

NAVIGANT

ENERGY

Ontario Energy Board

2015 Natural Gas Market Review

Stakeholder Forum

Ontario Energy Board

2300 Yonge Street, 25th Floor

Toronto, Ontario M4P 1E4

West Hearing Room / ADR Room

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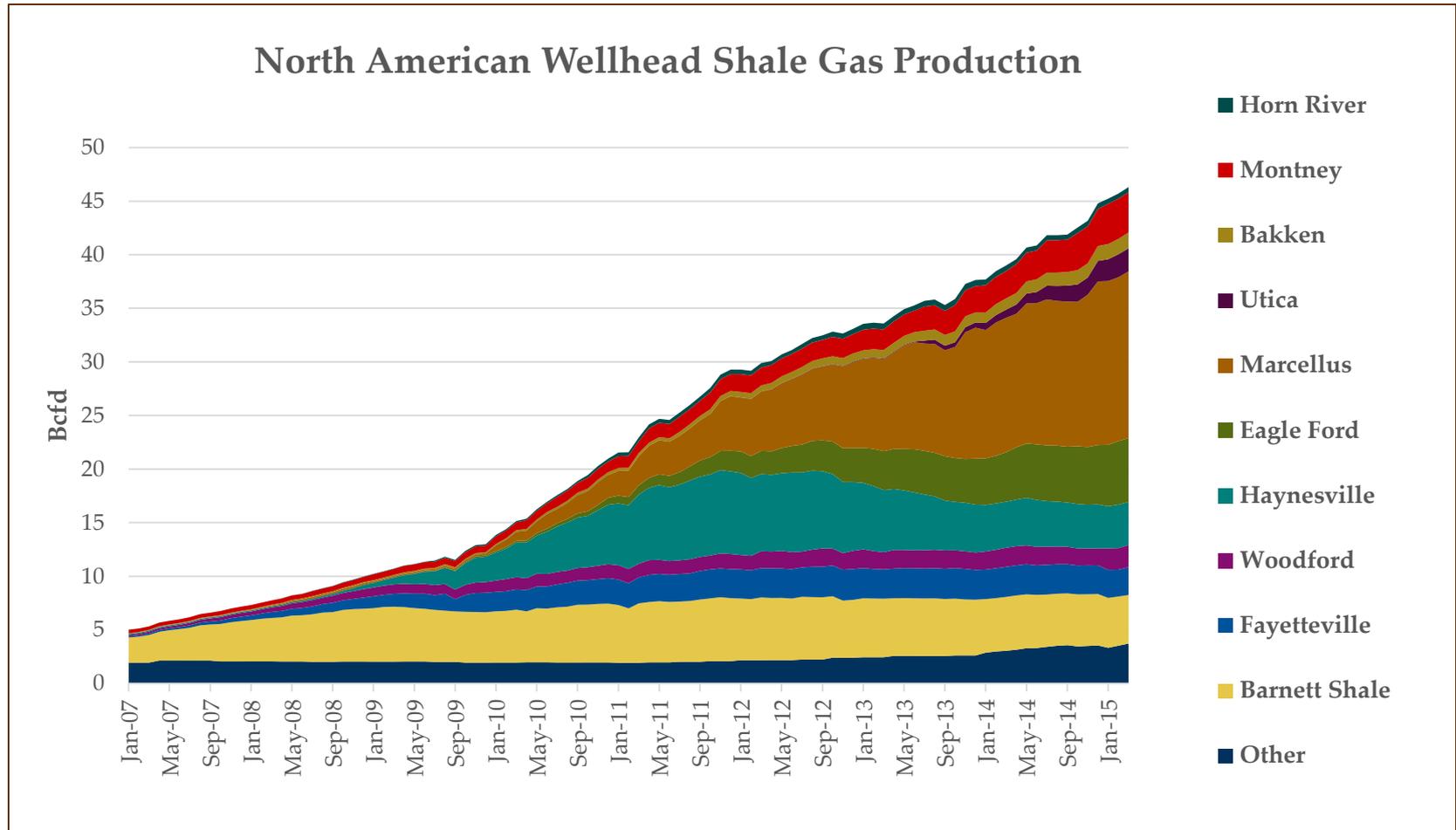
Purpose of Navigant's Engagement

Ontario Energy Board staff engaged Navigant Consulting to prepare a 2015 update of the 2014 Natural Gas Market Review, intended to be a concise update of the changes since the 2014 Review 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.

Many of the following slides present a chart from the 2014 Review, with a revised chart for the 2015 Update and a comparison chart to highlight the differences.

As with the 2014 Review, Navigant has prepared low and high scenarios around the base case. All modeling was performed by Navigant using its proprietary versions of the GPCM gas model. Electric generation gas demand is an input provided by Navigant's proprietary Portfolio Optimization Model. The 2014 Review was based on Navigant's Mid-Year 2014 outlook; the 2015 Update is based on Navigant's Mid-Year 2015 outlook.

The key current trend in the North American natural gas market is the continuing general growth of shale gas production...



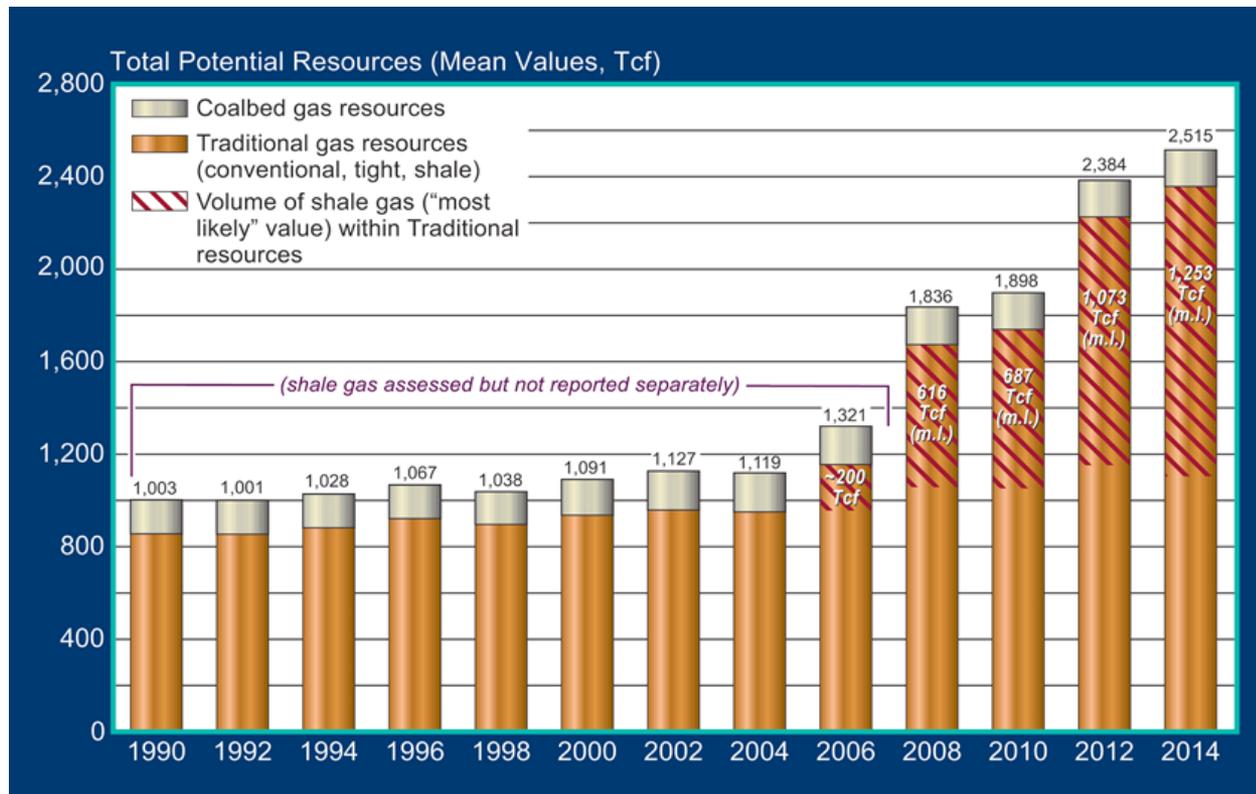
Shale Production Has Increased On Cost Improvements Primarily from Horizontal Drilling

