

2015 Natural Gas Market Review Summary Report

Prepared for:
Ontario Energy Board



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2015 Natural Gas Market Review--Summary Report

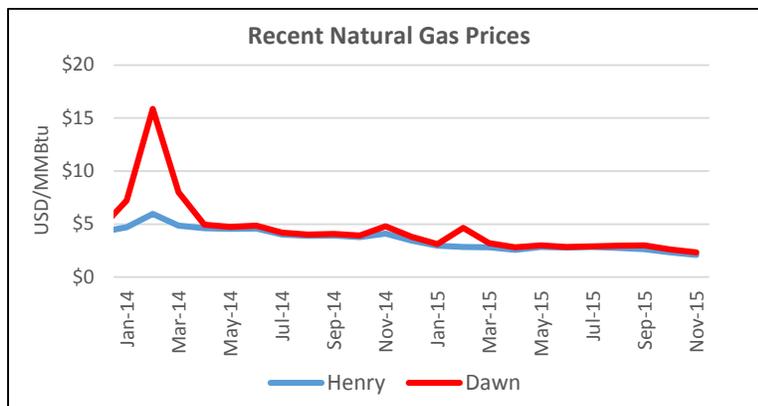
Purpose

Navigant Consulting was retained by Ontario Energy Board staff to provide a 2015 Natural Gas Market Review. The 2015 Market Review is intended to constitute a concise update (“2015 Update”) of the 2014 Natural Gas Market Review (“2014 Review”), focusing on changes in market conditions and emerging trends and developments in the North American and Ontario natural gas markets. The 2015 Update also includes a forecast of Ontario gas prices, supply and demand, and regional pipeline flows. Navigant’s forecast modeling is performed using Navigant’s proprietary version of the commercially available gas modeling package GPCM. GPCM is a partial equilibrium model that clears supply and demand throughout North America based on supply and demand functions, and capacities and costs of natural gas transportation and storage. Gas demand for electric generation is an input to the gas modeling, and is produced by Navigant’s proprietary Portfolio Optimization Model.

Review of Current Market Conditions

Prices have consistently decreased since the Polar Vortex of early 2014, a period of extremely cold winter weather, when they peaked at \$15.87 per MMBtu at Dawn and \$5.97 per MMBtu at Henry Hub¹. As can be seen in the presentation for the 2015 Natural Gas Market Review stakeholder forum (“Forum Presentation”)², shown in Figure 1, below, Dawn prices have tracked Henry Hub prices closely the last several years, except for certain instances occurring during the heating season, such as the Polar Vortex. Prices ended the year 2014 at \$3.81 per MMBtu at Dawn (with a range from \$3.81 to \$15.87, averaging \$5.87 per MMBtu) and \$3.43 per MMBtu at Henry, then continued down during 2015 to \$2.32 per MMBtu at Dawn (with a range of \$2.32 to \$4.63, averaging \$3.03 per MMBtu) and \$2.08 per MMBtu at Henry by November 2015. These drops coincided with both continued increases in natural gas production, notably shale gas in the U.S. Northeast, as well as a global decrease in the price of crude oil.

Figure 1: Recent Natural Gas Prices, Henry Hub and Dawn



Source: ICE

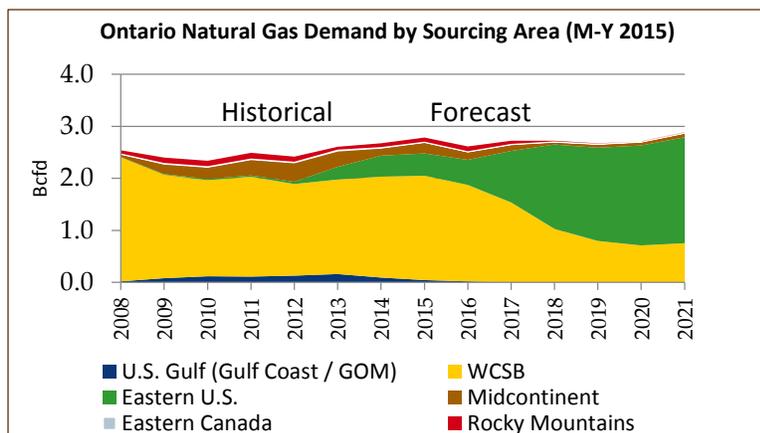
¹ All prices herein are expressed in 2013 USD.

