2018

NATURAL GAS VOLUME FORECAST

MARKET FORECAST & LOAD RESEARCH

NOVEMBER 2018

Manitoba Hydro

IMPORTANT:

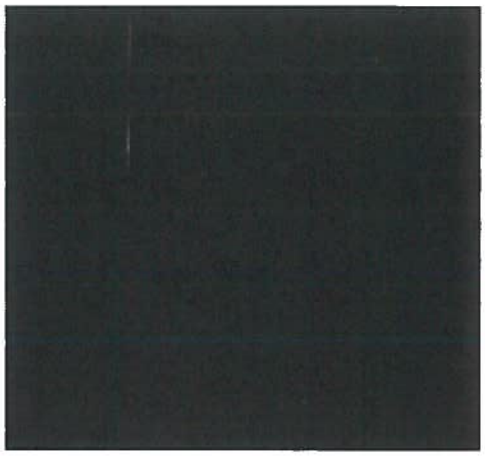
EXECUTIVE SUMMARY

Overview

In 2017/18 Manitoba Hydro had 280,509 natural gas customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3 with the breakdown as follows:

Figure 1 – Actual Volume by Supply Source

Actual Volume by Supply Source
(2017/18)



i. **System Supply Customers** – An average of [redacted] customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3. For their supply, Manitoba Hydro offers two different rate options: Quarterly Service and Fixed Rate Service.

ii. **Western Transportation Service (WTS) Customers** – An average of [redacted] customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3.

iii. **Transportation Service (T-Service) Customers** – A total of [redacted] customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3.

2018/19 – First Year of the Forecast

The 2018/19 forecast is for an average of [redacted] customers with a total volume of [redacted] 10^3m^3. This is a customer [redacted] of [redacted] customers [redacted] from 2017/18 and a volume [redacted] of [redacted] 10^3m^3 [redacted] from the Heating Value and Weather Adjusted actuals in 2017/18.

For the 2018/19 fiscal year, Quarterly Rate customers are forecast to [redacted] customers to [redacted], Fixed Rate customers to [redacted] customers to [redacted] WTS customers to [redacted] customers to [redacted] and T-Service to [redacted] customer to [redacted]

Also for 2018/19, Quarterly Rate volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. Fixed Rate volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. WTS volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. T-Service is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. These are all compared to the 2017/18 Heating Value and Weather Adjusted actuals.

Table 1 – Volume Forecast by Supply Source

Manitoba Hydro Natural Gas Forecast by Supply Source
2008/09 - 2027/28

	System Supply				WTS		T-Service		Total	
	Quarterly Rate		Fixed Rate							
Fiscal Year	Ave Custs	10^3m^3	Ave Custs	10^3m^3	Ave Custs	10^3m^3	Ave Custs	10^3m^3	Ave Custs	10^3m^3
2008/09	[redacted]								261,935	[redacted]
2009/10									263,391	
2010/11									264,978	
2011/12									266,699	
2012/13									268,625	
2013/14									270,953	
2014/15									273,465	
2015/16									275,728	
2016/17									277,899	
2017/18									280,509	
2018/19	[redacted]									
2019/20										
2020/21										
2021/22										
2022/23										
2023/24										
2024/25										
2025/26										
2026/27										
2027/28										

Note: Historical Values re Heating Value and Weather Adjusted

Demand Side Management (DSM) in the Forecast

This forecast reflects future energy savings arising from future DSM natural gas offerings and market engagement as outlined in Manitoba Hydro's DSM Plan. Savings due to DSM programs to date are embedded in the historical data that is the basis for this forecast. The current level of past achieved DSM savings is assumed to remain in place throughout the future. Program-based DSM energy savings reduces total sales volume in 2027/28 from [redacted] 10^3m^3 to [redacted] 10^3m^3.

Figure 2 – Natural Gas Volume Forecast

2018 Natural Gas Volume Forecast
Volume (10^3m^3)

[redacted]

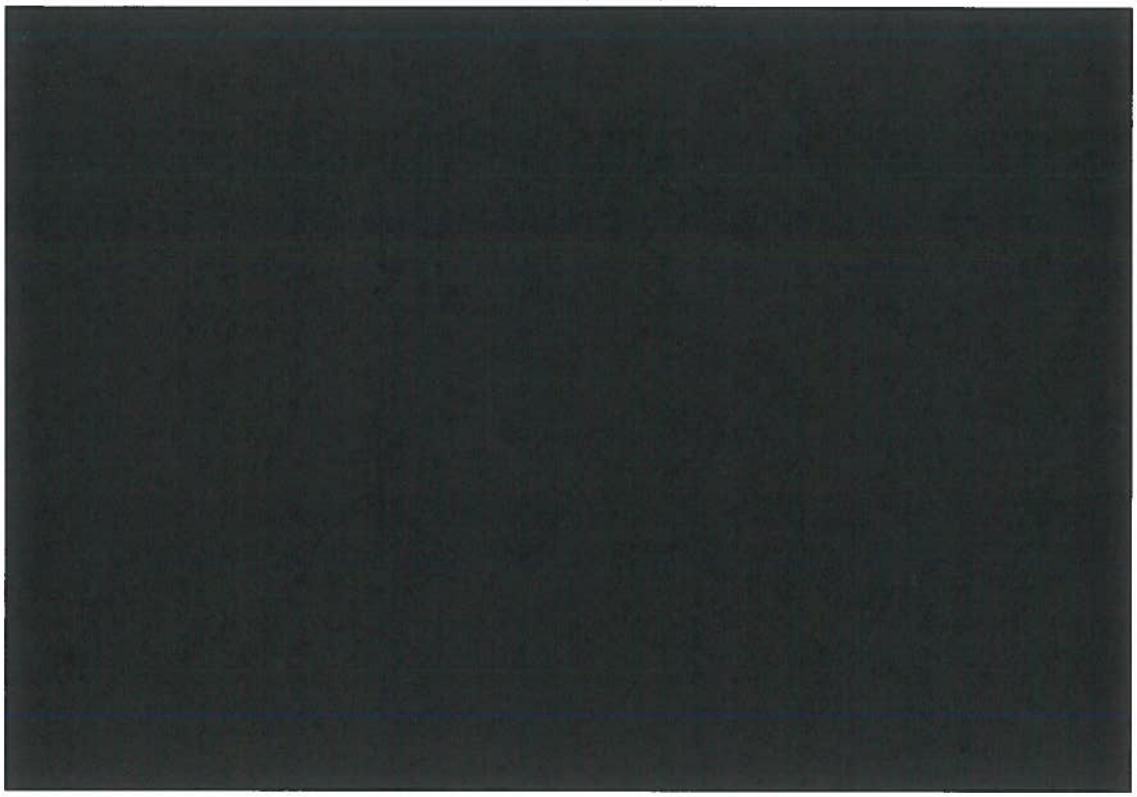
Comparison of the 2017 to the 2018 Forecast

For 2018/19, the forecast of customers is [redacted] than previously forecast in the 2017 Natural Gas Volume forecast. In 2017/18, [redacted] SGS Residential customers selected Manitoba Hydro's Quarterly service over the WTS service than projected in the 2017 forecast. As such, the 2018 forecast was updated accordingly with the forecast for SGS Residential Quarterly customers [redacted] and the SGS Residential WTS customers [redacted] for 2018/19. For 2018/19, the forecast of volume is [redacted] 10^3m^3 [redacted] than previously forecast in the 2017 Natural Gas Volume forecast and primarily attributable to the actuals being slightly [redacted] in the SGS Residential, SGS Commercial and LGS sectors than projected [redacted] the 2017 forecast.

By 2027/28, the 2018 forecast of [redacted] customers represents a [redacted] customers compared to the 2017 forecast of [redacted] customers, with the volume forecast [redacted] 10^3m^3 [redacted] than previously forecast in the 2017 Natural Gas Volume forecast.

Figure 3 – Change of Natural Gas Volume Forecast

Comparison of 2017 to 2018 Forecast
Volume (10^3m^3)



Volume Variability

Variability due to economic/year-to-year variation is estimated to be [redacted] in the first year of the forecast, and [redacted] in the second year of the forecast. This represents the best level of accuracy possible within the gas volume forecast.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

INTRODUCTION

This document is prepared annually as Manitoba Hydro's forecast of its future natural gas volume requirements for its service area. Centra Gas Manitoba Incorporated is a wholly owned subsidiary of Manitoba Hydro that oversees the natural gas distribution operations of Manitoba Hydro. Centra's rates and terms of service are regulated by the Manitoba Public Utilities Board. This document will refer to "Manitoba Hydro" rather than "Centra".

This forecast reflects future energy savings arising from future DSM natural gas offerings and market engagement as outlined in Manitoba Hydro's DSM Plan. In addition, this document only addresses volumetric sales at the customers' gas meters. It does not consider Unaccounted For Gas (UFG), which is made up of losses due to leakage and accounting discrepancies due to billing cycles, meter inaccuracies and adjustments.

Customer sales are measured by volume. The unit of measurement is cubic meters (m^3) and this document forecasts customer sales in thousands of cubic meters (10^3m^3). An average Small General Service Residential natural gas customer uses [redacted] m^3 of natural gas per year.

Natural gas is purchased from suppliers as an amount of energy measured in gigajoules (GJ). Customers are billed in terms of volume measured in cubic meters (m^3). The heating content of the gas can vary, and in order to allow the volumes to be comparable on an energy basis, the historic billed volumes are adjusted to a heating value of [redacted] $GJ/10^3m^3$.

[redacted]

The fiscal year in this document encompasses the April through March period that corresponds to Manitoba Hydro's fiscal year. This differs from the natural gas year, used for gas purchasing, which runs from November to October. A "month" in this document refers to the actual calendar month. Customer billing periods have been adjusted in both the history and forecast to correspond to the calendar months.

The service area includes all natural gas consumers in Manitoba. Manitoba Hydro natural gas customers are classified into the following rate classes:

General Service Class Customers

- Small General Service Class (SGS) are residential (SRES) and small commercial (SCOM) customers with an annual volume of less than 15,000 m^3 per year.
- Large General Service Class (LGS) are medium-sized commercial and industrial customers (and a few large residential customers) with annual consumption greater than 15,000 m^3 and less than 680,000 m^3.