Key Factors to Lower Unit Costs of Production Have Been:

- Proliferation of pad drilling
- Longer laterals
- More efficient 'walkable' rigs
- Advanced completion techniques
- Better fracking 'recipes'
- Better 'geo' intelligence of the resource base
- Lower field service provider costs (e.g. drilling, completion)

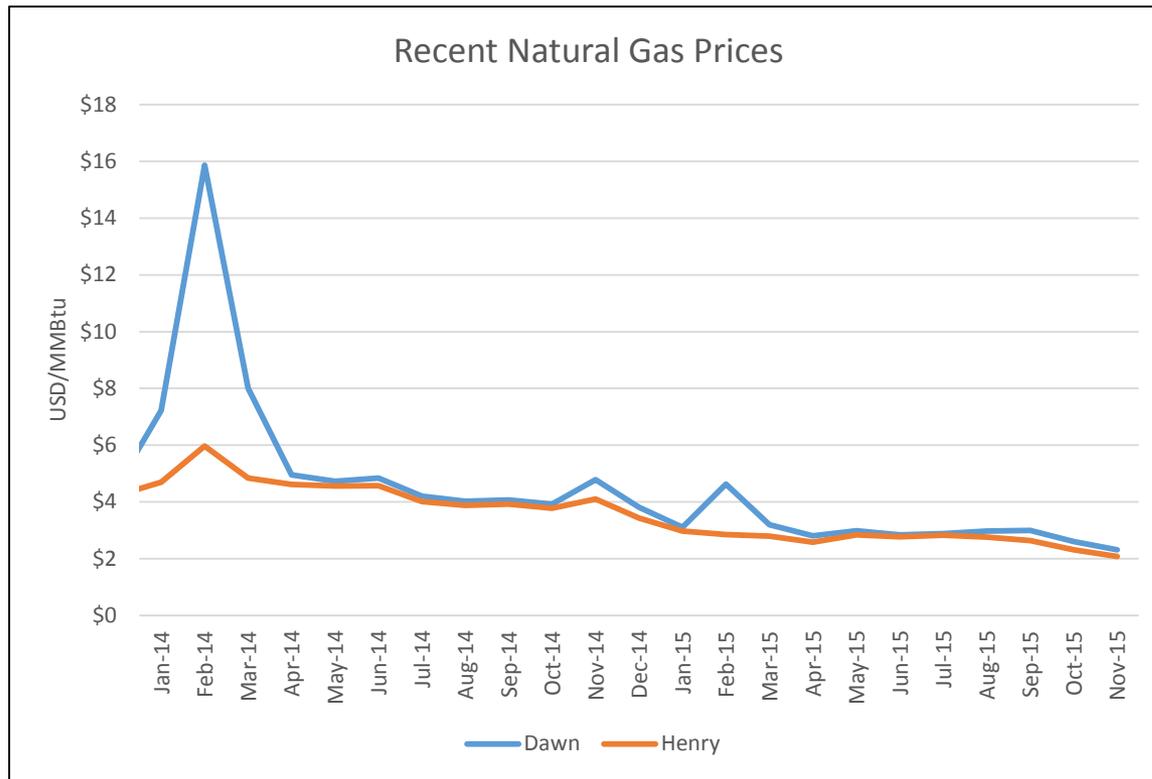
As well as increasing estimates of shale gas resources.

U.S. Natural Gas Resource Estimates by the U.S. Potential Gas Committee



- » Potential Gas Committee 2014 natural gas resource estimates for the U.S. were 1,253 Tcf of shale gas, and a total potential resource of 2,515 Tcf (excluding proved reserves), up 5% from 2012 estimate.

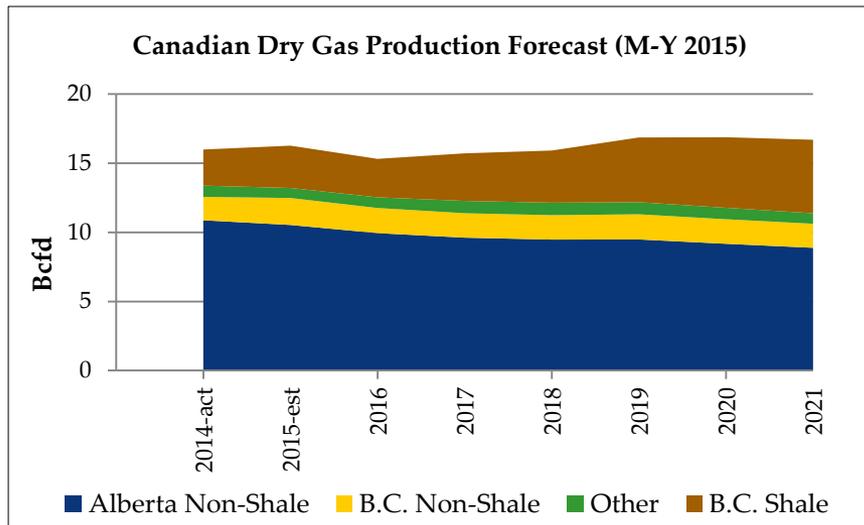
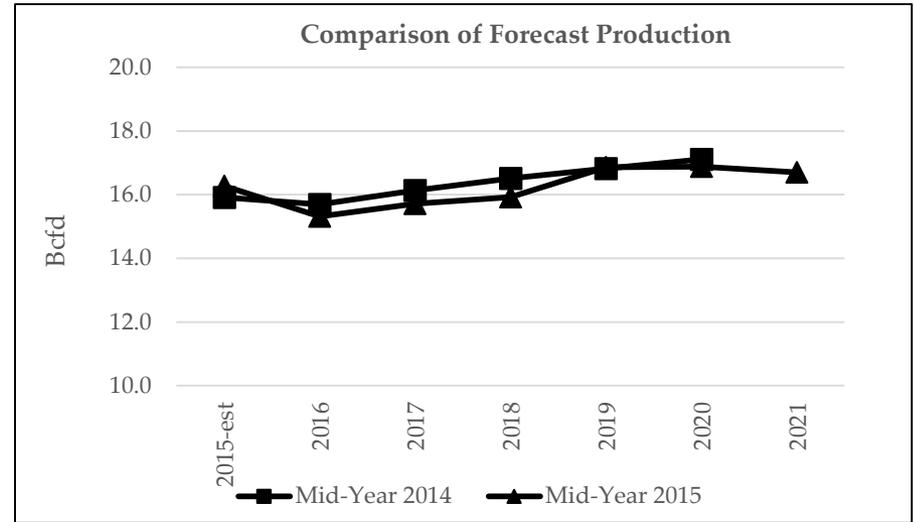
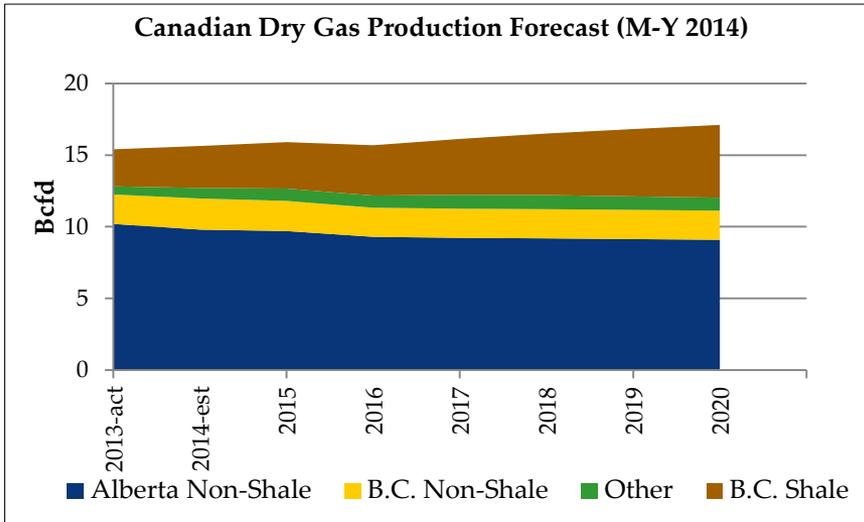
Natural Gas Prices Have Consistently Decreased Since the Polar Vortex of Early 2014