² See slide 5 of the Forum Presentation.

The key driver of the North American natural gas market continues to be the strength of the gas resource and prolific gas production made possible by the “shale revolution”. North American shale gas production has continued to increase since the 2014 Review.³ Total shale gas production at the wellhead exceeded 46 Bcfd by March 2015 (the latest quarterly data available for Canadian shale play production covers Q1 of 2015), versus the almost 41 Bcfd as of July 2014 reported in the 2014 Review.

As shown in Figure 2⁴, the proportion of Ontario gas usage coming from the U.S. Appalachian Basin (i.e. Marcellus and Utica plays) is expected to increase from 0.4 Bcfd currently to more than 2 Bcfd by 2021. Navigant forecasts the Appalachian Basin share of supplies to Ontario going from an 18 percent share in 2016 all the way up to a 71 percent share in 2021, significantly outpacing the Western Canadian Sedimentary Basin’s 26 percent share. This phenomenon is a reflection of the massive resources and production in the Northeast U.S., as well as expected developments in pipeline infrastructure construction and regional gas flows.

Figure 2: Ontario Natural Gas Demand by Sourcing Area (M-Y 2015)



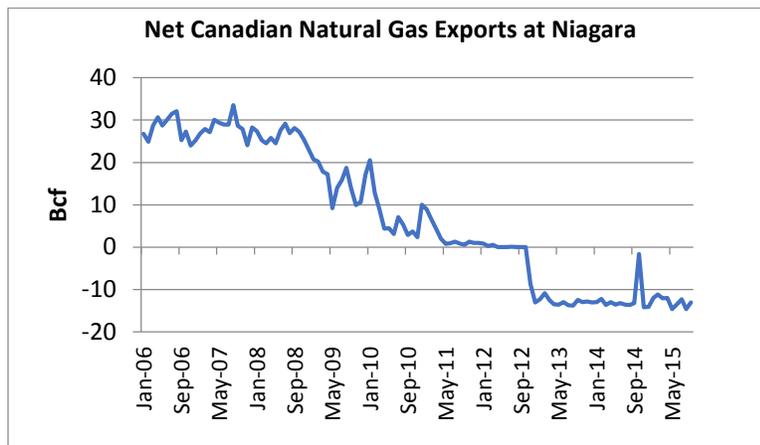
Source: RBAC/ Navigant Mid-Year 2015 Forecast

As shown in Figure 3, below, the shift in flows at Niagara that began in 2012 has continued to the present, reflecting the flow of U.S. supplies northward into Canada. With respect to the future, expected new pipeline capacity will enable the shift to increased U.S. supplies discussed above. Specifically, new capacity is expected to include 1) the proposed Rover pipeline with 1.3 Bcfd of new capacity to Canada beginning June 2017, and 2) the proposed Nexus pipeline with 750 MMcfd of new capacity to Canada beginning November 2017.

³ See slide 2 of the Forum Presentation.

⁴ See also slide 12 of the Forum Presentation.

Figure 3: Net Canadian Natural Gas Exports at Niagara



Source: NEB

Outlook: 2015 Update vs 2014 Review forecasts

North America

Navigant’s forecasts of overall North American natural gas supply and demand have not changed significantly between the 2014 Review and the 2015 Update. Forecast supply for 2020 increased about 1.6 percent to 109.7 Bcfd from the 2014 Review, while forecast demand for 2020 decreased about 1.4 percent to 100.2 Bcfd from the 2014 Review. Since the demand metric is consumption, the difference between forecast demand and supply is the lease/pipe/plant/storage categories of forecast gas usage.

Canada

Navigant’s forecasts of overall Canadian natural gas demand have remained relatively stable between the 2014 Review and the 2015 Update.⁵ While there have been reports of deferrals of oil sands projects, Navigant’s oil sands outlooks have already been conservative, and adjustment would be premature given the volatility in the oil markets and the associated project announcements in the industry.⁶ In the 2015 Update, by 2021, there is a drop in forecast Canadian gas demand versus the 2014 Review of about 400 MMcfd, out of about 12 Bcfd, or about minus 3.3 percent.

