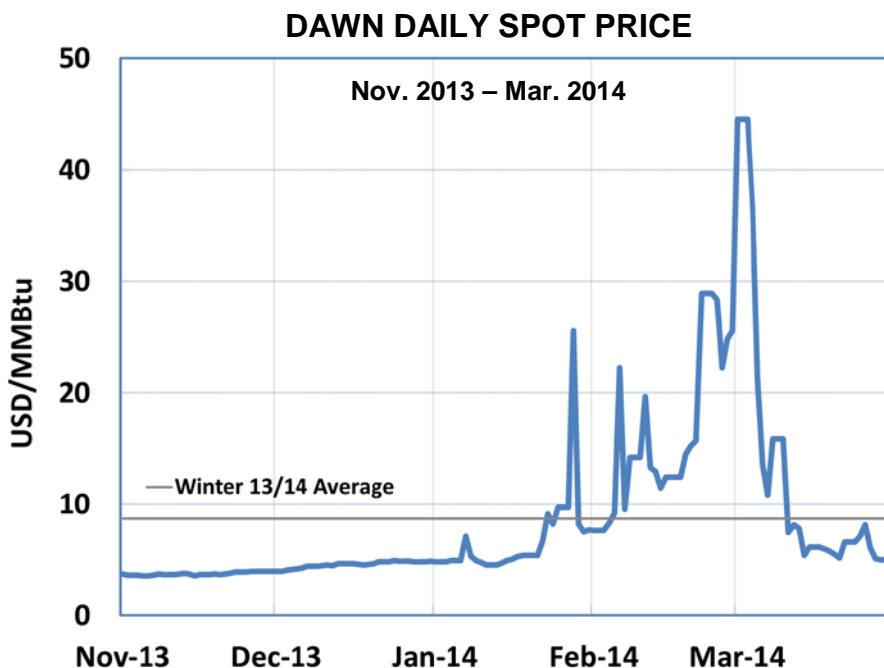
⁴⁰ NEB case number RH-001-2014, commonly referred to as “the Settlement Agreement”. See *NGMR Report*, p. 18.

3 Winter 2013/14 Natural Gas Prices

3.1 Introduction

Session 2 of the Stakeholder Conference focussed on natural gas prices over the winter of 2013/14 – what happened and why – and on how the parameters of distributor natural gas supply plans manage the risks and costs of gas supply, transportation and storage purchases that are reflected in the ‘system gas’ rate smaller consumers are charged for distributor-supplied natural gas.

Average Dawn Hub natural gas spot prices over the November 2013 to March 2014 period were more than double levels registered over the same 5 months the previous winter, and more than 90% higher than the average over the previous four winters.⁴¹ As the *Winter Report* notes, other market centres experienced similar price behaviour over the winter, reflecting the inter-related nature of North American markets.⁴²



Source: Navigant data

Given the impact of market prices on consumers – including both those who purchase gas directly from the market as well as ‘system supply’ customers who pay a rate based

⁴¹ Calculated from data provided in *Review of Ontario Natural Gas Markets During the 2013-2014 Winter* (November 24, 2014); 2014 NGMR Stakeholder Conference presentation by ICF International on behalf of [Union Gas](#) Ltd. (slide 13).

⁴² See *Winter Report*; Figure 22 for U.S. northeast, Dawn Hub, Henry Hub and AECO-C prices; p. 19.

on forecast gas prices which are later trued-up to actual prices through the Board's QRAM⁴³ – there was considerable stakeholder interest in examining the factors that may have contributed to the behaviour of gas prices over the winter; and in how distributor gas supply plans account for risk associated with these factors on an ongoing basis.

3.2 Contributing Factors

As summarized below, the *Winter Report* identified the main factors that affected Ontario natural gas supply, demand and prices over the 2013/14 winter period.

Record demand – Extreme cold temperatures over an extended period and broad geographic market area drove Ontario gas consumption over the November – March period nearly 13% above the average for the previous five winters.⁴⁴ Ontario industrial, residential and commercial gas demand were, respectively, about 8%, 18%, and 19% higher than previously (gas use for electric power generation was the exception, declining 4%).⁴⁵ Demand in the interconnected U.S. market was also high, at almost 15% above the previous 5-year average.⁴⁶

Regional market competition – Interconnected, mainly U.S. Midwest markets subject to the same weather system were competing with Ontario for supply. In the first two winter months, imports from the U.S. were far below normal, with Dawn storage providing incremental supplies.⁴⁷ Declining storage levels in February and March raised Dawn prices, drawing above-average monthly flows from the U.S. and TCPL Mainline (see 'Pipeline tolls' below).⁴⁸