Ontario-Related Market Forecast Modeling Assumptions

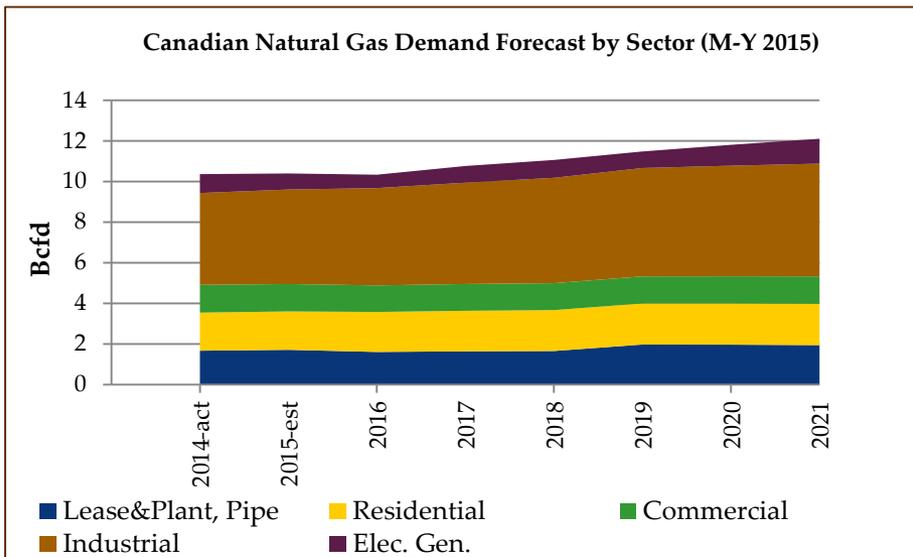
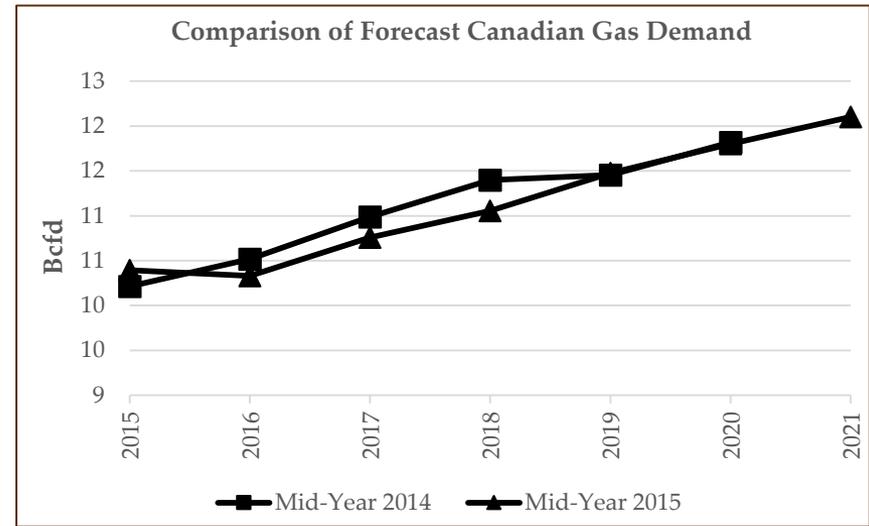
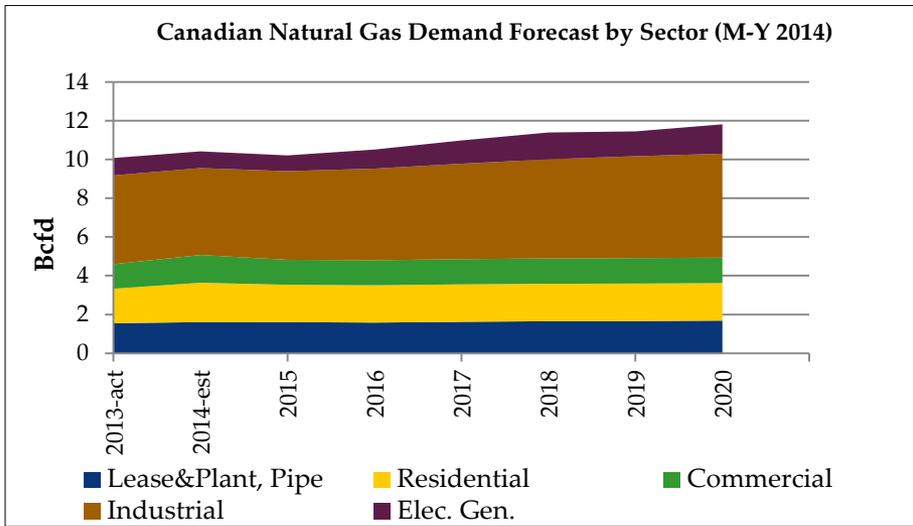
- » **TCPL Mainline Settlement (RH-001-2014)—Rate Increase Included**
- » **TCPL Mainline - Energy East Conversion—Not Included**
- » **TCPL Eastern Mainline Project—Not Included**
- » **TCPL Kings North Project—Not Included**
- » **U.S. Pipelines to Canada:**
 - **Nexus: 750 MMcfd, commencing November 2017**
 - **Rover: 1.3 Bcfd, commencing June 2017**
- » **Ontario Carbon Policy**
 - **Electric generation demand incorporates Ontario joining the California/Quebec carbon market**
- » **East Coast LNG Export Volumes—0.8 Bcfd by 2020**
- » **West Coast Canada LNG Export Timing—2019 online**
- » **West Coast USA LNG Export Timing—2017 online**
- » **Alberta Oil Sands Demand—Reaches 2.6 Bcfd by 2021**
- » **Appalachian Basin Shale Production—Reaches 29.9 Bcfd by 2021**

Canadian gas production forecast trend is lower, flatter.