Top Consumers

- High Volume Firm Class (HVF) are commercial and industrial customers where annual consumption exceeds 680,000 m^3.

- Mainline Firm Class (MLF) are commercial and industrial customers where annual consumption exceeds 680,000 m^3 and where the customer is served directly from the Company's transmission system or through dedicated distribution facilities at high pressure.

- Interruptible Class (INT) are commercial and industrial customers where annual consumption must exceed 680,000 m^3, and elect to allow their service to be interrupted upon notice.

Special Rates

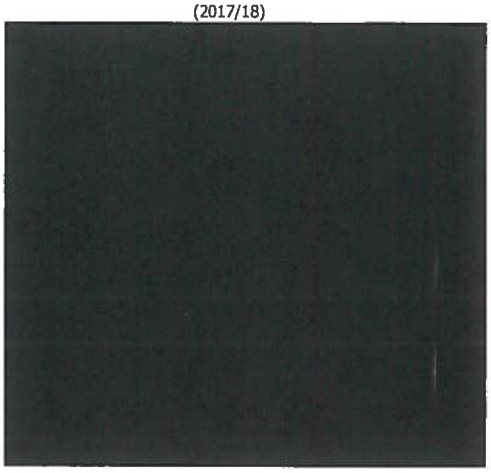
- Power Stations Class (PS) includes [redacted]

- Special Contract (SPEC) is [redacted]

2017/18 – Actuals

In 2017/18, Manitoba Hydro had 280,509 natural gas customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3.

Figure 4 – Actual Volume by Customer



General Service Residential (SRES)

- During 2017/18 there were an average of [redacted] General Service Residential (SRES) customers who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.

General Service Commercial (SCOM) & LGS

- During 2017/18 there were an average of [redacted] General Service Commercial (SCOM) customers who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.
- During 2017/18 there were an average of [redacted] Large General Service (LGS) customers who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.

Top Consumers

- During 2017/18 there were an average of [redacted] High Volume Firm (HVF) customers who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.
- During 2017/18 there were an average of [redacted] Mainline Firm (MLF) customers who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.
- During 2017/18 there were an average of [redacted] Interruptible (INT) customers who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.

Special Rates

- During 2017/18 there were [redacted] customers in the Power Stations Class (PS) who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.
- During 2017/18 there was [redacted] Special Contract (SPEC) customer who used a Heating Value and 10^3m^3 Weather Adjusted volume of [redacted] 10^3m^3.

Table 2 – 2017/18 Average Customers

2017/ 18 Average Customers by Class Actuals					
	Quarterly Rate	Fixed Rate	WTS	T-Service	Total
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
Power S					
Special Contract					
Total					280,509

Table 3 – 2017/18 Volume

2017/18 Volume by Class (10^3m^3) Heating Value and Weather Adjusted Actuals					
	Quarterly Rate	Fixed Rate	WTS	T-Service	Total
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
less C					
Power Stations					
Special Contract					
Total					

Table 4 – 2017/18 Average Use

2017/18 Average Use per Customer (m^3/yr) Heating Value and Weather Adjusted Actuals					
	Quarterly Rate	Fixed Rate	WTS	T-Service	Overall
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
Power Stations					
Special Contract					
Overall					

Manitoba Hydro natural gas customers have the opportunity to select their primary gas supplier and the three options available to customers are:

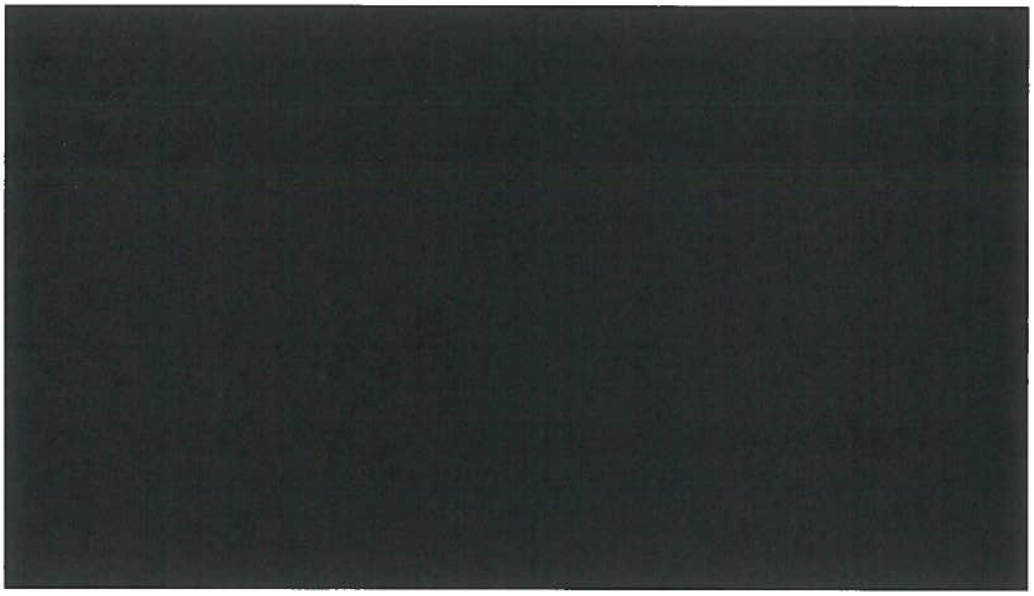
System Supply is the service where Manitoba Hydro's purchases the primary gas for the customer. During 2017/18 there were an average of [redacted] System Supply customers who used a Heating Value and Weather Adjusted of [redacted] 10^3m^3. Manitoba Hydro has two different rate options for their supply: a Quarterly service, and a Fixed Rate service.

Western Transportation Service (WTS) is the service where a broker purchases the primary gas for a customer. Manitoba Hydro bills customers on behalf of the broker and remits the primary gas charges to the broker. During 2017/18 there were an average of [redacted] WTS customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3.

Transportation Service is the service where customers purchase their own primary gas and Manitoba Hydro does not bill the customer for the primary gas. During 2017/18 there were [redacted] Transportation Service customers who used a Heating Value and Weather Adjusted volume of [redacted] 10^3m^3.

Figure 5 – Actual Volume by Supply Source

Actual Volume by Supply Source
(2017/18)



FORECAST OVERVIEW

2018/19 – First year of the forecast

The 2018/19 forecast is for an average of [redacted] customers with a total volume of [redacted] 10^3m^3. This is a customer [redacted] of [redacted] customers [redacted] from 2017/18 and a volume [redacted] of [redacted] 10^3m^3 [redacted] from the Heating Value and Weather Adjusted actuals in 2017/18.

For the 2018/19 fiscal year, Quarterly Rate customers are forecast to [redacted] customers to [redacted] Fixed Rate customers to [redacted] customers to [redacted] WTS customers to [redacted] customers to [redacted] and T-Service to [redacted] customer to [redacted]

Also for 2018/19, Quarterly Rate volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. Fixed Rate volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. WTS volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. T-Service is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3. These are all compared to the 2017/18 Heating Value and Weather Adjusted actuals.

The average use of SGS Residential customers is forecast to [redacted] m^3/year [redacted] to [redacted] m^3/year. The average use of SGS Residential Fixed Rate customers are forecast to be the same as SGS Residential Quarterly Rate customers at [redacted] m^3/year, but SGS Residential WTS customers are [redacted] usage customers on average and are forecast to use [redacted] at [redacted] m^3/year.

The average use of SGS Commercial customers is forecast to [redacted] m^3/year [redacted] to [redacted] m^3/year. The average use of SGS Commercial Quarterly and Fixed Rate customers are both forecast to be [redacted] m^3/year and SGS Commercial WTS customers are forecast to be [redacted] at [redacted] m^3/year.

The average use of LGS customers is forecast to [redacted] m^3/year [redacted] to [redacted] m^3/year. The average use of LGS Quarterly and Fixed Rate customers are both forecast to be [redacted] m^3/year and LGS WTS customers are forecast to be [redacted] at [redacted] m^3/year.

Table 5 – 2018/19 Average Customers by Class

2018/19 Average Customer by Class 2018 Forecast	Quarterly Rate	Fixed Rate	WTS	T-Service	Total
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
Power Stations					
Special Contract					1
Total	[redacted]				

Table 6 - 2018/19 Volume by Class

2018/19 Volume by Class (10^3m^3) 2018 Forecast	Quarterly Rate	Fixed Rate	WTS	T-Service	Total
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
less Curtailed Int					
Power Stations					
Special Contract					
Total					

Table 7 – 2018/19 Average Use Per Customer

2018/19 Average Use per Customer (m^3/yr) 2018 Forecast	Quarterly Rate	Fixed Rate	WTS	T-Service	Overall
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
Power Stations					
Special Contract					
Overall					

2019/20 – Second year of the forecast

The 2019/20 forecast is for an average of [redacted] customers with a total volume of [redacted] 10^3m^3. This is a customer [redacted] of [redacted] customers [redacted] from the 2018/19 forecast and a volume [redacted] of [redacted] 10^3m^3 [redacted] from the 2018/19 forecast.

Quarterly Rate customers are forecast to [redacted] customers to [redacted] in 2019/20, Fixed Rate customers to [redacted] customers to [redacted] in 2019/20, WTS customers to [redacted] customers to [redacted] in 2019/20, with [redacted] in T-Service in 2019/20. These are all compared to the 2018/19 forecast year.

Quarterly Rate volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3 in 2019/20. Fixed Rate volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3 in 2019/20. WTS volume is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3 in 2019/20. T-Service is forecast to [redacted] 10^3m^3 [redacted] to [redacted] 10^3m^3 in 2018/19. These are all compared to the 2018/19 forecast year.