Use of storage – U.S. storage facilities serving markets inter-connected with Ontario were under-filled in early November relative to average levels over the previous 5 years – a gap that widened as gas withdrawals exceeded normal drawdowns over the winter.⁴⁹ Ontario storage levels were normal going into November, but rapid withdrawals to meet rising Ontario demand led to early depletion of reserves.⁵⁰

⁴³ Small-volume distribution customers who do not buy gas from a gas marketer receive 'system supply' gas from their distributor. See the "QRAM Discussion" in the *Winter Report*, p. 24.

⁴⁴ *Winter Report*, p. 6.

⁴⁵ *Ibid.*

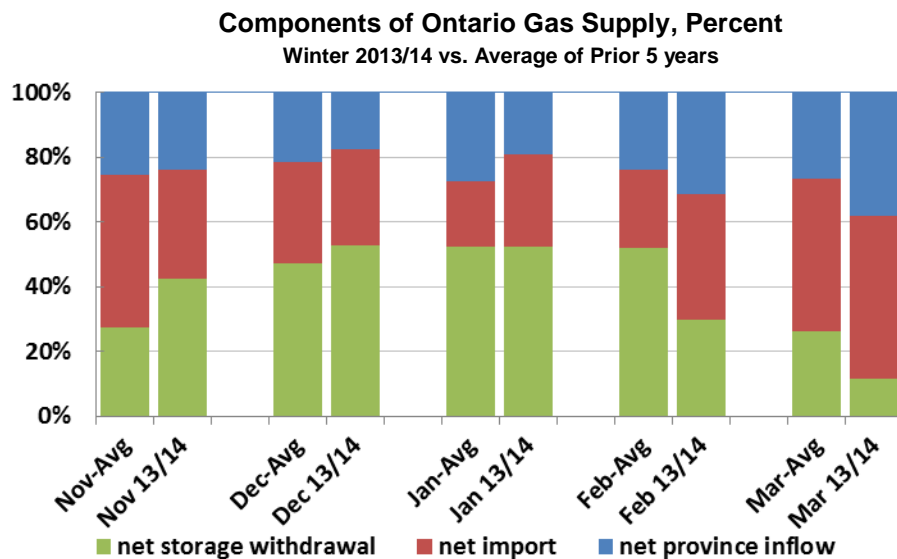
⁴⁶ *Winter Report*, p. 9.

⁴⁷ *Winter Report*, Figure 19, p. 17; and Figure 20, p. 18.

⁴⁸ *Winter Report*, p. 1 and Figures 20 and 21, p. 18.

⁴⁹ *Winter Report*, p. 12 and Figure 14 (p. 13).

⁵⁰ *Winter Report*, pp. 13 - 14 and Figure 15 (p. 14).



Pipeline tolls – Higher than previous interruptible tolls on TCPL’s Mainline raised the potential landed cost (gas plus delivery) of incremental supply from Empress on the Mainline, which “limited the competitiveness of [Mainline supplies from] Empress as an economic source of supply, leading incremental gas for Ontario to be drawn from the Midwest and Northeast, further exacerbating Dawn prices.”⁵¹

Contractual obligations (*‘checkpoint balancing’*) – to meet a contractual obligation to true up their Banked Gas Accounts, some larger gas customers put additional pressure on prices by purchasing gas close to the late February deadline when market prices were already elevated due to high demand, low storage volumes and costly incremental pipeline supply.⁵²

3.3 Gas Supply Planning Parameters

The *Winter Report* classifies the factors that can have an impact on gas prices into two categories: “independent” factors (like weather) over which a distributor has no control; and factors “more directly influenced” by a distributor or the regulator; i.e. a distributor’s gas supply planning tools.⁵³

The discussion below focusses on the latter, each of which involves balancing the cost of managing both the expected and unexpected, highlighting the plan elements

⁵¹ *Winter Report*, p. 24.

⁵² *Winter Report*, pp. 22 – 23.

⁵³ *Winter Report*, pp. 24 - 25.

emphasized by stakeholders in written comments and/or in the context of the Stakeholder Conference.⁵⁴ Note, however, that the “independent” factors (e.g. gas supply development; gas demand growth) are the subject of the market outlook to 2020, which is the focus of section 5 below.