Regarding forecast Canadian natural gas production, in 2020 the 2015 Update forecasts slightly lower production than in the 2014 Review, at 16.9 Bcfd versus 17.1 Bcfd.⁷ This marginal difference is due to lower amounts of forecast conventional gas production in British Columbia. The 2021 forecast in the 2015 Update shows an additional decrease to 16.7 Bcfd versus 2020 (due to further decreases in WCSB forecast conventional gas production in Alberta and British Columbia, partially offset by increases in British Columbia forecast unconventional gas production). The 2014 Review, on the other hand, showed a 2021 forecast of Canadian production of 18.0 Bcfd, for a forecast production decrease in 2021

⁵ See slide 8 of the Forum Presentation.

⁶ In fact, while Navigant’s oil sands gas demand outlook for 2020 stands at 2.5 Bcfd, a recent Canadian Energy Research Institute report updated its oil sands gas demand outlook for 2020 from about 2.5 Bcfd to about 3.4 Bcfd. CERI, Canadian Oil Sands Supply Costs and Development Projects, Study No. 152, August 2015.

⁷ See slide 7 of the Forum Presentation.

between forecasts of about 1.3 Bcfd, or about minus 7.2 percent. The difference between the decrease in forecast Canadian production of 1.3 Bcfd and the decrease in forecast Canadian demand of 0.4 Bcfd is made up primarily by a decrease in forecast net pipe exports to the U.S. of about 0.9 Bcfd, as discussed below, which makes up for the smaller decrease in demand than in production. In the near term, the 2015 Update shows a decrease in total Canadian forecast gas production from 16.3 Bcfd in 2015 to 15.3 Bcfd 2016, resulting from decreases in conventional and unconventional production in British Columbia, as well as in conventional production in Alberta.

The forecast supply-demand balance is tighter in the 2015 Update than in the 2014 Review.⁸ Forecast total net exports, representing the surplus of Canadian production beyond Canadian demand, decreases starting 2020. In 2021, the difference in net exports is about 0.9 Bcfd, based on net pipe exports decreasing from 3.65 Bcfd to 2.75 Bcfd, which matches the difference between production and demand outlined earlier. By 2025, the decrease amounts to 1.6 Bcfd, corresponding to a decrease in Canadian production of about 1.9 Bcfd, mitigated by a decrease in Canadian demand of 0.3 Bcfd. This surplus decrease is also evidenced in part by the increase of eastern U.S. gas flows into Ontario, as shown in Figure 2.

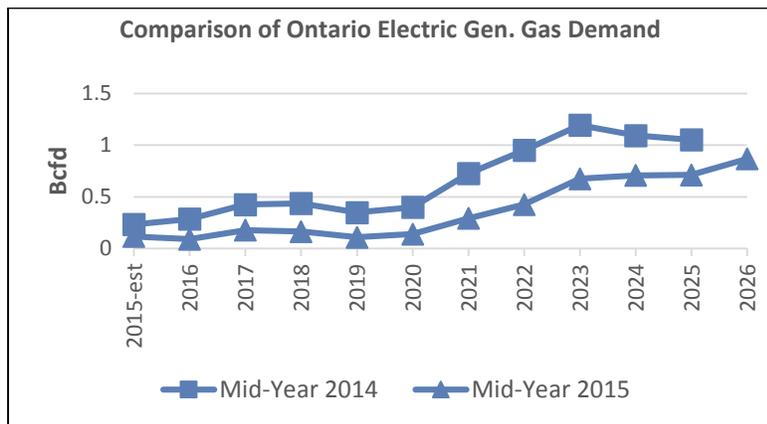
Ontario

Two main differences in sector gas demand in Ontario between the 2014 Review and the 2015 Update are: 1) an increasingly lower forecast (versus the 2014 Review) of natural gas demand for electric generation, reaching a difference of 0.25 Bcfd by 2020, as shown in Figure 4, below⁹, corresponding to an assumed increase in renewable generation over that period; and 2) a slower increase in gas-fired electric generation gas demand starting from 2020 (to 2023), due to the institution of a carbon market in Ontario, which makes Ontario's gas-fired generation more expensive than otherwise. While the more recent forecast is lower, it still reflects an increase in gas-fired generation gas demand starting about 2020, reflecting an overall increase in gas-fired electric generation (e.g. with growth of over 400 percent between 2020 and 2025, from 7.5 TWh to 40 TWh), due in part to on-going nuclear refurbishments/retirements, as well as an assumed slowdown in the increase in renewable generation. Table 1, below shows Ontario electric generation by source for selected years.