The 2019/20 SGS Residential customer average use forecast is [redacted] m^3/year [redacted] to [redacted] m3/year. [redacted]

The 2019/20 average use is forecast to be [redacted] m^3/year for SGS Commercial customers and [redacted] m^3/year for LGS customers. [redacted]

Table 8 – 2019/20 Average Customers by Class

2019/20 Average Customer by Class 2018 Forecast					
	Quarterly Rate	Fixed Rate	WTS	T-Service	Total
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
Power Stations					
Special Contract					
Total					

Table 9 – 2019/20 Volume by Class

2019/20 Volume by Class (10^3m^3) 2018 Forecast					
	Quarterly Rate	Fixed Rate	WTS	T-Service	Total
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
less Curtailed Int					
Power Stations					
Special Contract					
Total					

Table 10 – 2019/20 Average Use Per Customer

2019/20 Average Use per Customer (m^3/yr) 2018 Forecast					
	Quarterly Rate	Fixed Rate	WTS	T-Service	Overall
SGS Residential	[redacted]				
SGS Commercial					
LGS					
High Volume Firm					
Mainline Firm					
Interruptible Sales					
Power Stations					
Special Contract					
Overall					

Comparison of the 2017 Forecast to the Actuals

There were [redacted] customers in 2017/18 than forecast. There were [redacted] in the SGS Residential group and [redacted] in the combined SGS Commercial and LGS groups. Each year, some LGS customers are expected to qualify as SGS Commercial when their consumption reduces. [redacted] customers than expected switched from LGS to SGS Commercial during 2017/18 so the number of LGS customers was [redacted] than forecast and the number of SGS Commercial customers was [redacted] than forecast.

The number of WTS customers was [redacted] than forecast and the number of Quarterly Rate customers was [redacted] than forecast as [redacted] customers selected Manitoba Hydro's quarterly rate [redacted] WTS than forecast.

The Heating Value and Weather Adjusted actual volume for 2017/18 was [redacted] 10^3m^3 [redacted] than forecast. [redacted] groups.

Excluding Power Stations and Special Contract, whose forecasts are based on their 3-year historic average, the total Heating Value and Weather Adjusted actual volume was [redacted] 10^3m^3 or [redacted] than forecast. The largest differences were in the [redacted] group that used [redacted] 10^3m^3 [redacted] than forecast, the [redacted] group that used [redacted] 10^3m^3 [redacted] than forecast, and the [redacted] group that used [redacted] 10^3m^3 [redacted] than forecast.

Table 11 – 2017 Forecast Compared to the Actuals

2017 Forecast Compared to Actuals						
	2017/18 Average Customers			2017/18 Volume (10^3m^3)		
	Actual	Forecast	Act - Fcst	Actual	Forecast	Act - Fcst
SRES	[redacted]					
SCOM						
LGS						
HVF						
MLF						
INT						
PS						
SPEC						
TOTAL	280,509					
SRES-S						
SCOM-S						
LGS-S						
HVF-S						
MLF-S						
INT-S						
CUR						
TOTAL-S						
SRES-F						
SCO						
LGS-F						
TOTAL-F						
SRES-W						
SCOM-W						
LGS-W						
HVF-W						
MLF						
INT-W						
CUR						
TOTAL-W						
HVF-T						
MLF-T						
INT-						
PS-T						
SPEC-T						
TOTAL-T						

Changes between the 2017 and 2018 Forecasts

For 2018/19, the forecast of customers is [redacted] than previously forecast in the 2017 Natural Gas Volume forecast. In 2017/18, [redacted] SGS Residential customers selected Manitoba Hydro's Quarterly service [redacted] the WTS service than projected in the 2017 forecast. As such, the 2018 forecast was updated accordingly with the forecast for SGS Residential Quarterly customers [redacted] and the SGS Residential WTS customers [redacted] for 2018/19. For 2018/19, the forecast of volume is [redacted] 10^3m^3 [redacted] than previously forecast in the 2017 Natural Gas Volume forecast and primarily attributable to the actuals being slightly [redacted] in the SGS Commercial and LGS sectors than projected [redacted] the 2017 forecast.

By 2027/28, the 2018 forecast of [redacted] customers represents a [redacted] of [redacted] customers compared to the 2017 forecast of [redacted] customers, with the volume forecast [redacted] 10^3m^3 [redacted] than previously forecast in the 2017 Natural Gas Volume forecast.

Figure 6 – Change of Natural Gas Volume Forecast

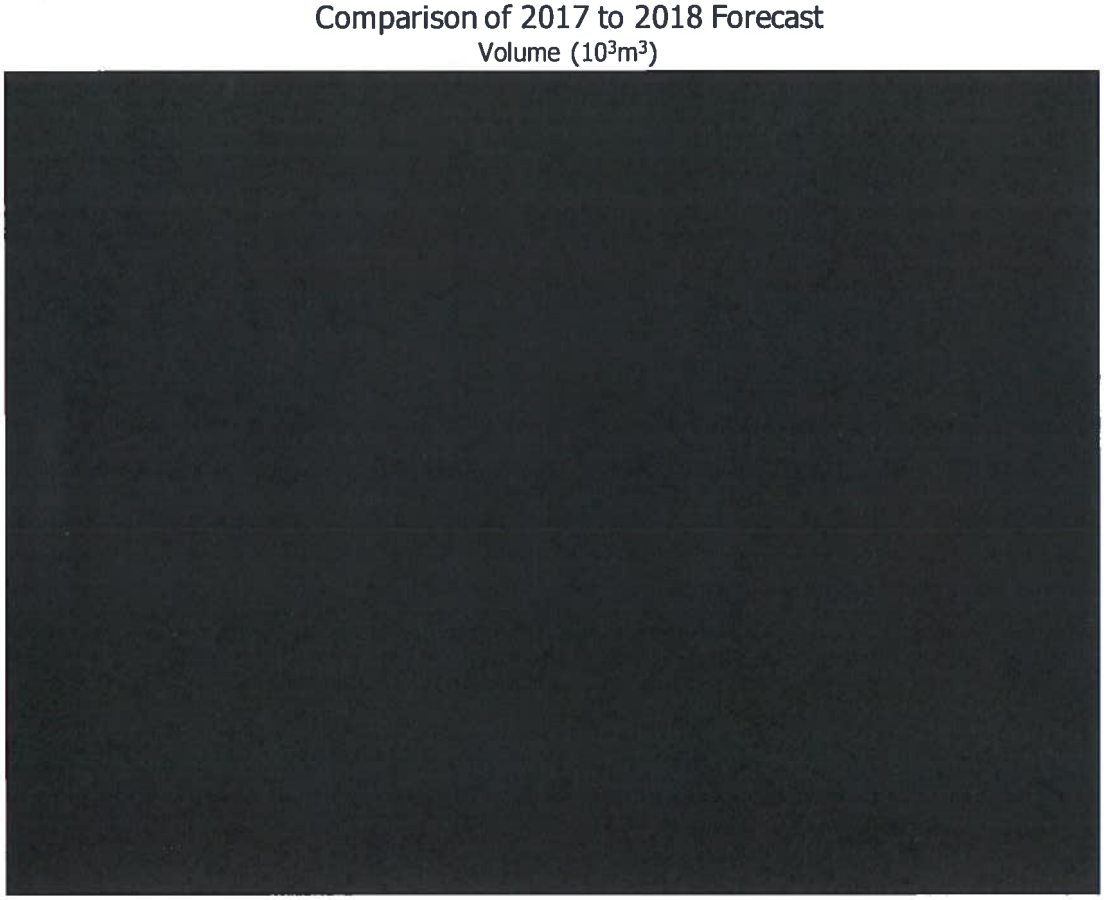


Table 12 – Changes between the 2017 and 2018 Forecast

Change between the 2017 and 2018 Forecast						
	2018/19 Average Customers			2018/19 Volume (10^3m^3)		
	2018 Fcst	2017 Fcst	Change	2018 Fcst	2017 Fcst	Change
SRES	[redacted]					
SCOM						
LGS						
HVF						
MLF						
INT						
PS						
SPEC						
TOTAL						
SRES-S						
SCOM-S						
LGS-S						
HVF-S						
MLF-S						
INT-S						
CURT-S						
TOTAL-S						
SRES-F						
SCO						
LGS-F						
TOTAL-F						
SRES-W						
SCOM-W						
LGS-W						
HVF-W						
MLF-						
INT-W						
CUR						
TOTAL-W						
HVF-T						
MLF-T						
INT-						
PS-T						
SPEC-T						
TOTAL-T						

FORECAST DETAILS

SGS Residential

SGS Residential (SRES) includes the residential customer class portion of the Small General Service (SGS) rate class. This is made up of dwellings that are directly billed by Manitoba Hydro for their natural gas use.

Excluded are multi-family gas heated dwellings (multiplexes, townhouses and apartments) where the individual residential units are not directly billed by Manitoba Hydro for their natural gas use. The bill and recorded consumption for their gas use is associated with a common service that serves multiple units. The gas used by these common services is part of the commercial sector: SGS Commercial or Large General Service. Also excluded are approximately [redacted] very large dwellings that have high usage and are classified in the Large General Service (LGS) class.

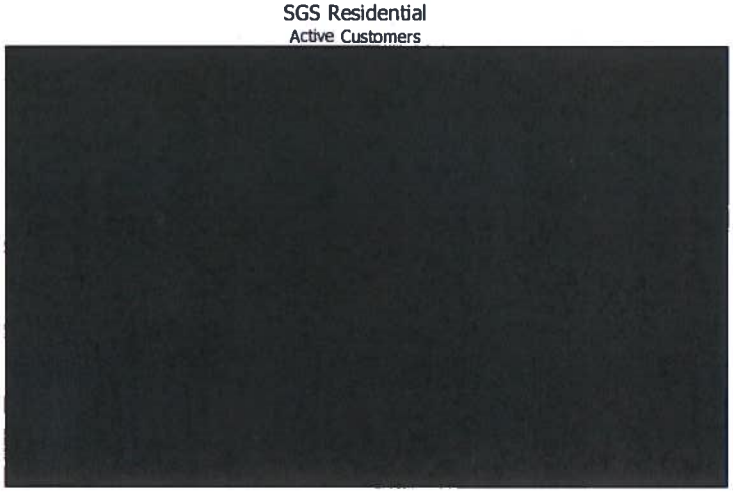
The primary gas supply for SGS Residential customers may be provided by Manitoba Hydro's regular Quarterly Service, broker-supplied fixed price contracts up to five years long (known as Western Transportation Service or WTS), or Manitoba Hydro's Fixed Rate Primary Gas Service.