3.3.1 Weather Assumptions

Noting that Union and Enbridge both now use the same (20 year declining trend) approach to the weather assumptions underlying their respective gas supply plans, the *Winter Report* asserts that weather assumptions “help drive the range of potential weather outcomes that would need to be planned for”, cautioning that regarding the weather, “it should be remembered that predictions are inherently risky and cannot be made with anything approaching certainty.”⁵⁵

3.3.2 Design Day

The design day criterion helps determine the distributor’s assumption for peak day gas demand. The higher (colder) the value (measured in heating degree days, or HDD) of the ‘design day’ parameter, the more a supply plan must rely on higher cost elements like extra storage or peaking supplies to meet expected peak day demand.⁵⁶ For a given QRAM period, the difference (+ / -) between actual and design day HDD will be used in determining (in combination with the actual vs. forecast price differential) the amount and direction of system supply price adjustment required for the next period.

3.3.3 Storage Level Targets

Stakeholders highlighted both in Stakeholder Conference remarks and in written comments the important role that storage plays in managing demand fluctuations and price risk. The two distributor’s approaches to setting both the levels and timing of pre-determined storage targets were also explained in written comments.⁵⁷

Generally, the lower the level of actual stored gas compared to the planned ‘target’ amount for a given point in time, the greater the risk that stored supplies will run out ahead of schedule and have to be replaced at a potentially higher price. Under both

⁵⁴ [Enbridge](#) set out its gas supply planning parameters and approach in written comments (pp. 2 – 9) and in its Stakeholder Conference [presentation](#) and remarks ([Transcript V.1](#); pp. 90 – 99). [Union](#) details their approach in written comments (pp. 4 – 8) and describes how it was applied in its Stakeholder Conference [presentation](#) and remarks ([Transcript V.1](#); pp. 52 – 62).

⁵⁵ *Winter Report*; p. 25 and p. 28, respectively. Staff notes that several gas supply planning parameters are involved in mitigating the risk around weather assumptions, including incremental supply (spot and forward) procurement and storage level planning. See *Winter Report*; pp. 26 – 27.

⁵⁶ *Winter Report*; p. 25.

⁵⁷ [Union](#); p. 4 and [Enbridge](#); p. 6.

distributor's regimes, as a storage target date approaches, decisions are made as to when and how much gas to purchase so as to ensure target levels are met on schedule.

3.3.4 Incremental Supply Procurement

When actual demand significantly exceeds planned demand over a given gas supply plan period, unscheduled gas purchases are an option for making up the difference. Stakeholders commented to the effect that how and when such gas and transportation purchases are made will affect the unit cost of the gas needed to meet requirements.

The incremental supply procurement approaches embedded in Enbridge and Union's respective gas supply plans were not the same. While Enbridge's gas supply plan included incremental supply purchases on the daily and intra-month markets, Union's plan called for month-ahead supply procurement.⁵⁸

3.4 Implications for Distributor Gas Supply Plans

A number of stakeholders expressed views on what can be learned from the winter 2013/14 experience that might better inform and enhance the Board's review of distributor gas supply plans and applications for QRAM adjustments going forward. These implications generally involved either the content of distributor gas supply plans, or the context in which they are reviewed by the Board.

3.4.1 Gas Supply Plans

Some stakeholders suggested that the Board provide guidance to distributors on gas supply plans, including by articulating the Board's role with respect to such plans; or by establishing the principles upon which the strategy underlying a plan should be based.

A number of stakeholders expressed the view that gas supply plans should be evaluated in the context of a broader 'integrated resource plan'. One explained that this approach could integrate reviews of supply related matters otherwise conducted in rate cases, deferral account cases and leave-to-construct proceedings.

Context or timing of reviews notwithstanding, a number of stakeholders made suggestions as to the topics that should be covered in a gas supply plan review process. These included, in no particular order:

- sales and throughput forecasts that match the terms of the respective underlying transportation contracts to show capacity utilization over the life of the commitment

⁵⁸ *Winter Report*, p. 27

- forecasts of peak day, winter season and annual requirements
- the results of gas supply plan scenario/sensitivity analyses over a range of demand and price combinations, including abnormal conditions such as severely colder or warmer than normal weather ('stress tests')
- storage fill targets
- contingency plans
- price and toll differentials
- supply diversity
- deviations from plan
- retrospective gas supply plan performance.

Several stakeholders commented in support of distributors exercising discretion when responding to unexpected market developments, including considering options not specifically contemplated in a plan that has been subject to the Board's review.