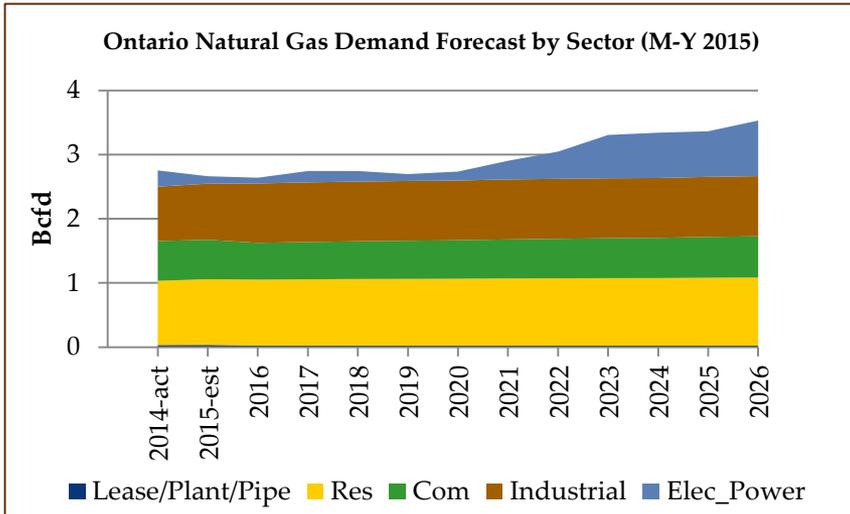
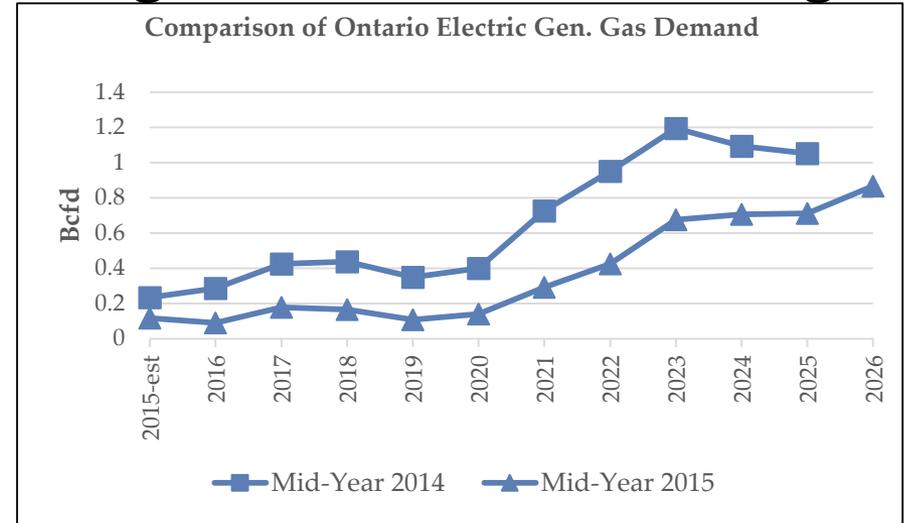
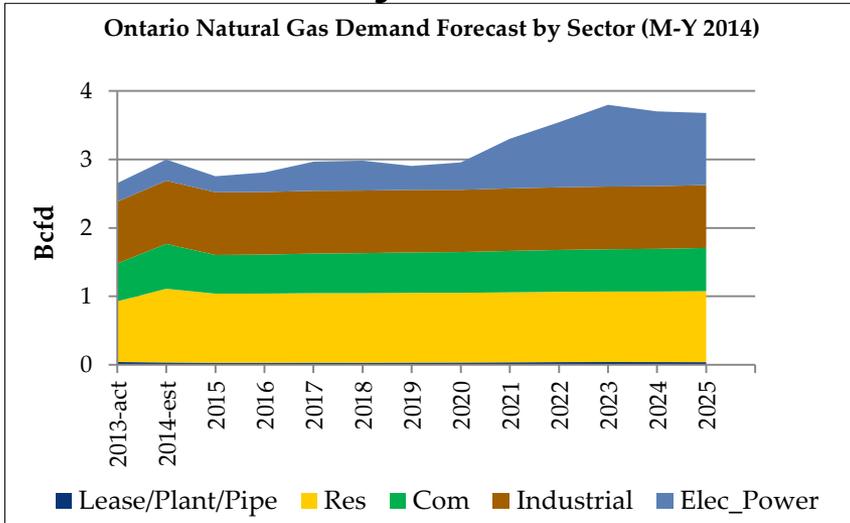
- Note that the 2015 Update charts extend through 2021, while the 2014 Review charts extend through 2020
- The drop in forecast production is primarily reflective of displacement by supplies from the U.S. Northeast.

Forecast Canadian natural gas demand has not changed significantly.



- Demand growth, while less than in our 2014 Forecast, is driven primarily by the industrial sector, represented in large part by the Alberta oil sands.

Forecast Ontario electric generation gas demand is lower, but the out-year trend is increasing rather than decreasing.