All but approximately [redacted] SGS Residential Customers use natural gas for space heating of their dwelling. The remainder either uses their natural gas for other purposes (e.g. natural gas fireplace or barbeque) or have a gas connection but not using it. Approximately [redacted] of Residential gas use is for space heating. About [redacted] is for water heating, and the remaining [redacted] is for other natural gas end uses such as ranges, dryers, fireplaces, barbeques, saunas, hot tubs, and pool heaters.

SGS Residential Customers

During 2017/18 there was an average of [redacted] SGS Residential customers. Over the last nine years, this class has [redacted] an average of [redacted] customers or [redacted] per year. They are forecast to [redacted] at an average of [redacted] customers or [redacted] per year between 2017/18 and 2027/28. The [redacted] is due to the customer growth forecast in Manitoba Hydro's Forecast of Key Economic and Financial Indicators and forecast [redacted] in the saturation of natural gas space heating.

Figure 7 – SGS Residential Customers

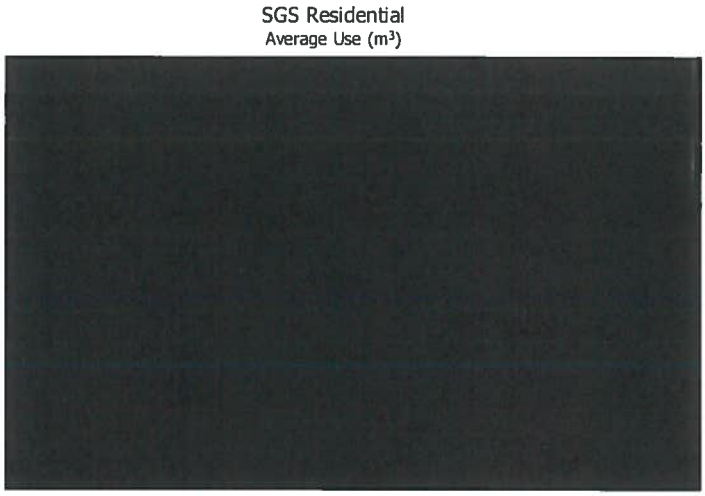


SGS Residential Average Use

SGS Residential average use is currently [redacted] m^3 per customer. It has [redacted] m^3 or [redacted] per year since 2008/09. It is forecast to [redacted] at [redacted] m^3 or [redacted] per year [redacted] to 2027/28.

[redacted]

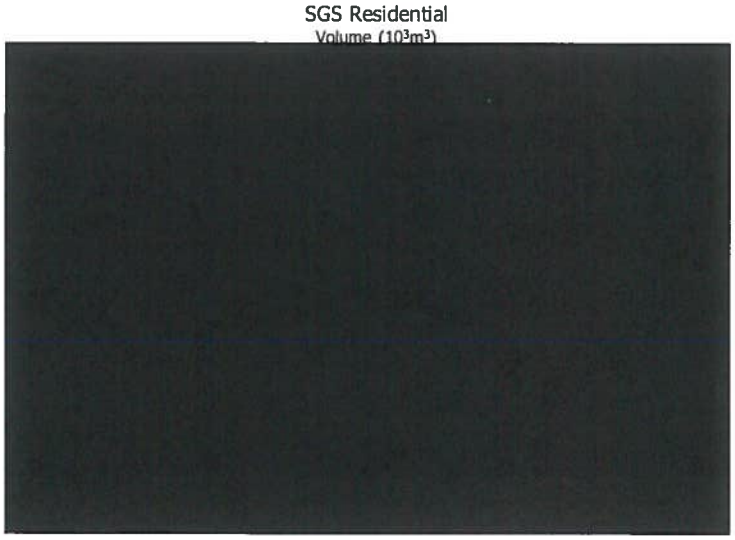
Figure 8 – SGS Residential Average Use



SGS Residential Volume

Since 2008/09, SGS Residential volume has [redacted] an average of [redacted] 10^3m^3 or [redacted] per year and is forecast to [redacted] by [redacted] 10^3m^3 or [redacted] per year until 2027/28.

Figure 9 – SGS Residential Volume



SGS Commercial and LGS

SGS Commercial (SCOM) includes the commercial customer class portion of the Small General Service (SGS) rate class. SCOM customers typically have an annual volume of less than 15,000 m^3 per year.

Large General Service (LGS) consists of medium-sized customers with usage between 15,000 m^3 and 680,000 m^3 per year. Most of these are commercial customers, but approximately [redacted] large residential dwellings are included in this class as well.

SGS Commercial and LGS Customers

The total number of customers in the combined SGS Commercial and LGS classes is [redacted] to [redacted] Over the past nine years, the [redacted] has been about [redacted] customers or [redacted] per year. Over the next ten years, these classes are forecast to [redacted] by [redacted] customers or [redacted] per year.

Figure 10 – SGS Commercial & LGS Customers

Combined SGS Commercial & LGS
Active Customers

[redacted]

[redacted] the efficiency of individual LGS customers improve and annual usage declines to where it becomes more favorable from a rate perspective to be classified as an SGS Commercial customer.

Figure 11 – SGS Commercial & LGS Customers Separated

The SGS Commercial class has [redacted] by [redacted] customers or [redacted] per year over the last nine years. It is forecast to [redacted] by [redacted] customers or [redacted] per year over the next ten years. LGS has [redacted] by [redacted] customers or [redacted] per year over the last nine years. It is forecast to [redacted] by [redacted] customers or [redacted] per year over the next ten years.

SGS Commercial & LGS
Active Customers

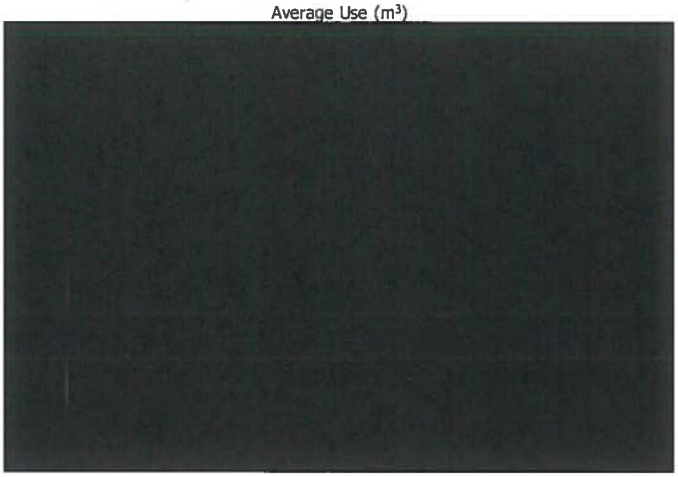
[redacted]

SGS Commercial and LGS Average Use

The combined average use of SGS Commercial and LGS has [redacted] and has [redacted] by [redacted] m^3 or [redacted] over the last nine years. [redacted]

Figure 12 – SGS Commercial & LGS Average Use

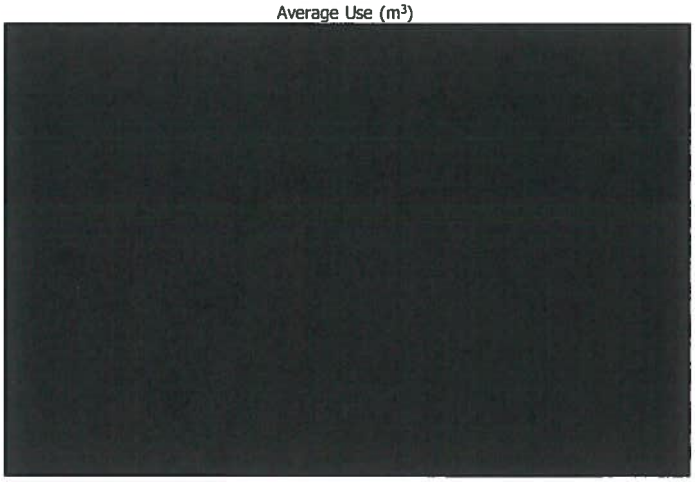
Combined SGS Commercial & LGS
Average Use (m^3)



The SGS Commercial average use is currently [redacted] m^3 per customer and is forecast [redacted] at [redacted] m^3. The group is limited to a maximum of 15,000 m^3 per customer, [redacted]

Figure 13 – SGS Commercial Average Use

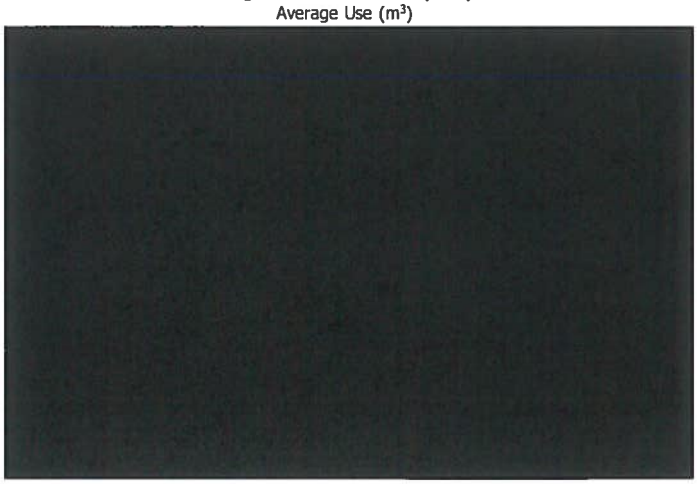
SGS Commercial
Average Use (m^3)



The LGS average use is currently [redacted] m^3 per customer and is forecast to [redacted] m^3 per customer. The group is limited to the range 15,000 m^3 to 680,000 m^3 per customer, [redacted]

Figure 14 – LGS Average Use

Large General Service (LGS)
Average Use (m^3)



SGS Commercial and LGS Volume

The combined total volume of SGS Commercial and LGS classes has [redacted] by [redacted] 10^3m^3 or [redacted] per year over the last nine years. It is expected to [redacted] by [redacted] 10^3m^3 or [redacted] per year for the next ten years.