By way of example, one stakeholder ventured that in effect, the concept of 'storage' could be broadened to include the practice of meeting pre-set, dated gas storage targets with purchases of 'landed gas' at Dawn timed to account for current and expected market price levels over the relevant time horizon.

In fact, stakeholders generally did not favour the establishment of a more mechanistic or standardized approach to gas supply plans and the implementation thereof, variously citing differences across distributors in terms of service territory, mix of tools available to adjust supply; etc. as precluding a 'pro-forma' approach.

3.4.2 Gas Supply Plan Review Process

Some stakeholders commented that the Board's existing approach to gas supply plan reviews is appropriate, individually supporting some or all aspects of the Board's August 14, 2014 Decision on [EB-2014-0199](#) to enhance consumer information and education regarding gas cost changes and to allow for a more detailed review in the case of significant bill impacts.

Others expressed the view that plans should be reviewed yearly (currently the reviews take place during a cost of service rates proceeding, but changes can be included in an annual Incentive Rate-setting Mechanism application). The rationale expressed in written comments for favouring more frequent gas supply plan reviews varied:

- as last winter's experience showed, distributor gas supply plans are becoming more complex;
- the implications for distributor gas supply plans and large 'direct purchase' gas consumers of the ongoing shift in Ontario gas supply sources from west to east; and
- the potential for unutilized TCPL Mainline pipeline capacity to Dawn to be removed service, restricting access to WCSB gas.

3.4.3 Gas Supply Reference Price

In the course of the Stakeholder Conference, stakeholders commented to the effect that during winter 2013/14 peak demand periods, spreads between AECO-C, Empress and/or Dawn hubs were often inexplicably outside historical norms. The issue was raised as to whether the reference price used for rate-setting and QRAM adjustment purposes – currently based on the Empress price – should be replaced with a Dawn Hub price.

In written comments, a number of stakeholders variously expressed support for the Board's further examination of the merits of replacing the existing reference price with an alternative. Stakeholder preferences ranged from a single pricing point to a distributor-specific 'price basket', or a service area-specific reference price approach. Given the potential implications of changing the reference price for both distributors and consumers, one stakeholder commented that the Board should engage all stakeholders to review the matter.

4 Natural Gas | Electricity Market Interface

4.1 Background

The ‘natural gas/electricity market interface’ – the focus of Stakeholder Conference Session 3 – refers to the market relationship between the price of natural gas used for electricity generation on the one hand and the wholesale price of electricity set in the IESO administered market on the other. In essence, the higher the price of natural gas purchased by gas-fired generators, the higher the wholesale price of electricity when gas-fired generation is needed to meet Ontario electricity demand.⁵⁹

As Stakeholder Conference participants heard, this pricing relationship was examined in the Board’s 2005 [Natural Gas Electricity Interface Review](#) (“NGEIR”). NGEIR addressed the potential mismatch between relatively unpredictable demand for gas by gas-fired generators and then-existing storage and pipeline transportation rates and service offerings to generators.⁶⁰ New types of natural gas storage and transportation services and associated rates and market prices were the result.⁶¹

Market conditions in the winter of 2013/14, especially periods marked by high demand for both gas and electricity, highlighted the natural gas/electricity pricing relationship. The conference discussion and some stakeholder written comments included views on how well the arrangements put in place following NGEIR worked and the potential implications going forward.

4.2 The Evolving Gas/Electricity Relationship

There were two elements of the relationship between the gas market and the electricity market raised in the consultation. One was the relationship between gas and electricity market prices arising directly from the fact that electricity is produced by consuming gas. The other was the relationship between the gas and electricity sectors arising from the potential for one to substitute for the other or be deployed in combination with the other. Each is discussed in turn below.

⁵⁹ “For a variety of reasons, gas is setting the price in the Ontario market for about half the time, but most of the peak periods.” OEB MSP; [Transcript V.1](#); p. 130.

⁶⁰ See the [Natural Gas Electricity Interface Review – a Report by Ontario Energy Board Staff](#) (EB-2005-0306); November 21, 2005.

⁶¹ The NGEIR consultation was followed by a generic hearing. See [Natural Gas Electricity Interface Review - Decision with Reasons](#) (EB-2005-0551); November 7, 2006. An industry-led process that took place at about the same time resulted in improved operational coordination between the IESO and gas pipeline operators.