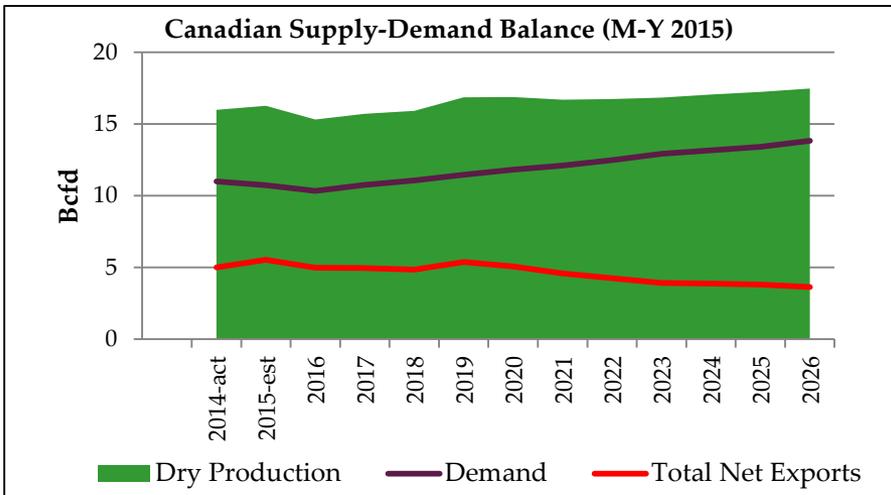
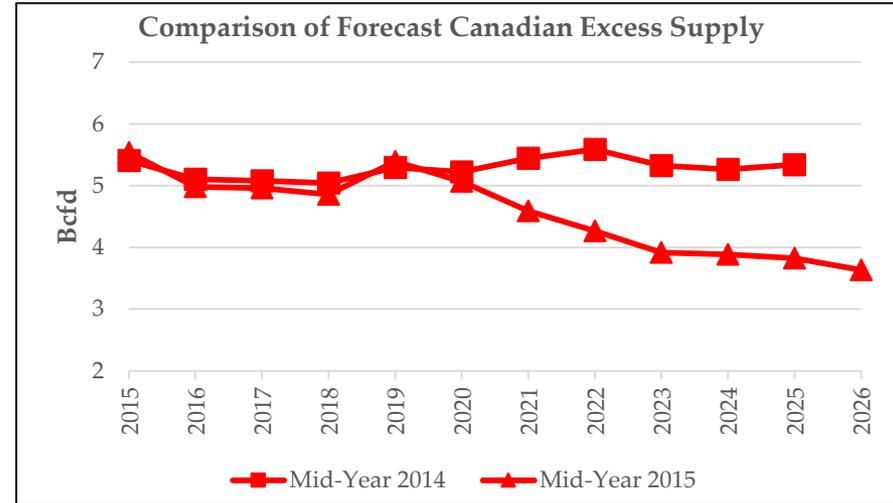
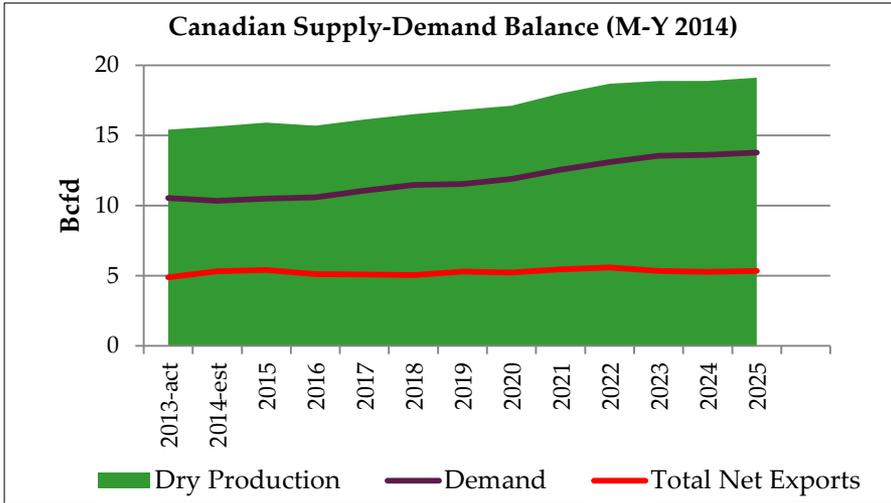


The 2015 Update reflects an interim drop in Ontario electric generation gas demand versus the 2014 Review before the demand ramps up beginning in about 2020, and then a lower increase in demand in the 2015 Update as part of that ramp up.

- The driver for the decrease in gas demand for electric generation in Ontario during 2015-2016 is a large increase in renewable generation at that time.
- The driver for the slower increase in electric generation gas demand after 2020 is the assumption of a carbon market in Ontario. Gas demand still increases, however, due to nuclear retirements and an assumed slowdown in the increase of renewables expansion.

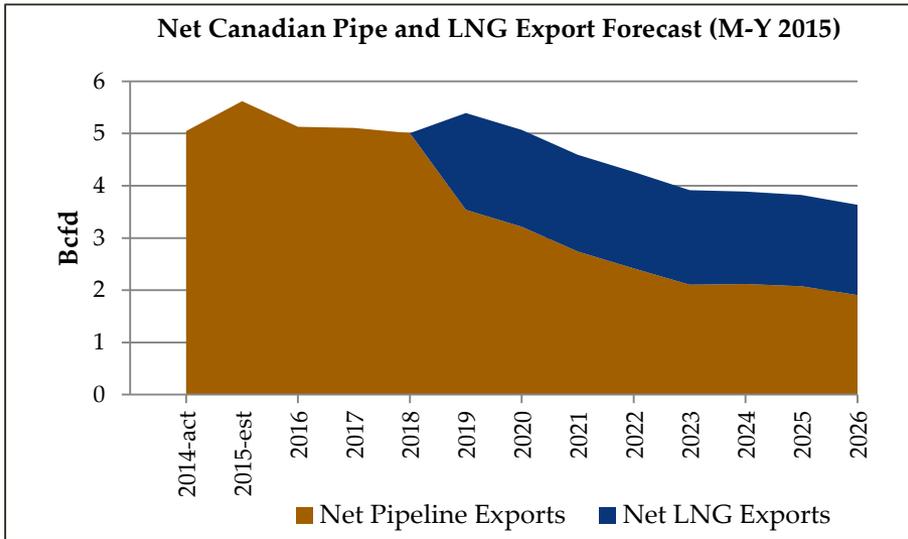
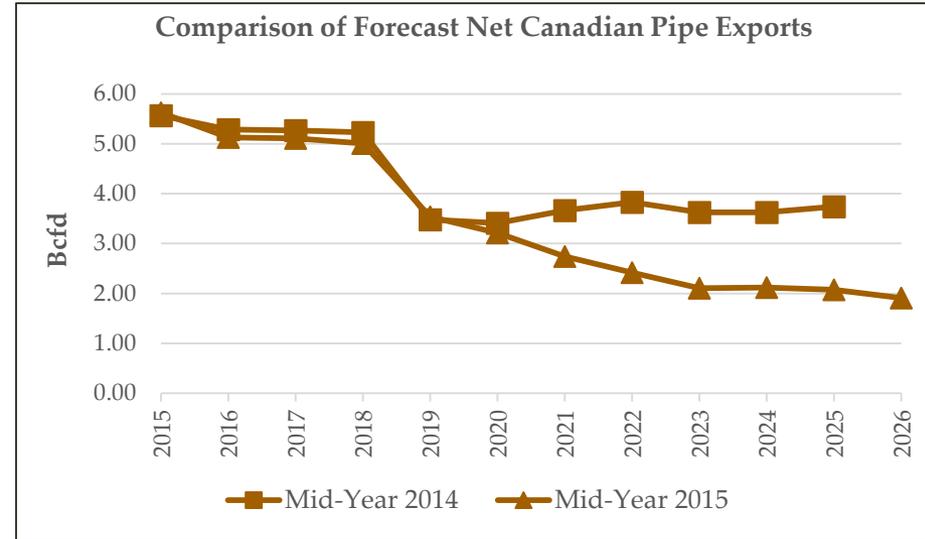
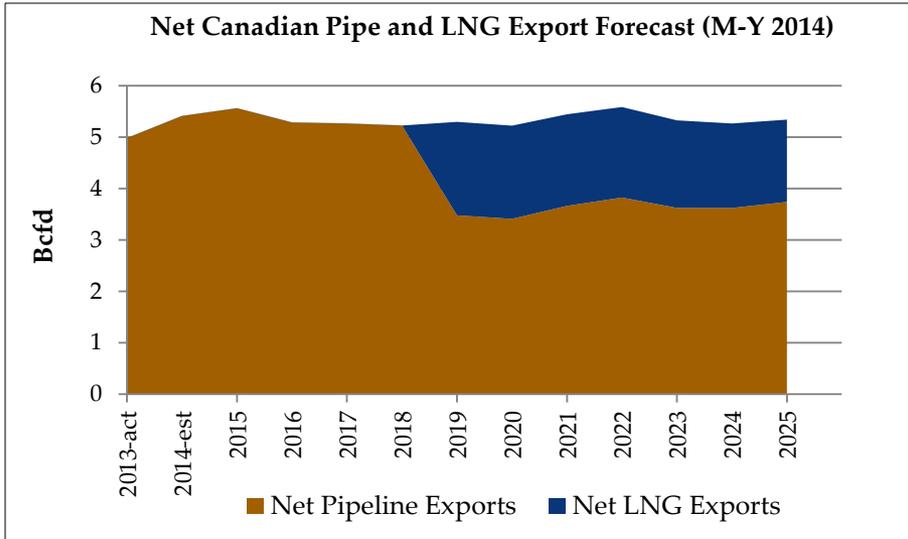
In some cases, as in the comparison chart on this slide, a longer horizon is shown in order to depict relevant information.