Figure 15 – SGS Commercial & LGS Volume

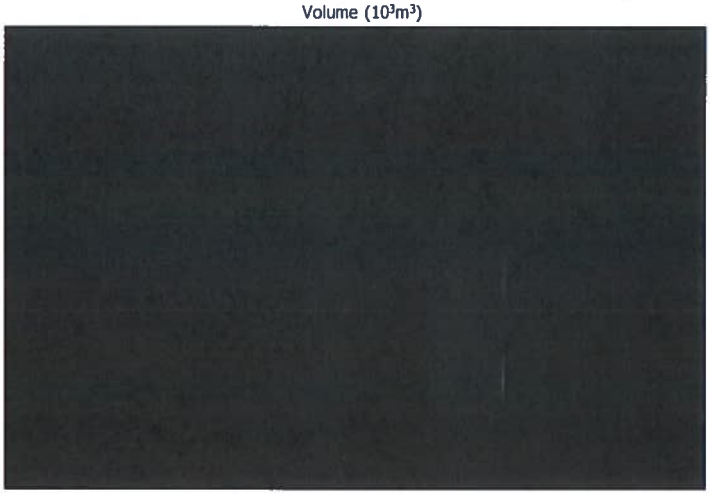


Figure 16 – SGS Commercial Volume

SGS Commercial volume has [redacted] by [redacted] 10^3m^3 or [redacted] over the last nine years. The SGS Commercial class is forecast to [redacted] by [redacted] 10^3m^3 or [redacted] per year for the next ten years.

Figure 17 – LGS Volume

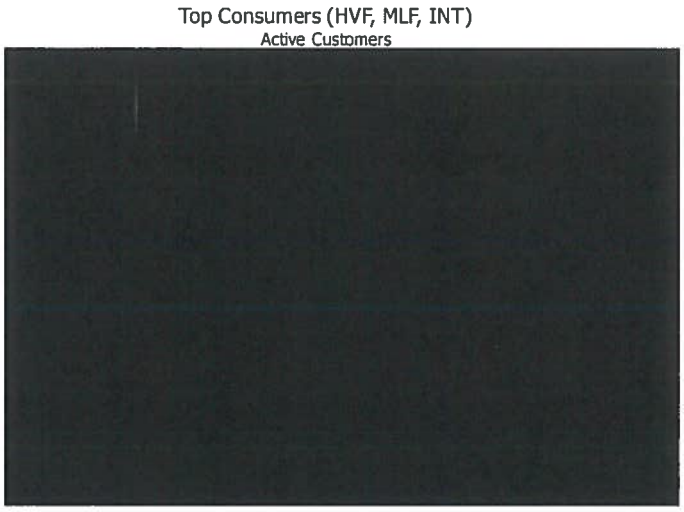
Large General Service volume has [redacted] by [redacted] 10^3m^3 or [redacted] per year. It is forecast to [redacted] by [redacted] 10^3m^3 or [redacted] per year for the next ten years.

Top Consumers

Top Consumers Customers

This category includes all active Top Consumers in the High Volume Firm (HVF), Mainline Firm (MLF) and Interruptible (INT) classes, whether their gas is supplied by Manitoba Hydro (System Supply), or a broker (WTS) or purchased directly by the customer (Transport). The number of Top Consumers has [redacted] from [redacted] in 2008/09 to [redacted] in 2017/18. This forecast assumes that there will be [redacted] customers in the Top Consumers class for the duration of the forecast.

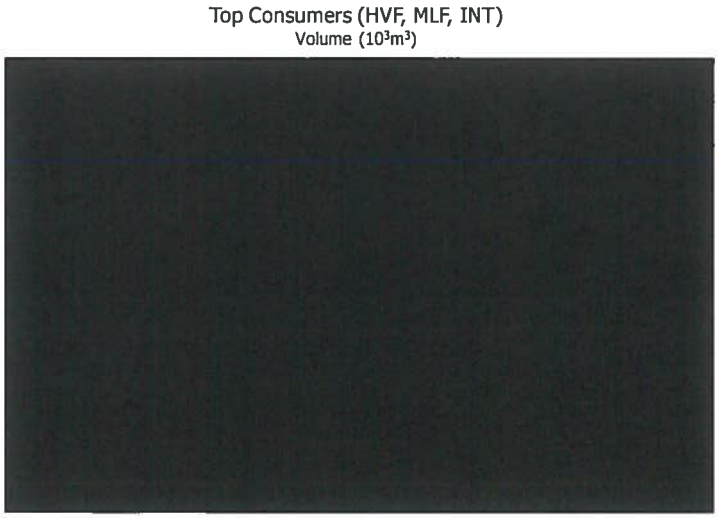
Figure 18 –Top Consumers Customers



Top Consumers Volume

Top Consumers volume [redacted] for the past ten years. Their total volume is forecast [redacted] Individual customers are forecast for three years, and then the third forecast year is extended for the remainder of the forecast period as there are no adequate long term indicators of either an increase or decrease in gas use for these customers.

Figure 19 – Top Consumers Volume



Special Rates

There are [redacted] customers [redacted] and have special rates because [redacted] Their forecasts are based on three-year historical averages instead of attempting to forecast their volume. Their consumption [redacted] and an incorrect forecast can have an adverse effect on their billing. The use of a three-year average eliminates any possibility of bias for rate setting purposes.

Power Stations

There are [redacted] customers in the Power Stations Class. [redacted]

Figure 20 – Power Stations

Power Stations
Volume (10^3m^3)

[redacted]

Special Contracts

There is [redacted]

Figure 21 – Special Contracts

Special Contract
Volume (10^3m^3)

[redacted]

Total Sales

Total Sales Customers

Total Sales includes all active gas customers. Growth has been [redacted] over the past nine years with an average [redacted] of [redacted] customers or [redacted] per year. The number of customers is forecast to [redacted] at [redacted] customers or [redacted] per year [redacted]

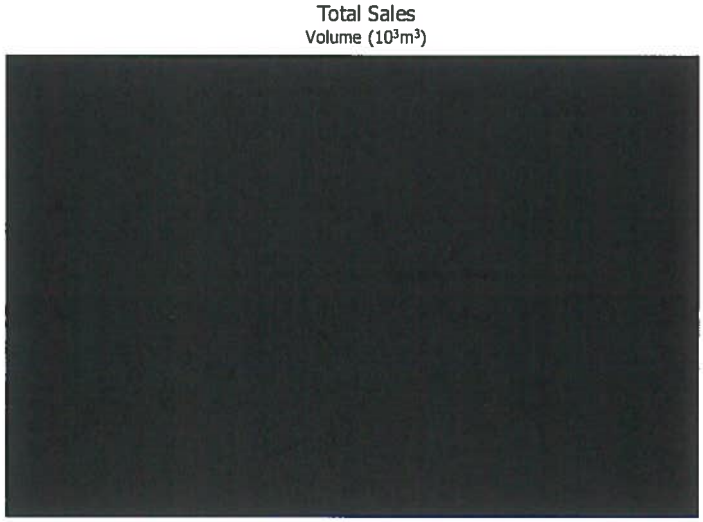
Figure 22 – Total Sales Customers

Total Sales Volume

The Total Sales volume forecast is the sum of the volume forecasts for all SGS, LGS, HVF, MLF, INT, Power Station and Special Contract classes. Total Sales volume has [redacted] on average [redacted] 10^3m^3 or [redacted] per year in the last nine years. The Total Sales volume is forecast to [redacted] on average by [redacted] 10^3m^3 or [redacted] per year. The forecasted [redacted] in volume is attributed to the [redacted].

The Corporation's Demand Side Management initiatives are contributing to the forecasted reductions in Total Sales volume. [redacted].

Figure 23 – Total Sales Volume



Fixed Rate Primary Gas Service

Manitoba Hydro's Fixed Rate Primary Gas Service (FRPGS) began in 2009. There have been several offerings each year with 1, 3 and 5 year terms available.

FRPGS product information is provided to customers to allow them to make informed decisions by understanding the differences between choosing the quarterly service, broker fixed price offerings, and Manitoba Hydro's fixed price offering for their primary gas service.

During 2017/18 the number of customers enrolled averaged [redacted] for SGS Residential, [redacted] for SGS Commercial, and [redacted] for Large General Service customers. The Heating Value and Weather Adjusted volume consumed by these FRPGS Customers in 2017/18 was [redacted] 10^3m^3 for SGS Residential, [redacted] 10^3m^3 for SGS Commercial and [redacted] 10^3m^3 for LGS.

The number of FRPGS SGS Residential customers is forecast to be [redacted] in 2018/19, [redacted] in 2019/20 [redacted] to [redacted] in 2027/28. The number of FRPGS SGS Commercial customers is forecast to be [redacted] in 2018/19, [redacted] in 2019/20 and forecast to have [redacted] in 2027/28. The number of FRPGS LGS customers is forecast to be [redacted] in 2018/19, [redacted] in 2019/20 [redacted] to [redacted] in 2027/28.

The FRPGS SGS Residential volume forecast is [redacted] 10^3m^3 in 2018/19, [redacted] 10^3m^3 in 2019/20 and [redacted] to [redacted] 10^3m^3 in 2027/28. The FRPGS SGS Commercial volume forecast is [redacted] 10^3m^3 in 2018/19, [redacted] 10^3m^3 in 2019/20 [redacted] 10^3m^3 in 2027/28. The FRPGS LGS volume forecast is [redacted] 10^3m^3 in 2018/19, [redacted] 10^3m^3 in 2019/20 [redacted] 10^3m^3 in 2027/28.

The average use for all FRPGS classes (SGS Residential, SGS Commercial and LGS) was forecast using the average use for System Supply Customers (quarterly rate and FRPGS) [redacted]

Western Transportation Service

Western Transportation Service (WTS) is the service where a broker purchases the primary gas for a customer. Manitoba Hydro bills customers on behalf of the broker and remits the primary gas charges to the broker.

WTS started offering fixed price contracts in 2000. WTS customers reached a maximum of [redacted] of Manitoba gas customers in 2006/07, but have [redacted] customers or [redacted] as of March 2018.

SGS Residential customers using a broker are forecast to be [redacted] in 2018/19, [redacted] in 2019/20 and [redacted] by 2027/28.

The SGS Commercial customers using a broker are forecast to be [redacted] in 2018/19, [redacted] in 2019/20 and [redacted] by 2027/28.

The LGS customers using a broker are forecast to be [redacted] in 2018/19, [redacted] in 2019/20 and [redacted] by 2027/28.