4.2.1 The Gas/Electricity Price Relationship

Stakeholder Conference participants heard that high natural gas prices put “significant” upward pressure on wholesale electricity prices over the 2013/14 winter, but high electricity demand, inertia (import) prices and import curtailments ordered by adjacent system operators also played a role.⁶²

Stakeholders representing bulk purchasers of gas at wholesale, especially those who rely on the secondary gas market when necessary, remarked at the conference and/or in written comments on how these consumers were significantly affected by elevated winter gas prices.

Some stakeholders observed that the Board’s NGEIR framework had a stabilizing impact on natural gas/electricity market dynamics over the winter.⁶³ Staff further observes that comparatively low gas use for electricity generation relative to the average over the five previous winters may also have played a stabilizing role.⁶⁴

Information provided to the consultation suggests to staff that a number of factors will contribute to the evolution of the gas/electricity price relationship going forward, of which the most significant are:

- 1) the growing contribution gas-fired electricity generation will make to Ontario’s electricity mix going forward; and
- 2) the impact on the use of Ontario gas storage and transportation infrastructure of shifting supply sources and regional demand patterns.

Dawn Hub was singled out in stakeholder comments as particularly important, since gas-fired generation contracts currently specify natural gas priced at Dawn. On a related note, a stakeholder expressed the view that the anticipated transition from ‘energy’ to ‘capacity’ based contracts would have no impact the gas-fired generators’ practice of relying on shorter-term gas (and therefore higher cost) gas supply arrangements.

⁶² See OEB MSP; [Transcript V.1](#); p. 129; In 3 – 9 and Stakeholder Conference [Presentation](#); slide 16.

⁶³ While the effect on wholesale prices (HOEP) was significant, stakeholders were reminded that 1) the impact was muted for consumers paying a commodity price that combines a relatively high wholesale electricity price and the comparatively stable ‘Global Adjustment’; and 2) RPP prices had a price smoothing effect for low volume electricity customers; see OEB MSP; [Transcript V.1](#); pp. 132 – 133.

⁶⁴ See *Winter Report*; p. 6; as noted in section 3.2 above.

4.2.2 The Gas/Electricity Synergistic Relationship

Several stakeholders remarked in the Stakeholder Conference on how both gas and electricity markets might benefit from reinforcing one another, or might otherwise operate in a more integrated fashion.

Some stakeholders' written comments indicated support for further stakeholder discussions on gas and electricity sector optimization. On this subject, individual stakeholders advised that:

- such a discussion would best take place after the role of DSM in natural gas distribution system planning has been clarified;
- because the commodity markets are competitive, regulatory involvement would only add unnecessary costs; and
- discussions on related matters are already taking place at the local and regional levels (in the context of community energy plan development) and in formalized multi-stakeholder working groups and institutions organized around specific themes or subject areas.

Other stakeholders offered suggestions on how the Board might facilitate such a discussion, including:

- constituting a 'stakeholder advisory committee' along the lines employed by IESO to engage stakeholders on wholesale electricity market development matters;
- convening a forum similar to the *Natural Gas Forum*; and
- participating in an inter-agency stakeholder forum on the LTEP.

4.3 Implications

Depending on market developments over the intervening period, electricity generator 'as and when needed' purchases of storage and especially pipeline services for ever larger volumes of gas – particularly under peak demand conditions – may as early as 2019 begin to test the market for pipeline capacity and storage services and by extension, the regulatory arrangements currently serving gas-fired generators.

Accordingly, stakeholders advised that the Board keep abreast of developments affecting both gas and electricity markets through timely cross-sector communication. The sentiment was also expressed that better coordination between the electricity and gas sectors could help mitigate the risk of market imbalances. Stakeholders commented on how the Board might achieve both, as summarized below.

4.3.1 For Cross-sector Communication

Gas distributors noted in written comments that their electricity sector customers are engaged on an ongoing basis on issues as they arise and that existing information sources – including the distributor information reporting called for under the [Storage and Transportation Access Rule](#) (“STAR”) can be used to keep abreast of gas/electric market developments.

Acknowledging that gas and electricity market counterparts engage one another directly, one stakeholder commented that there may be a role for the Board on matters involving barriers to cross-sector communication and coordination. A number of stakeholders variously supported the idea that regular cross-sector communication would be valuable, and that the Board’s recently announced annual Natural Gas Forum would be an appropriate venue for doing so.

4.3.2 For Cross-market Coordination

In relation to gas/electricity market coordination – for example suitable opportunities for gas-fired generators to ‘nominate’ (i.e. book) pipeline capacity to deliver gas as and when dispatched – one stakeholder expressed the view that while further enhancement is welcome, sufficient mechanisms are currently in place to facilitate timely, cost-effective generator transactions.