The forecast of supply available for exports is declining.



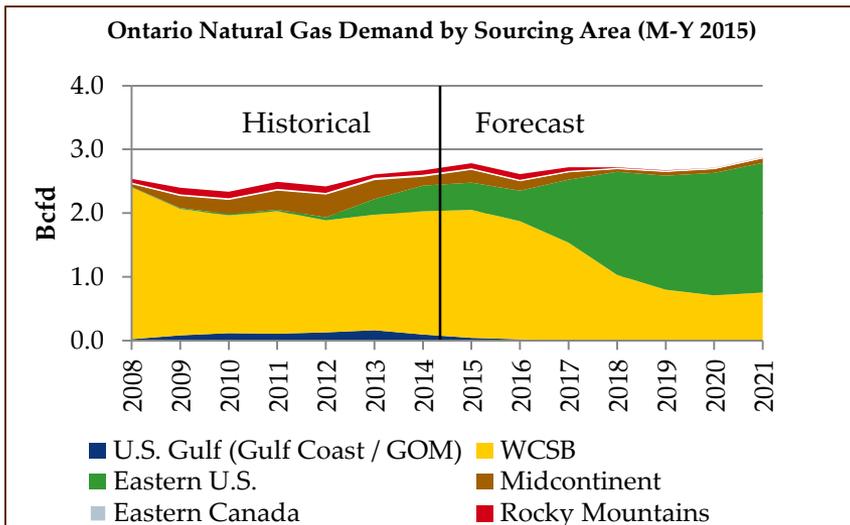
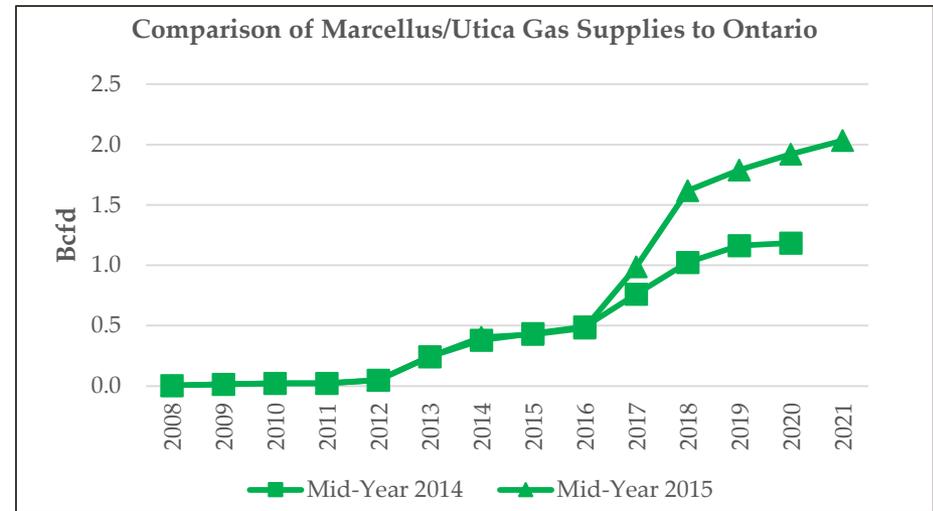
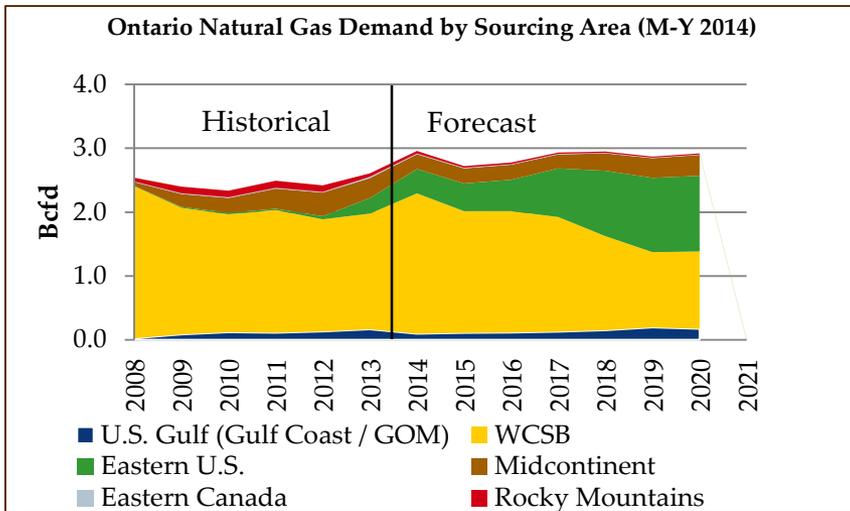
- Total Net Exports represents the surplus of Canadian production beyond Canadian demand.
- The drop in forecast Total Net Exports results from a decrease in production, somewhat mitigated by a decrease in demand.
 - In 2023, excess supply has dropped by about 1.4 Bcfd, corresponding generally to a production decrease of about 2.1 Bcfd, less a demand decrease of about 0.6 Bcfd.

Forecast Canadian pipe exports to the U.S. decrease.