For the forecast period, compared to the class average, the WTS monthly average use is forecast at [redacted] for SGS Residential, [redacted] for SGS Commercial and [redacted] for LGS.

There are also [redacted] WTS customers in the Top Consumers classes that are forecast to consume [redacted] 10^3m^3 in 2018/19, and is expected to [redacted] 10^3m^3 for the remainder of the forecast period.

FORECAST TABLES

The forecast tables include monthly information on customers, volume and billed demand for 2018/19 and 2019/20. This document also includes fiscal year information on customers, volume and average use for the 2018/19 to 2027/28 period, as required for preparation of the Integrated Financial Forecast (IFF).

Each table starts with class totals. The classes are:

SRES - Small General Service Residential

SCOM - Small General Service Commercial

LGS - Large General Service

HVF - High Volume Firm

INT – Interruptible

CURT – Curtailed Interruptible

PS - Power Stations

SPEC - Special Contract

TOTAL - Total Sales

This is followed by 4 sections that itemize all the classes by service type. The 4 service types are:

xxxx-S - System Supply Quarterly Service

xxxx-F - System Supply Fixed Rate Primary Gas Service

xxxx-W - Western Transportation Service

xxxx-T - Transport Service

Curtailed Interruptible

Interruptible customers may be interrupted from time to time. The curtailed volume is provided as an alternate service and is a non-firm volume which is removed from the forecast. They are shown as negative numbers in the CURT-S and CURT-W classes for System Supply and WTS respectively.

Table 13 – 2018/19 Monthly Customers

2018/19 Monthly Customers - Total

Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES												
SCOM												
LGS												
HVF												
ML												
INT												
PS												
SPE												
TOTAL												

2018/19 Monthly Customers - System Supply Quarterly Service

SRES-S	
SCOM-S	
LGS-S	
HVF-	
MLF	
INT-S	
TOTAL-S	

2018/19 Monthly Customers - System Supply Fixed Rate Primary Gas Service

SRES-F	
SCO	
LGS-	
TOTA	

2018/19 Monthly Customers - Western Transportation Service

SRES-W	
SCOM-W	
LGS-W	
HVF-	
MLF	
INT-	
TOTAL-W	

2018/19 Monthly Customers - Transport Service

HVF-	
MLF-	
INT-	
PS-T	
SPEC	
TOTA	

Table 14 – 2018/19 Monthly Volumes

2018/19 Monthly Volume (10^3m^3) - Total

Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES												
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPEC												
TOTAL												

2018/19 Monthly Volume (10^3m^3) - System Supply Quarterly Service

SRES-S	
SCOM-S	
LGS-S	
HVF-S	
MLF-S	
INT-S	
CUR	
TOTAL-S	

2018/19 Monthly Volume (10^3m^3) - System Supply Fixed Rate Primary Gas Service

SRE	
SC	
LGS-	
TOT	

2018/19 Monthly Volume (10^3m^3) - Western Transportation Service

SRES-W	
SCOM-W	
LGS-W	
HVF-W	
ML	
INT	
CU	
TOTAL-W	

2018/19 Monthly Volume (10^3m^3) - Transport Service

HVF-T	
MLF-T	
INT-	
PS-T	
SPEC-T	
TOTAL-T	

Table 15 – 2018/19 Monthly Demand

2018/19 Monthly Demand (10^3m^3) - Total												
Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES												
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPEC												
TOTAL												

2018/19 Monthly Demand (10^3m^3) - System Supply Quarterly Service	
SRES-	
SCOM	
LGS-S	
HVF-S	
MLF-S	
INT-S	
TOTAL-S	

2018/19 Monthly Demand (10^3m^3) - System Supply Fixed Rate Primary Gas Service	
SRES	
SCOM	
LGS-F	
TOTA	

2018/19 Monthly Demand (10^3m^3) - Western Transportation Service	
SRES-	
SCOM	
LGS-W	
HVF-W	
MLF-W	
INT-W	
TOTAL-W	

2018/19 Monthly Demand (10^3m^3) - Transport Service	
HVF-T	
MLF-T	
INT-T	
PS-T	
SPEC-	
TOTAL-T	

Table 16 – 2018/19 Monthly Average Use

2018/19 Monthly Average Use per Customer (m^3/yr)												
Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES	[redacted]											
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPEC												
TOTAL												

2018/19 Monthly Average Use per Customer - System Supply Quarterly Service	
SRES-S	[redacted]
SCOM-S	
LGS-S	
HVF-S	
MLF-S	
INT-S	
TOTAL-S	

2018/19 Monthly Average Use - System Supply Fixed Rate Primary Gas Service	
SRES-F	[redacted]
SCOM-F	
LGS-F	
TOTAL-F	

2018/19 Monthly Average Use - Western Transportation Service	
SRES-W	[redacted]
SCOM-W	
LGS-W	
HVF-W	
MLF-	
INT-W	
TOTAL-W	

2018/19 Monthly Average Use - Transport Service	
HVF-T	[redacted]
MLF-T	
INT-T	
PS-T	
SPEC-T	
TOTAL-T	

Note: HVF, MLF, INT, PS, SPEC and TOTAL-T are shown in 10^3m^3

Table 17 – 2019/20 Monthly Customers

2019/20 Monthly Customers - Total

Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES	[redacted]											
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPE												
TOTAL												

2019/20 Monthly Customers - System Supply Quarterly Service

SRES-S	[redacted]
SCOM-S	
LGS-S	
HVF	
ML	
INT	
TOTAL-S	

2019/20 Monthly Customers - System Supply Fixed Rate Primary Gas Service

SRES-F	[redacted]
SCO	
LGS	
TOT	

2019/20 Monthly Customers - Western Transportation Service

SRES-W	[redacted]
SCOM-W	
LGS-W	
HVF-	
MLF	
INT-	
TOTAL-W	

2019/20 Monthly Customers - Transport Service

HVF	[redacted]
MLF	
INT-	
PS-	
SPE	
TOT	

Table 18 – 2019/20 Monthly Volumes

2019/20 Monthly Volume (10^3m^3) - Total

Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES												
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPEC												
TOTAL												

2019/20 Monthly Volume (10^3m^3) - System Supply Quarterly Service

SRES-S	
SCOM-S	
LGS-S	
HVF-S	
MLF-S	
INT-S	
CU	
TOTAL-S	

2019/20 Monthly Volume (10^3m^3) - System Supply Fixed Rate Primary Gas Service

SRES	
SCO	
LGS-F	
TOTA	

2019/20 Monthly Volume (10^3m^3) - Western Transportation Service

SRES-W	
SCOM-W	
LGS-W	
HVF-W	
MLF	
INT	
CUR	
TOTAL-W	

2019/20 Monthly Volume (10^3m^3) - Transport Service

HVF-T	
MLF-T	
INT	
PS-T	
SPEC-T	
TOTAL-T	

Table 19 – 2019/20 Monthly Demand

2019/20 Monthly Demand (10^3m^3) - Total												
Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES												
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPEC												
TOTAL												

2019/20 Monthly Demand (10^3m^3) - System Supply Quarterly Service	
SRES	
SCO	
LGS-	
HVF-S	
MLF-	
INT-S	
TOTAL-S	

2019/20 Monthly Demand (10^3m^3) - System Supply Fixed Rate Primary Gas Service	
SRES	
SCOM	
LGS-F	
TOTA	

2019/20 Monthly Demand (10^3m^3) - Western Transportation Service	
SRES-	
SCOM-	
LGS-W	
HVF-W	
MLF-W	
INT-W	
TOTAL-W	

2019/20 Monthly Demand (10^3m^3) - Transport Service	
HVF-T	
MLF-T	
INT-T	
PS-T	
SPEC-	
TOTAL-T	

Table 20 – 2019/20 Monthly Average Use

2019/20 Monthly Average Use per Customer (m^3/yr)												
Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SRES												
SCOM												
LGS												
HVF												
MLF												
INT												
PS												
SPEC												
TOTAL												
2019/20 Monthly Average Use per Customer - System Supply Quarterly Service												
SRES-S												
SCOM-S												
LGS-S												
HVF-S												
MLF-S												
INT-S												
TOTAL-S												
2019/20 Monthly Average Use - System Supply Fixed Rate Primary Gas Service												
SRES-F												
SCOM-F												
LGS-F												
TOTAL-F												
2019/20 Monthly Average Use - Western Transportation Service												
SRES-W												
SCOM-W												
LGS-W												
HVF-W												
MLF-												
INT-												
TOTAL-W												
2019/20 Monthly Average Use - Transport Service												
HVF-T												
MLF-T												
INT-T												
PS-T												
SPEC-T												
TOTAL-T												

Note: HVF, MLF, INT, PS, SPEC and TOTAL-T are shown in 10^3m^3

Table 21 – Annual Average Customers

Average Customers - Total										
Fiscal Year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
SRES										
SCOM										
LGS										
HVF										
MLF										
INT										
PS										
SPEC										
TOTAL										
Average Customers - System Supply Quarterly Service										
SRES-S										
SCOM-S										
LGS-S										
HVF-S										
MLF-										
INT-S										
TOTAL-S										
Average Customers - System Supply Fixed Rate Primary Gas Service										
SRES-F										
SCO										
LGS-										
TOTA										
Average Customers - Western Transportation Service										
SRES-W										
SCOM-W										
LGS-W										
HVF-										
MLF										
INT-										
TOTAL-W										
Average Customers - Transport Service										
HVF-										
MLF-										
INT-										
PS-T										
SPEC										
TOTA										

Table 22 – Annual Volume

Annual Volume (10^3m^3) - Total										
Fiscal Year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
SRES										
SCOM										
LGS										
HVF										
MLF										
INT										
PS										
SPEC										
TOTAL										
Annual Volume (10^3m^3) - System Supply Quarterly Service										
SRES-S										
SCOM-S										
LGS-S										
HVF-S										
MLF-S										
INT-S										
CUR										
TOTAL-S										
Annual Volume (10^3m^3) - System Supply Fixed Rate Primary Gas Service										
SRES-F										
SCOM										
LGS-F										
TOTAL-F										
Annual Volume (10^3m^3) - Western Transportation Service										
SRES-W										
SCOM-W										
LGS-W										
HVF-W										
MLF-										
INT-										
CUR										
TOTAL-W										
Annual Volume (10^3m^3) - Transport Service										
HVF-T										
MLF-T										
INT										
PS-T										
SPEC-T										
TOTAL-T										

Table 23 – Annual Average Use

Annual Average Use per Customer (m^3/yr)										
Fiscal Year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
SRES	[redacted]									
SCOM										
LGS										
HVF										
MLF										
INT										
PS										
SPEC										
TOTAL										
SRES-S	[redacted]									
SCOM-S										
LGS-S										
HVF-S										
MLF-S										
INT-S										
TOTAL-S										
SRES-F	[redacted]									
SCOM-F										
LGS-F										
TOTAL-F										
SRES-W	[redacted]									
SCOM-W										
LGS-W										
HVF-W										
MLF-W										
INT-W										
TOTAL-W										
HVF-T	[redacted]									
MLF-T										
INT-T										
PS-T										
SPEC-T										
TOTAL-T										

Note: HVF, MLF, INT, PS, SPEC and TOTAL-T are shown in 10^3m^3

VARIABILITY AND ACCURACY

Volume Variability

The forecast is prepared with the goal of being an unbiased and accurate predictor of future volumes. It was produced with the expectation that there is a 50% chance that the actual will be higher than forecast, and a 50% chance that the actual will be lower than forecast.