Improved access to pipeline and storage market operational information to facilitate electricity wholesale market operations was also raised as an issue in the Stakeholder Conference. In written comments, one stakeholder expressed the view that any such information sharing should be authorized by the Board and/or customers. Another suggested that the Board review its regulatory instruments to ensure information sharing opportunities are not unduly restricted.

5 Outlook to 2020: Trends & Implications

As noted in section 1, the objective of the 2014 NGMR is to identify and explain key influences on the Ontario natural gas sector over the next 3 to 5 years and highlight any implications there may be for the Board's consideration. This section provides an overview of market development trends expected to affect prices in the near term and summarizes stakeholder comments as to the potential implications of those trends for Ontario.

5.1 Trends Affecting Markets & Prices to 2020

According to the *NGMR Report*, prices at Dawn over the period to 2020 are expected to be reasonable and competitive and relatively less volatile than experienced previously.⁶⁵ In the 'Reference' gas demand forecast scenario, annual average Dawn Hub prices over the period from 2014 to 2020 are expected to rise from an estimated \$4.80/MMBtu to \$5.68/MMBtu, an overall increase of about 18%. This compares to forecast Dawn Hub price increases in the 'Low' and 'High' gas demand scenarios of 2.7% and 27.8% respectively.⁶⁶

Continued growth expected for North American natural gas output will exert a moderating influence on market prices over the period to 2020.⁶⁷ In Canada, gas production is expected to rebound from the gradual decline observed from 2006 to 2014, thanks to B.C. shale gas output and gas associated with oil production. By 2020, overall North American natural gas output is expected to rise by 24% from current levels, led by shale gas which by then is forecast to account for over 50% of total continent-wide gas output.

Between 2013 and 2020, North American gas demand is forecast to increase by about 16% to just over 101 Bcf/day. Over the same period, gas demand is expected to rise about 17% in Canada, led by increased oil sands-related WCSB gas use; and by 11% in Ontario, driven mainly by gas-fired electricity generation. North American LNG exports, forecast at 7.5 Bcf/d by 2020, are also expected to be a demand side factor affecting market prices.⁶⁸

⁶⁵ See *NGMR Report*, p. 41. Navigant explains the reason for reduced price volatility in some detail; see *loc. cit.* pp. 5 – 6.

⁶⁶ Calculations based on Navigant data. Annual average 2020 prices are \$4.94 and \$6.15/MMBtu for the low and high demand scenarios respectively; see *NGMR Report*, p. 44 and Figure 47.

⁶⁷ *NGMR Report*, pp. 27 – 29

⁶⁸ See *NGMR Report*, pp. 30 – 34; Figs. 31 and 34; and discussion; pp. 1, 12.

5.2 Implications

5.2.1 For Pipeline Development & Storage

Despite higher expected Canadian gas production mentioned above, the *NGMR Report* suggests that the combination of rising U.S. shale gas output; oil sands and B.C. LNG exports claiming an increasing share of Canadian gas output; and gas on gas competition at Dawn Hub will result in U.S. gas flows to and through Ontario continuing to replace gas from the WCSB.⁶⁹

The *NGMR Report* also indicated that Ontario storage will play an increasingly important role in the coming years, including by ensuring gas supply is available to meet demand from gas-fired electricity generators during peak gas demand periods.⁷⁰

In that general context, stakeholders variously expressed concerns over the implications of these trends on:

- 'short-haul' pipeline capacity;
- pipeline capacity and storage sufficiency to meet future 'peak day' Ontario demand;
- distributor gas supply plans based on historical (west to east) flow patterns; and
- meeting uncertain and potentially significant future demand for gas for gas-fired electricity generation.

As to whether these trends and potential implications call for an urgent or cautious approach to new infrastructure development, stakeholder written comments included that:

- committing early to new or expanded pipeline infrastructure connections to U.S. shale gas basins is called for in view of pending competition from numerous U.S. markets;
- improved intra-provincial flows and/or access to U.S. shale gas would result from several Ontario pipeline enhancement projects currently in development;
- U.S. shale gas supply growth alone can be expected to drive incremental cross-border infrastructure development;
- overly hasty efforts to secure access to increased U.S. shale gas are not called for, since concerns over peak delivery capacity can be alleviated by contracting for long-haul transportation on existing pipelines;

⁶⁹ *NGMR Report*, pp. 1; 18; 46.

⁷⁰ *NGMR Report*, p. 40.