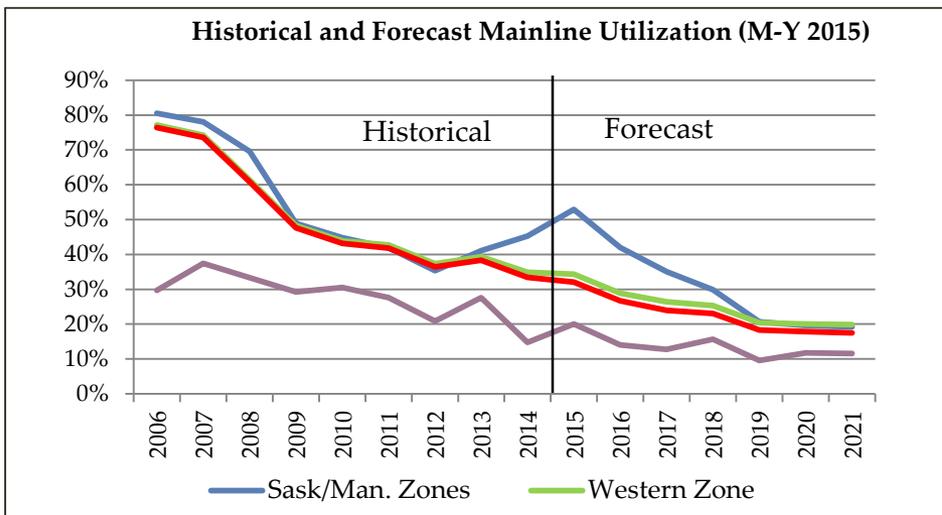
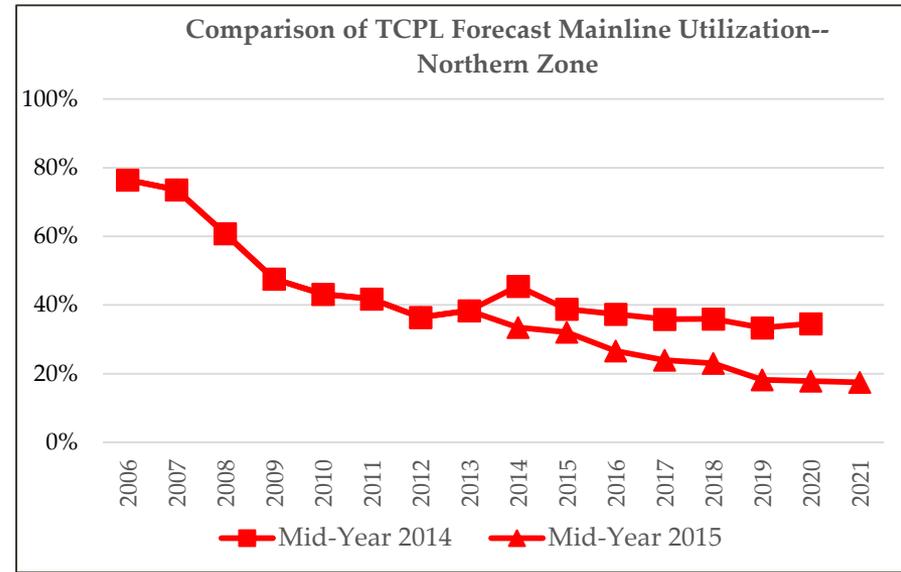
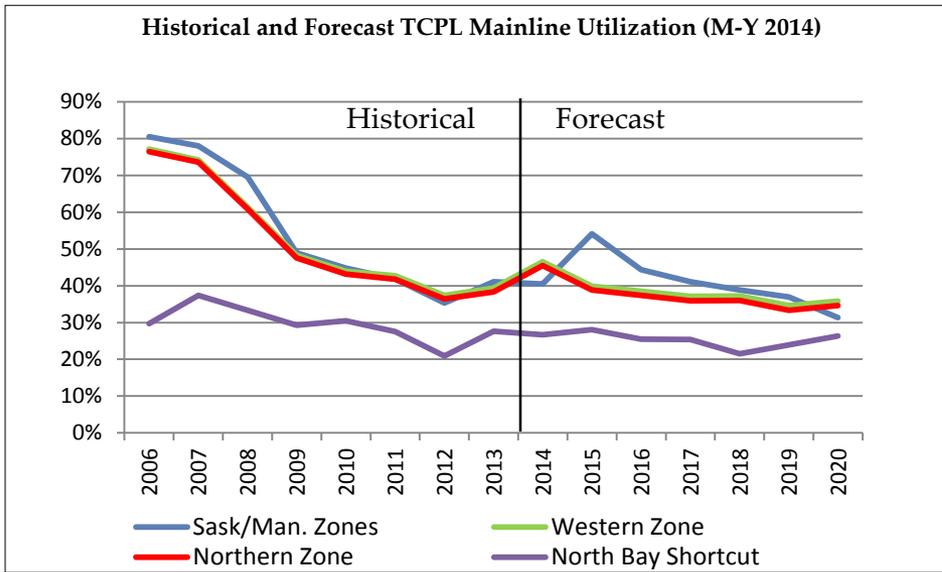
- Key factors contributing to the decrease in pipe exports to the U.S. are the lower Canadian gas production, as well as increases in deliveries of U.S. gas into eastern Canada, as shown on the next slide.

Forecast Marcellus/Utica Supplies to Ontario are higher.



- The 2015 Update has increased the amount of U.S. gas serving Ontario up to ~2 Bcfd in 2021, representing more than 70% of Ontario demand.
- A key component of the change is the addition of the Rover pipeline in the 2015 Update, with capacity of 1.3 Bcfd into Dawn commencing June, 2017.