This section presents a probability-based estimate of how much future actual volumes might vary from forecast. This can be used to produce forecasts with a specific probability of occurrence, or can be used to determine the probability of specific volumes occurring. This analysis was done excluding the Special Contract and Power Stations, [redacted] they are forecast using their own three-year historical averages.

The standard deviation and correlation coefficient of historical weather adjusted volume was determined. These were then applied to the forecast to give an estimate of the width of the volume confidence bands. 10% and 90% confidence bands (-/+ 1.28 standard deviations) were selected to represent a low and high scenario.

This calculation gives the variability due to economic effects and year-to-year variation in natural gas use. It does not include variability due to weather which was removed through the use of weather adjusted volumes. The following table summarizes the variability of volume due to economic effects and year-to-year variation:

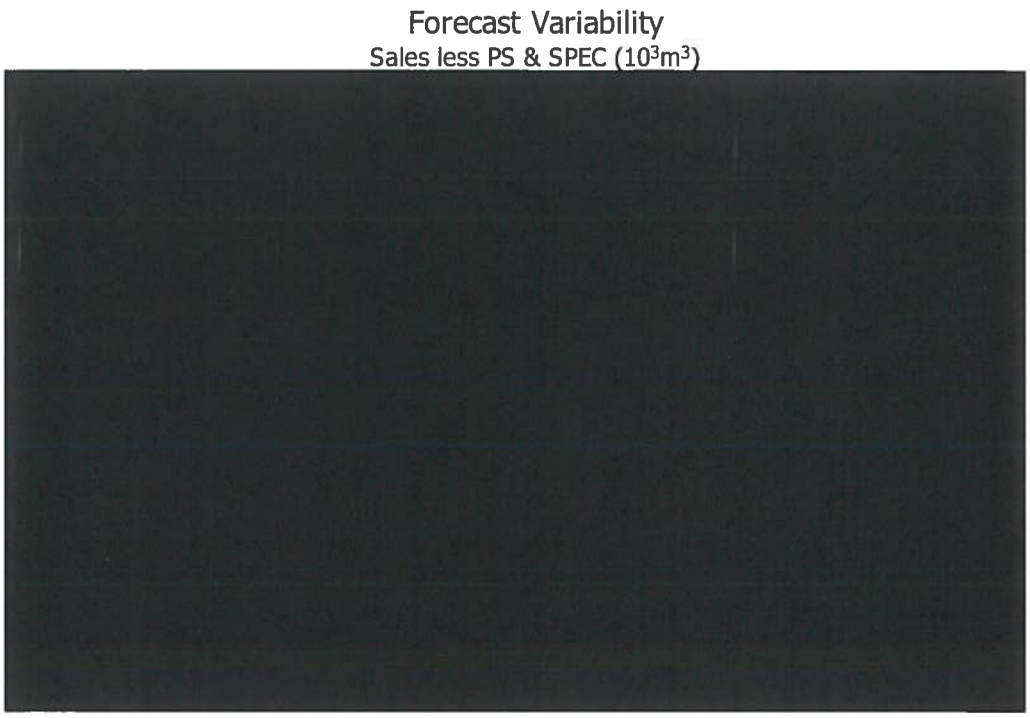
Table 24 – Volume Variability

Volume Variability (10^3m^3)						
Fiscal Year	Forecast 10^3m^3	Economic Std Dev	10% Prob Point	90% Prob Point	Bandwidth +/- to Forecast	Bandwidth +/- as % of Forecast
2018/19	[redacted]					
2019/20						
2020/21						
2021/22						
2022/23						
2023/24						
2024/25						
2025/26						
2026/27						
2027/28						

Variability due to economic/year-to-year variation is estimated to be [redacted] in the first year of the forecast, and [redacted] in the second year of the forecast. This represents the best level of accuracy possible within the gas volume forecast.

The figure below illustrates the expected bandwidths:

Figure 24 – Volume Variability



Forecast Accuracy

The tables below show the first and second year forecast accuracy of the last eight Natural Gas Volume Forecasts for total volume less Special Contract and Power Stations:

Table 25 – First Year Forecast Accuracy

First Year Forecast Accuracy					
Forecast Created	Year being Forecast	Forecast 10^3m^3	Actual 10^3m^3	% Diff	Over/Under
2017	2017/18	[redacted]			
2016	2016/17				
2015	2015/16				
2014	2014/15				
2013	2013/14				
2012	2012/13				
2011	2011/12	1,577,627			
2010	2010/11	1,601,893			

Table 26 – Second Year Forecast Accuracy

Second Year Forecast Accuracy					
Forecast Created	Year being Forecast	Forecast 10^3m^3	Actual 10^3m^3	% Diff	Over/Under
2016	2017/18	[redacted]			
2015	2016/17				
2014	2015/16				
2013	2014/15				
2012	2013/14				
2011	2012/13				
2010	2011/12	1,602,442			

ASSUMPTIONS

Economic Assumptions

Economic forecast assumptions are taken from the economic variables that become part of Manitoba Hydro's Forecast of Key Economic and Financial Indicators and the Energy Price Forecast. These documents contain Manitoba Hydro's forecasts of economic variables including prices of electricity, natural gas and oil, Gross Domestic Product (GDP), Manitoba population and residential electric customers.

The following are the economic variables used for this Natural Gas Volume Forecast:

Residential Customers – The number of Manitoba residential customers is forecast to increase by 1.3% or 6,242 units in 2018/19 and averages 1.1% per year over the forecast period. This compares to a historical average increase of 1.2% per year over the last ten years. This is used in the SGS Residential customer forecast and the SGS Commercial and LGS customer forecast.

Electricity and Natural Gas Prices - The electricity price forecast is based on the Consumer Price Index (CPI) and rate increase projections contained in the Integrated Financial Forecast. The nominal electricity price is forecast to increase annually by 3.6% in 2018/19 and 3.7% from 2019/20 to 2027/28. In real terms, this will translates to an annual increase of 1.5% in 2018/19 and between 1.6% and 1.8% from 2019/20 to 2027/28. Manitoba Hydro views the natural gas price forecast as commercially sensitive information. Consistent with the Clean Environment Commission and Electric General Rate Application, this information will not be publicly disclosed. The ratio of prices is used in the SGS Residential customer forecast.

Gross Domestic Product (GDP) - Real economic growth in Manitoba is expected to grow 1.8% in 2018/19 and average 1.7% for the remainder of the forecast period. This is used in the electric GS Mass Market forecast which is then used in the SGS Commercial and LGS customer forecasts.

Heating Value Assumptions

The Heating Value is the amount of energy per unit of gas and it varies month to month. All forecast volumes are standardized to their energy equivalent Heating Value of [redacted] $GJ/10^3m^3$.

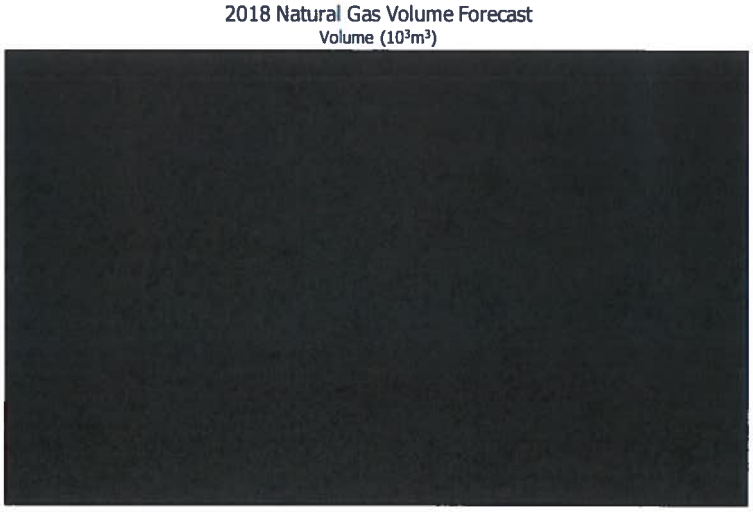
Weather Effect and Normal Weather Assumptions

[redacted]

Demand Side Management (DSM) in the Forecast

This forecast reflects future energy savings arising from future DSM natural gas offerings and market engagement as outlined in Manitoba Hydro's DSM Plan. Savings due to DSM programs to date are embedded in the historical data that is the basis for this forecast. The current level of past achieved DSM savings is assumed to remain in place throughout the future. Program-based DSM energy savings reduces total sales volume in 2027/28 from [redacted] 10^3m^3 to [redacted] 10^3m^3.