- the potential risk to ratepayers of newly built pipeline facilities quickly becoming under-utilized suggests caution, especially where multiple paths become available to deliver gas from essentially the same source basin, or where actual shale gas production is less than expected; and
- pipeline expansions or new developments should be considered in the context of a distributor's 'integrated resource plan'.

5.2.2 For Access to Market Information

Some stakeholders included in their Stakeholder Conference remarks references to the important role played by secondary markets for pipeline capacity and storage services during the winter 2013/14 peak demand periods. Many stakeholders, notably those representing consumers that buy directly from the market, expressed views in written comments on pipeline capacity and storage market transparency.

Two stakeholders commented to the effect that improved market transparency was not needed, given the types of market information sellers currently make available to buyers, including in response to the disclosure requirements set out in STAR.

Most written comments on the matter, however, suggested that greater access to market information would be helpful. One stakeholder cited the information IESO makes available on the electricity market as an example of the level of transparency that would be appropriate. Others were more specific; variously indicating that information on the Dawn Hub price index, intra-Ontario gas flows, receipts and deliveries by delivery point, pipeline capacity availability and storage levels would be useful.

Stakeholder suggestions as to how the Board might further address the matter included by conducting a review of the information requirements set out in STAR; by adding it to upcoming *Natural Gas Forum* discussions; and by commissioning a study of the types of information that might best provide the required market insights.

5.2.3 For Regulatory Processes

The trends and issues mentioned above have implications for the Board's processes, including its consideration of natural gas utility applications. In staff's view, there is a consensus among stakeholders that the next few years will be marked by more or less continuous adjustment to changes on both the supply and demand sides of the Ontario natural gas market.

A number of stakeholders supported the Board's forward-looking orientation of annual *Natural Gas Forums*; many included written comments in the form of suggestions on the form or content of the NGF. Some stakeholders took the opportunity to propose or recommend specific activities that, based on issues raised in the 2014 NGMR, they believed should be considered by the Board including:

- a review of the Board's distributor *Filing Guidelines for Pre-Approval of Long Term Natural Gas Supply and/or Upstream Transportation Contracts* to determine whether they contemplate the kind of long term commitments that might be needed to enable Ontario access to new supply sources; and
- a review of the efficiency of the Board's facilities application assessment process.

5.2.4 For the Board's Role

Some conference participants remarked that the continued development of U.S. shale gas production over the next few years may have implications for the Board in terms of its role and the dominant regulatory themes emerging from market developments, and in terms of how the Board might engage with other regulatory and/or sector-related agencies to maintain an awareness of activities and processes that may affect Ontario gas sector development. Some stakeholders elaborated on these implications in written comments.

A number of stakeholders offered views on the Board's role in relation to the natural gas market, among which were that Board should ensure:

- just and reasonable rates in the public interest;
- the market operates efficiently including by limiting unnecessary barriers;
- investments are appropriate and costs are allocated with a view to risk and benefits;
- that market developments are in the public interest;
- that stakeholders are provided with a forum for information exchange and discussion; and
- that the Board's role evolve with changes in the market.

A majority of stakeholder written comments expressed views on the issue of inter-regulatory communication and coordination. Some focussed on the rationale for communication and coordination mechanisms, including

- the impact on Ontario consumers of the adequacy, reliability and pricing of supply and infrastructure upstream of Ontario;
- the effect of one regulatory decision on projects in other regulatory jurisdictions;

- avoiding regulatory approvals conditional on decisions of other regulators; and
- rising electricity market dependence on gas-fired generation.

One stakeholder acknowledged in written comments the practical difficulty of coordinating regulatory proceedings. A number of stakeholders shared their views on approaches to inter-agency coordination that might be considered, such as:

- joint reviews of applications before another regulatory body;
- informal communications with other regulatory agencies such as through CAMPUT;
- informal dialogue at the Board member and staff levels;
- Ontario-based intervenors coordinating their participation in federal or other hearings that have a ramifications for Ontario markets and include the impacts of related regulatory decisions in their evidence; and
- increased communication on Ontario electricity supply planning among government and regulatory agencies.

6 Recommendations

Based on the information provided in Navigant's *Winter Report* and *NGMR Report*, Stakeholder Conference discussions and in stakeholder written comments, staff's recommendations for the Board's consideration are set out below.