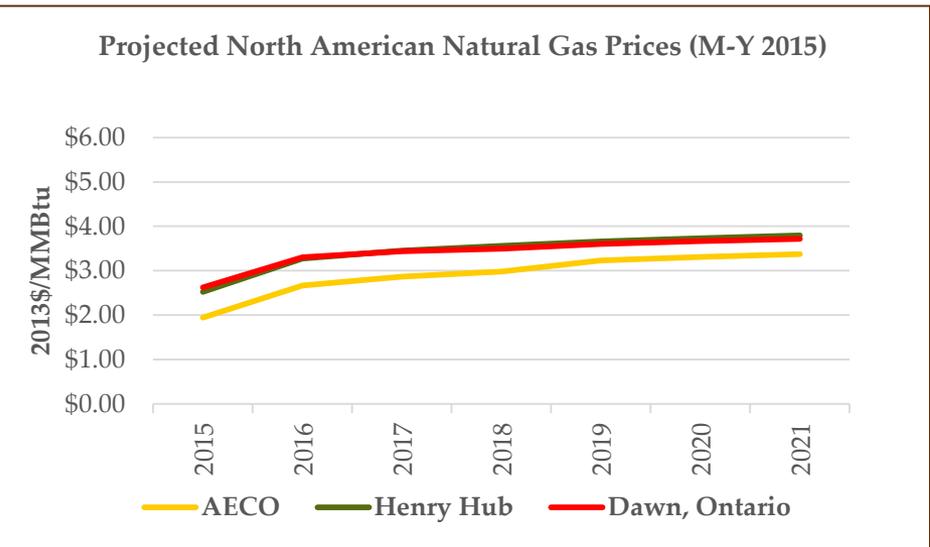
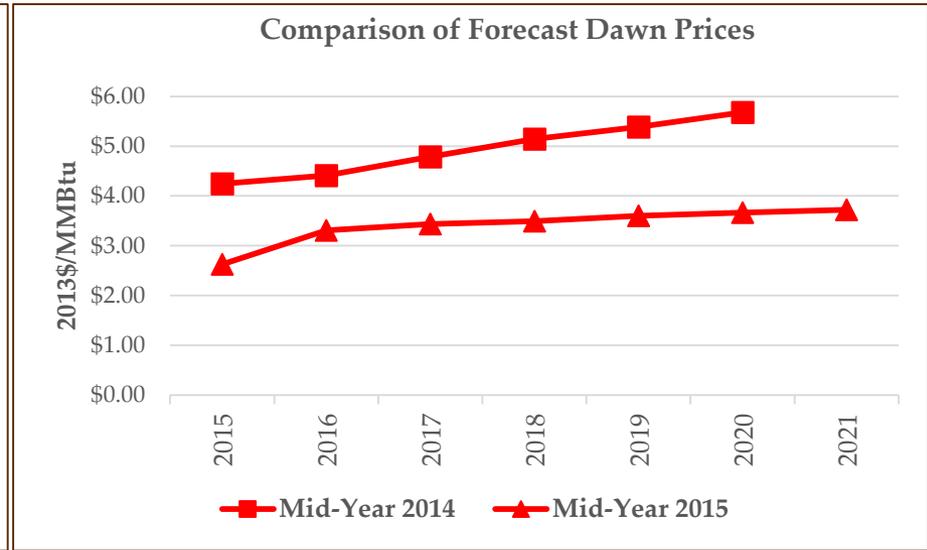
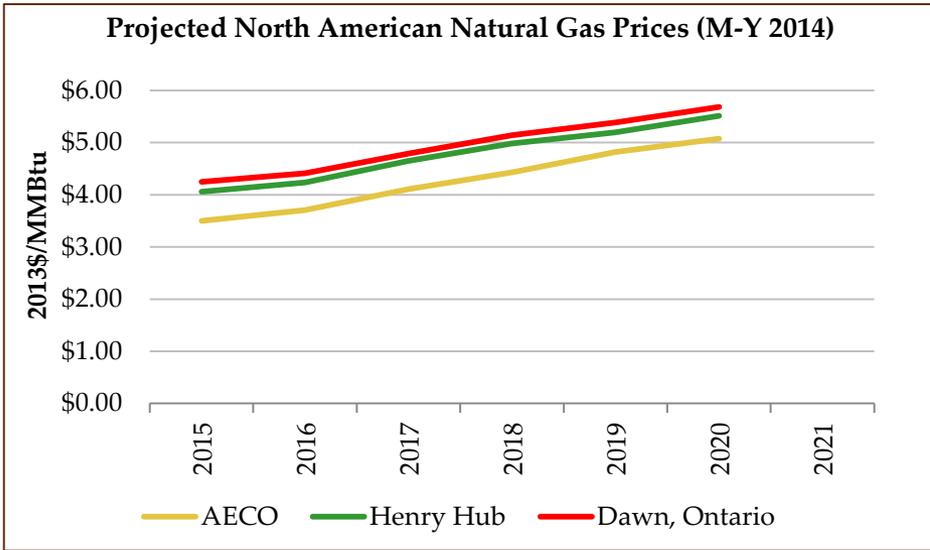
Forecast utilization on the TCPL Mainline shows further declines.



- In keeping with the decrease in WCSB supplies serving Ontario demand as shown on the previous slide, TCPL Mainline utilization shows a continued decreasing trend in the out-years in the 2015 Update versus the 2014 Review.
- Increasing gas-on-gas competition, driven primarily by growing Marcellus and Utica production, have already impacted flows on TCPL, and that process is expected to continue.

Forecast North American gas price trend is flatter, and much lower.

(All prices in 2013 US dollars)



- With weaker demand and stable supplies, North American gas prices are considerably lower in the 2015 Update
- Prices at Dawn stay well under \$4.00 per MMBtu through the forecast period, reaching only \$3.72 per MMBtu in 2021.

2015 Ontario Base Case and Scenario Assumptions

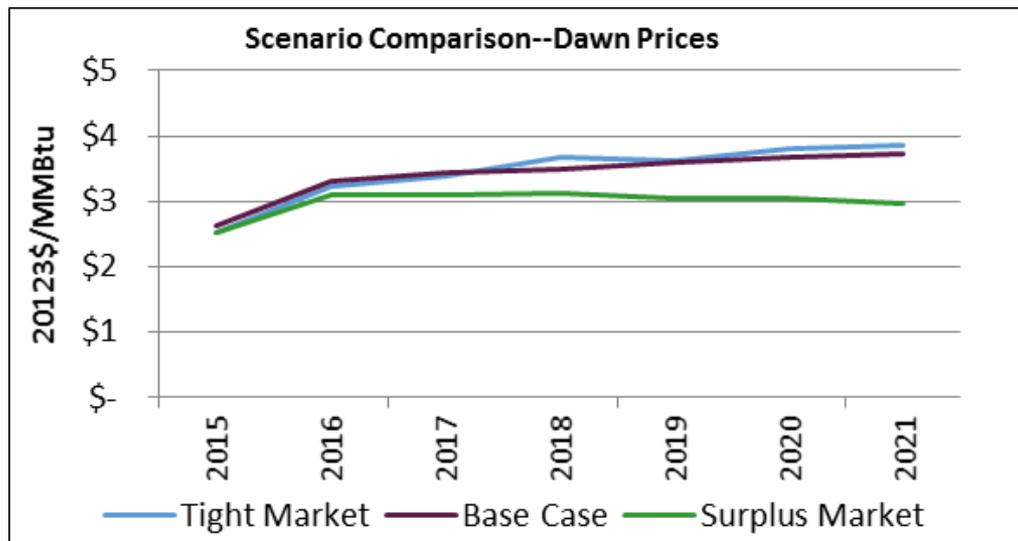
	Base Case	Surplus Market Case (Low Demand/High Supply)	Tight Market Case (Higher Demand)
Mainline Settlement (RH-001-2014)	Rate increase included	Rate increase included	Rate increase included
Energy East Conversion	Excluded	Excluded	Included
East Coast LNG Exports--Volumes	0.8 Bcfd by 2020	0.8 Bcfd by 2020	2.0 Bcfd by 2020
West Coast Canada LNG Exports--Timing	2019 online	2020 online	2018 online
West Coast US LNG Export--Timing	2017 online	2018 online	2017 online
Alberta Oil Sands Gas Demand	Reaches 2.6 Bcfd by 2021	20% below base starting in 2016	20% above base starting in 2016
Marcellus to Dawn Pipelines *	Includes Nexus pipeline at 1 Bcfd (750 MMcfd to Dawn)	Expand Nexus pipeline by an incremental 1 Bcfd	Remove Nexus pipeline as no longer needed given regional demand increases in US Northeast
Appalachian Shale Production	Includes 29.9 Bcfd of production by 2021	Up about 13% by 2021 with new pipeline capacity	No change from Base Case

**The Base and Surplus Market Case include some additional pipeline expansions on National Fuels, Tennessee Pipeline and Niagara as part of the Nexus Pipeline project*

Scenario Results

The results of the Surplus Market and Tight Market cases are summarized as follows:

Case	Dawn, Ontario Prices in 2020 (2013 US\$ per MMBtu)
Surplus Market Case	\$2.96
Base Case	\$3.72
Tight Market Case	\$3.87



Summary of Key Points

- » 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 creating the current abundance and consequent 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.
 - Gas demand for electric generation is forecast to increase, but at a slower rate than in the 2014 Review. This is due to the institution of a carbon market in Ontario.
 - Canadian natural gas surplus (after LNG exports) is forecast to be lower in the 2015 Update as additional U.S. shale gas moves 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).

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