Figure 25 – Natural Gas Volume Forecast



METHODOLOGY

SGS Residential Methodology

The SGS Residential Basic forecast was derived from population forecasts that are part of Manitoba Hydro's Forecast of Key Economic and Financial Indicators. These were combined with an appliance forecast developed in an end use model.

i. **Forecast All Dwellings** - The forecast of Manitoba Hydro residential customers was taken from Manitoba Hydro's Forecast of Key Economic and Financial Indicators. This customer forecast was based on the average of several Manitoba population forecasts from various external agencies multiplied by a forecast of the people per customer ratio. The customer forecast was reduced by about 0.5% to account for customers with multiple services to obtain the forecast of individual dwellings.

ii. **Forecast Existing Dwellings** – Existing gas-serviced dwellings were broken down by dwelling type (single detached, multi attached, and individually metered apartment suites) within Winnipeg and within the Gas Available regions outside Winnipeg. The rate of change due to demolitions was estimated and customer switches of their space heating fuel were taken into account.

iii. **Historical Space Heating Systems** – The number of historical dwellings by type and region were each divided into four space heating systems: Gas High-Efficiency Furnace, Gas Mid-Efficiency Furnace, Gas Standard-Efficiency Furnace and Gas Boiler. Percentages of each heat type in existing dwellings were taken from the 2014 Residential Energy Use Survey.

iv. **Forecast of Space Heating Systems in New Dwellings** – For the Electric Forecast, econometric equations were developed to forecast the number of electric space heating systems in new single detached and multi attached dwellings in Winnipeg and South Gas regions. The remaining new dwellings would all be heated with natural gas, and were considered to be the number of new gas heated dwellings.

v. **Forecast of Space Heating Systems in Existing Dwellings** – The average age of heating systems in existing dwellings was determined from the 2014 Residential Energy Use Survey. The number of replacements was estimated using a Weibull distribution based on the average age of each furnace type from the survey. Switches of furnace types were estimated using survey respondents in older dwellings with newer heating systems. Their former heating system was verified using billing system information and notes.

vi. **Forecast of Water Heating Systems in New and Existing Dwellings** – Natural gas water heater saturations and average age were estimated for dwellings with and without natural gas space heat using information from the 2014 Residential Energy Use Survey. The number of replacements was forecast using a Weibull distribution based on the average age of water heaters. Switches between fuels were taken into account when forecasting future numbers of water heaters.

vii. **Other End Uses** – Gas cooking, gas clothes dryers and miscellaneous natural gas use were forecast by dwelling type using the saturation data from the 2014 Residential Energy Use Survey.

viii. **Space Heating, Water Heating and Appliance Usage** – Conditional Demand Analysis using the 2014 Residential Survey data combined with 2014/15 customer annual use from billing data was used to derive the average annual energy use for different types of heating systems and natural gas appliances for existing and for newer dwellings. These average uses were multiplied by the number of each type of system and appliance to get the forecast of total energy use.

ix. **Determine Total Usage** - The forecast number of appliances multiplied by the average use of each appliance determined the volume forecast. The forecast of Codes and Standards energy savings and projected savings of future Demand Side Management Programs as outlined in the DSM Plan were subtracted.

SGS Commercial and LGS Methodology

i. **Customer Forecast -** The combined number of SGS Commercial and LGS customers was generated for each year of the forecast period. The annual [redacted] in customers was forecast using historical correlation with electric GS Mass Market customer growth, which was forecast by Manitoba GDP and with residential electric customers.

The yearend historical customer data from 1999/2000 to 2017/18 was modeled and the parameters are as follows:

Model: **Number of GS Customers**

Equation: Number of Customers (t) = [redacted]

Results:

Model R-Squared	Variable	Coefficient	t-stat
91.4%	Constant	[redacted]	6.56
	GSMM	[redacted]	13.03

The number of Commercial Customers for each year was split into SGS Commercial and LGS classes based on historical trends. In 2017/18, [redacted] of the customers were in the SGS Commercial class and [redacted] were in the LGS class. The SGS Commercial percentage is forecast to [redacted] to [redacted] by 2027/28. [redacted]

When a customer's expected annual volume reduces to less than 15,000 m^3, the customer is eligible to be switched from the LGS customer class to the SGS Commercial customer class. [redacted]

ii. **Average Use -** The SGS Commercial class consists of customers using up to 15,000 m3 of gas per year, and the LGS class consists of customers using between 15,000 m3 and 680,000 m3 per year. By definition, [redacted]

In other words, if usage by individual customers increases sufficiently then they will be re-classed, switching from either SGS Commercial to LGS or from LGS to High Volume Firm (HVF). Conversely, if usage by individual customers decreases, customers will either move from HVF to LGS or from LGS to SGS Commercial. [redacted]

[redacted]

iii. **Volume Forecast** - The forecasts for customers and average use are multiplied together for each class to calculate demand in m3 for SGS Commercial and LGS.

SGS Commercial Total Use (t)

= SGS Commercial Number of Customers (t) x SGS Commercial Average Annual Use (t)

LGS Total Use (t)

= LGS Number of Customers (t) x LGS Average Annual Use (t)

Top Consumers Methodology

The Top Consumers forecast was prepared on a customer by customer basis. Each customer was analyzed individually, and a monthly forecast was determined for the first three forecast years.

To help forecast monthly volumes, historic monthly consumption for the past three years was first adjusted to the standard heating value and then weather adjusted. For customers with unchanging usage over that time, the three years of monthlies were averaged and used. In cases where the historic volume trended up or down, the last year of monthlies or two years of averaged monthlies was used.

Similarly, historic monthly recorded demand for the past three years was used to help forecast monthly peak consumption. From the forecast of customer monthly peaks, the billed demand was determined. Billed demand is the highest recorded demand of the current month and the previous 11 months, but only from the winter months of November through March.

Information on individual company operating plans was collected from industry news and from Manitoba Hydro's Key and Major Account representatives. This information was used to help forecast volume and demand changes, rate classifications and gas supply arrangements. The first three years of the forecast includes production-related and square footage related increases that are confirmed to be taking place.

For each Top Consumer customer, year three of their forecast is used from year four and on.

Monthly Allocations

Monthly Customers

The monthly historical growth pattern of the number of customers in each rate class is used to allocate annual growth throughout the year. This way, customer growth is reflected more accurately to the month in which it will occur.

Table 27 – Monthly Allocation of Customer Changes

Monthly Allocation of Customer Changes												
Class	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
SGS Res												
SGS Com												
LGS												

Monthly Volumes

Monthly historical volumes for each rate class are heating value and weather adjusted and monthly percentages are calculated. Those percentages are then applied to the annual forecast volumes of each rate class to give the monthly forecast.

Table 28 – Monthly Allocation of Volume

Monthly Allocation of Volume												
Class	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
SGS Res												
SGS Com												
LGS												

GLOSSARY OF TERMS

Small General Service Class (SGS) – Residential and small commercial customers with an annual volume of less than 15,000 m^3 per year. If their volume is higher, then it is in their favor to switch to Large General Service (LGS) which has a higher basic charge but lower per unit charge. In this document, SGS Residential is abbreviated as SRES, and SGS Commercial is abbreviated as SCOM.

Large General Service Class (LGS) – Medium-sized commercial and industrial customers (and a few residential customers) with annual consumption greater than 15,000 m^3 and less than 680,000 m^3.

High Volume Firm Class (HVF) – Commercial and industrial customers where annual consumption exceeds 680,000 m^3.

Mainline Firm Class (MLF) – Commercial and industrial customers where annual consumption exceeds 680,000 m^3 and where the customer is served directly from the Company's transmission system or through dedicated distribution facilities at high pressure.

Interruptible Class (INT) – Commercial and industrial customers where annual consumption must exceed 680,000 m^3, and elect to allow their service to be interrupted upon notice. The customer pays a lower cost for this service. Manitoba Hydro may help the customer find alternative service, but the customer is expected to have an alternative energy source available.

Curtailed Interruptible – Refers to the gas that was not supplied to interruptible customers due to the interruptions.

Quarterly Service (-S) – This is the Quarterly Service of gas that Manitoba Hydro procures (System Supply) and delivers to its gas customers. The primary gas rate is set every three months.

Fixed Rate Primary Gas Service (-F) – This is the 1-year, 3-year and 5-year contract service that Manitoba Hydro procures (System Supply) and delivers to its gas customers.

Western Transportation Service (WTS or -W) – This is an unbundled service pertaining only to the primary gas portion of the gas consumed at a customer's facility. Under WTS, Manitoba Hydro receives, manages and re-delivers broker-provided primary gas. Manitoba Hydro bills WTS customers for the primary gas portion of the customer's consumption on behalf of the broker (using the broker's primary gas price) and remits the money collected to the broker.

Transportation Service (T-Service or -T) – Under this service, the customer is obligated to arrange for the supply and delivery of its own gas to the Manitoba gate stations. The gas is then received by Manitoba Hydro at the Manitoba gates and transported to the customer's plant gate. Manitoba Hydro does not purchase the gas for the customer. Charges for this service include delivery on the Manitoba Hydro system but do not include any supply cost component other than a charge to cover a proportionate share of unaccounted for gas losses on the Manitoba Hydro distribution system.

Billed Demand – This is the level at which customers are assessed a Demand Charge. For High Volume Firm, Mainline and Interruptible customers, the Monthly Billed Demand is equal to each customer's maximum recorded daily usage during the last twelve months, but only in the months covering the November to March period.

Recorded Demand – This is the maximum recorded daily usage during a month. Daily usage is based on a gas day that begins that day at 9 a.m. and ends 24 hours later on the next day.

Gas Year – This is the year from November to October. This is the fiscal year used for gas purchasing.

Cubic Meter (m3) – The unit of measurement used for natural gas volumes.

Ten-Three-M-Three (103m3) – A thousand cubic meters.

Ten-Three-M-Six (103m6) – A million cubic meters.

A Thousand cubic feet (Mcf) – The older form of measurement for natural gas volumes prior to the metric system. 1 Mcf = 28.32784 m^3.

Gigajoule (GJ) - One billion joules. A joule is a units of energy used to measure energy content.

Heating Value (HV) – A Measure of the energy content of gas. Units are given in $GJ/10^3m^3$. The Heating Value varies depending on the richness of the gas, but normal is considered to be [redacted] $GJ/10^3m^3$. To convert GJ to 10^3m^3, divide the GJ by the Heating Value.

2018 Natural Gas Volume Forecast

*Manitoba Hydro is a licensee of the Trademark and Official Mark.