6.1 Review of Board Policy on Gas Procurement

Distributor gas supply plans were the focus of much of the discussion in Session 2 of the Stakeholder Conference. In particular, the different ways distributors manage the cost/risk trade-offs of the various plan parameters were touched upon, providing useful information on distributor planning strategies and implementation decisions.⁷¹

In view of the potential impact on consumers of distributor gas supply plans and of the impact on those plans of an expected increased reliance on gas sourced from U.S. gas supply basins, staff recommends that the Board consider initiating a proceeding, by way of either a generic hearing or policy consultation, to examine the Board's policy in relation to gas procurement and the assessment and approval of distributor gas supply plans, including but not limited to:

- an analysis of the risk/cost trade-offs considered in the determination of each plan element, such as:
 - the demand forecast underlying procurement decisions
 - design day criteria
 - firm transportation planning
 - storage level planning
 - incremental supply procurement (i.e. spot vs. forward purchases)
- the minimum information required for the Board's review of a distributor's gas supply plan; and
- the implications of the Board's approval of a gas supply plan, particularly in relation to a distributor's discretion in implementing the plan.

Stakeholders also addressed the implications for the 'reference price' used for QRAM and system gas rate setting purposes of the continued Ontario gas supply shift from the WCSB to mid- and eastern U.S. supply basins. Specifically, the more gas consumed in Ontario is sourced from the U.S., the less a 'reference price' based on an Alberta

⁷¹ Staff notes that gas distributors have committed to providing stakeholders with an annual review of their respective gas supply plans.

market hub can be expected to reflect the cost of landed gas in Ontario. Staff therefore recommends that the Board consider including within the scope of the above-mentioned proceeding an examination of:

- the role of the 'reference price' in setting the rate charged for system gas supply;
- the criteria that a 'reference price' must meet in order to be appropriate for this purpose; and
- the merits of the current (Alberta-based) 'reference price' relative to alternatives (including a Dawn Hub related price) when considered in relation to these criteria in the context of the aforementioned shift in Ontario's gas supply mix.

6.2 Facilitating Gas/Electricity Market Coordination & Communication

Board staff believes that many stakeholders could benefit from the regular exchange of information pertinent to both natural gas and electricity market stakeholders. Staff therefore recommends that the Board consider including in the context of its next meeting of sector stakeholders information on issues related to the gas/electricity market interface, including but not necessarily limited to such topics as:

- the timing of gas purchase/delivery options and electricity supply commitments;
- relevant service offerings and prices for gas-fired generator customers; and
- potential future cross-sector synergies.

With a view to fostering gas/electricity market coordination, staff also recommends that the Board consider reviewing and providing further direction in relation to the Board's regulatory instruments pertinent to the disclosure by gas distributors of information on pipeline & storage operations.

6.3 Information Access & Market Monitoring

Based on the information and stakeholder views provided in the consultation, staff recommends that the Board consider incorporating into its next meeting of sector stakeholders information on:

- the adequacy of and access to the market information required to meet the needs of bulk gas purchasers; and
- infrastructure developments that may affect Ontario access to gas supplies over the near or longer term.

APPENDIX

Appendix

References

- ICF International Inc. [2010 Natural Gas Market Review](#); prepared for the Ontario Energy Board (EB-2010-0199); August 20, 2010
- Navigant Consulting Ltd. [Winter 2013/14 Natural Gas Price Review](#); prepared for the Ontario Energy Board (EB-2014-0289); November 25, 2014
- [2014 Natural Gas Market Review Final Report](#); prepared for the Ontario Energy Board (EB-2014-0289); December 22, 2014

Links to Transcripts

- Ontario Energy Board 2014 Natural Gas Market Review – Stakeholder Conference (EB-2014-0289); [Volume 1](#)
- 2014 Natural Gas Market Review – Stakeholder Conference (EB-2014-0289); [Volume 2](#)

Links to Stakeholder Written Comments

- [Association of Major Power Consumers in Ontario](#)
- [Association of Power Producers of Ontario](#)
- [Building Owners and Managers Association of the Greater Toronto Area](#)
- [Canadian Manufacturers and Exporters](#)
- [Consumers Council of Canada](#)
- [Enbridge Gas Distribution Inc.](#)
- [Energy Probe](#)
- [Independent Electricity System Operator](#)
- [Industrial Gas Users Association](#)
- [London Property Management Association](#)
- [Natural Resource Gas Limited](#)
- [Ontario Greenhouse Vegetable Growers | Federation of Rental-housing Providers of Ontario](#)
 - [Attachment](#)
- [School Energy Coalition](#)
- [TransCanada PipeLines Ltd.](#)
- [Union Gas Limited](#)
- [Vulnerable Energy Consumers Coalition](#)