⁸ See slides 10 and 11 of the Forum Presentation.

⁹ See also slide 9 of the Forum Presentation.

Figure 4: Comparison of Ontario Electric Generation Gas Demand, 2014 vs. 2015 Forecasts



Source: Navigant Mid-Year 2015 Forecast

Table 1: Ontario Electric Generation by Source, 2014 vs. 2015 Forecasts

	2016 (GWh)		2020 (GWh)		2025 (GWh)	
	2014 Forecast	2015 Forecast	2014 Forecast	2015 Forecast	2014 Forecast	2015 Forecast
Gas	14,699	4,635	19,969	7,494	50,451	40,403
Coal	0	0	0	0	0	0
Oil	0	0	0	0	0	0
Nuclear	96,241	96,241	84,073	84,073	66,865	66,875
Hydro	41,151	40,850	41,114	40,876	41,114	40,876
Wind	12,334	13,421	12,334	17,133	12,334	18,182
Solar	343	536	343	1,729	333	1,729
Biomass	3,495	3,498	3,495	3,498	3,495	3,498
Total	168,263	159,181	161,328	154,803	174,592	171,563

Source: Navigant POM

TransCanada Pipeline

Forecast utilization on the TransCanada Pipeline (“TCPL”) Mainline decreases farther and faster in the 2015 Update than in the 2014 Review.¹⁰ All legs have significantly lower forecast utilization in 2020 in the 2015 Update, such as the Western and Northern legs dropping from 35 percent to 18 percent and the North Bay leg dropping from 26 percent to 12 percent, as shown in Table 2¹¹:

¹⁰ See slide 13 of the Forum Presentation.

¹¹ 2021 utilizations are the same as those for 2020 in the 2015 Review.

Table 2: Comparison of TCPL Utilization, 2014 vs. 2015 Forecasts

TCPL Leg	Utilization in 2015 (2014 Review)	Utilization in 2015 (2015 Update)	Utilization in 2020 (2014 Review)	Utilization in 2020 (2015 Update)
Saskatchewan/Manitoba	54%	53%	31%	20%
Western	39%	34%	35%	18%
Northern	39%	32%	35%	18%
North Bay	28%	20%	26%	12%
Source: Navigant Mid-Year 2015 Forecast				

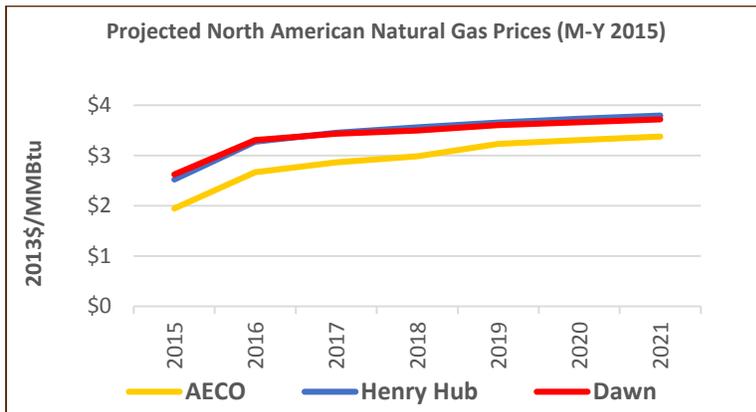
These trend differences began with the first forecast year (2015), where the Western and Northern legs in the 2015 Update have estimated utilization at 34 percent and 32 percent, respectively, versus forecast utilization in the 2014 Review of 39 percent. The difference for the North Bay Shortcut is 20 percent estimated versus 28 percent forecast. These differences are reflective of the economic and plentiful natural gas production in the U.S. Northeast.

Prices

With respect to prices, the forecast in the 2015 Update, shown in Figure 5, is significantly lower than that in the 2014 Review. While the 2014 Review forecast Dawn prices in 2020 at \$5.68 per MMBtu, the 2015 Update forecast is 35 percent lower at \$3.67 per MMBtu, increasing to only \$3.72 per MMBtu in 2021. The estimated 2015 price at Dawn in the 2015 Update is \$2.62 per MMBtu, 38 percent lower than the 2014 Review forecast of \$4.25 per MMBtu. These differences are due to estimated improvements in supply (i.e. still plentiful at lower cost), as well as lower estimates of demand.

An indicator of the forecast trend of low prices is that despite current low gas prices, production has not yet peaked. The basis of Dawn to Henry Hub prices is currently slightly positive, with Dawn exceeding Henry prices by about ten cents per MMBtu. In 2021, the forecast is for a reversal to a slight negative basis of about eight cents per MMBtu. The forecast change in the Dawn basis results from the impact of plentiful Marcellus and Utica supplies (available over the expanded infrastructure assumed in the Base Case), as well as the assumed addition of LNG export volumes in the Gulf of Mexico competing for supply. Over the course of the forecast, the average Henry Hub price of \$3.43 per MMBtu exceeds the \$3.41 per MMBtu Dawn average by only two cents per MMBtu.

Figure 5: Projected North American Natural Gas Prices (M-Y 2015)

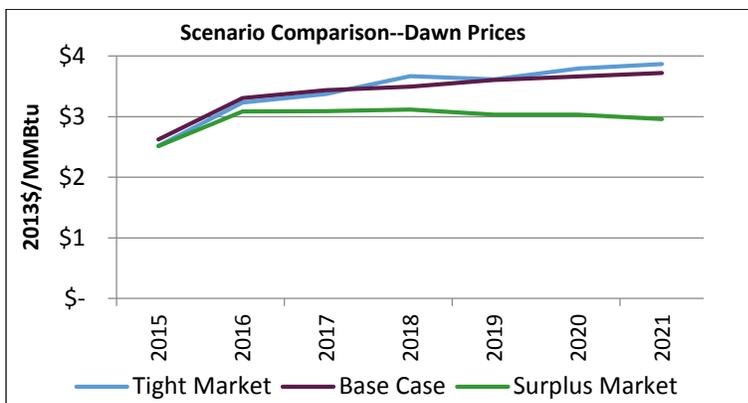


Source: Navigant Mid-Year 2015 Forecast

Scenario Results

Navigant prepared two scenarios, a “Surplus Market” with lower demand and higher supply, and a “Tight Market” with higher demand.¹² Figure 6, below, shows the impact of the scenario assumptions on the forecast natural gas prices at Dawn. The Tight Market case results in prices just slightly higher than the Base Case, with Dawn prices at \$3.87 per MMBtu rather than \$3.72 per MMBtu in 2021. The Surplus Market case, on the other hand, is characterized by prices up to 20 percent lower than the Base Case, as with the 2021 prices of \$2.96 per MMBtu in the Surplus Market case. The greater sensitivity of the Surplus Market case is consistent with the changing of both supply (greater) and demand (lower) assumptions, as opposed to only demand in the Tight Market case, which reflects the reality of natural gas abundance rather than any sort of limitations on supply and production.

Figure 6: Scenario Comparison--Dawn Prices



Source: Navigant Mid-Year 2015 Forecast

¹² See slide 15 of the Forum Presentation.

Conclusions

Natural gas prices in Ontario and the U.S. have been consistently decreasing for the last several years. Continued increased natural gas production, especially in the Marcellus and Utica play in the Northeast U.S., has been instrumental in the current abundance and low prices of North American natural gas.

Navigant's 2015 Update outlook for Ontario to 2021 reflects a stable market environment, with a limited number of metrics showing noticeable changes from the 2014 Review. First, gas demand for electric generation is forecast to increase at a slower rate than in the 2014 Review due to the institution of a carbon market in Ontario. While the more recent forecast is lower, it still reflects an increase in gas-fired generation gas demand, due in part to on-going nuclear refurbishments/retirements, as well as an assumed slowdown in the increase in renewable generation. Until 2020, forecast gas-fired electric generation gas demand lags the forecast in the 2014 Review because of larger assumed increases in near-term renewable generation. Second, Canadian natural gas surplus (after LNG exports) is forecast to be lower in the 2015 Update as additional U.S. shale gas is forecast to move into Eastern Canada, and also displaces Canadian gas supply from U.S. markets.

Navigant's forecast of Dawn prices has dropped significantly, to about \$3.70 per MMBtu in 2021, versus a 2020 forecast in the 2014 Review of about \$5.70 per MMBtu (all in 2013 USD).