CUSTOMER AND GAS DEMAND FORECAST

System Total Temperature-Adjusted Dth Sales and Throughput Comparison – 2017-2018 IRP and Actual Results

On a weather-normalized basis, the Company's natural gas sales through the IRP year ending May, 2018 is projected at 115.4 MMDth. The Company projected a total of 115.0 MMDth in last year's IRP for the same time period. Average usage per system-wide General Service (GS) customer for the IRP year is estimated at 107.3 Dth. The 2017-2018 IRP projected an average of 106.5 Dth. Temperature-adjusted system throughput (sales and transportation) is projected to finish the 2017-2018 IRP year at 195.4 MMDth. Last year's IRP forecasted 206.8 MMDth for the same period. Variance is primarily in the electric generation sector where usage in 2017 decreased about 39% from the prior year.

Temperature-Adjusted Dth Sales and Throughput Summary – 2018-2019 IRP Year

The sales demand for the 2018-2019 IRP year is forecasted to be 115.2 MMDth. The small decrease of 0.2% results from approximately 2.2 MMDth of annual sales demand shifting to transportation; over 250 customers receiving service on the GS, FS, and IS rate schedules will shift to the TS rate schedule in July of this year. Steady growth in the GS class is forecasted to bring sales demand to 122.2 MMDth for the 2027-2028 IRP year (see Exhibit 3.10).

The 2018-2019 IRP sales forecast of 115.2 MMDth will be the denominator used in the calculation of the percentage of sales supplied by cost-of-service production per the Trail Unit Settlement Stipulation. The numerator will be the actual cost-of-service quantity as reported at the wellhead.

The forecast projects GS customer growth from 1.05 million customers at the end of the 2018-2019 IRP year to more than 1.2 million GS customers by the end of the 2027-2028 IRP year (see Exhibit 3.1). The Company projects that the annual Utah GS usage per customer will be 104.6 Dth in the 2018-2019 IRP year and decline to 92.8 Dth by end of the 2027-2028 IRP year (see Exhibit 3.2). Annual Wyoming GS usage per customer is projected to be 127.7 Dth in the 2018-2019 IRP year and decline to 119.4 by the end of the 2027-2028 IRP year (see Exhibit 3.5).

The Company projects annual usage per Utah residential customer to be 80.8 in the 2018-2019 IRP year and decline to 72.6 Dth (see Exhibit 3.3) by the end of the 2027-2028 IRP year. The Company projects the average annual usage per Utah GS commercial customer to be 436.0 Dth in the 2018-2019 IRP year and 383.4 Dth by the end of the 2027-2028 IRP year (see Exhibit 3.4). The Company projects annual usage per Wyoming residential customer to be at 87.2 Dth in the 2018-2019 IRP year and 80.6 Dth by the end of the 2027-2028 IRP year (see Exhibit 3.6). The Company projects annual usage per Wyoming GS commercial customer to be 460.9 Dth in the 2018-2019 IRP year and 439.9 Dth by the end of the 2027-2028 IRP year (see Exhibit 3.7).

The Company expects system total throughput in this year's forecast to increase from 202.7 MMDth during the 2018-2019 IRP year to 214.3 MMDth by end of the 2027-2028 IRP year (see Exhibit 3.10).

The Company is projecting strong customer growth in Utah driven by a thriving economy, in-migration, and a household formation rate that is exceeding the supply of homes. GS demand in both the residential and commercial classes will continue to grow as a result. Non-GS commercial and industrial consumption will continue to grow modestly. Growth is projected to be slower in the Wyoming territory as the economy struggles with the downturn in natural resource production.

Residential Usage and Customer Additions

Utah

Utah residential GS customer additions through the twelve months ending December 2017 totaled 20,669. Strong housing demand is expected to continue as current economic conditions hold. The Company is forecasting about 22,500 residential additions in the 2018-2019 IRP year and about 22,700 in the 2019-2020 IRP year.

Actual temperature-adjusted residential usage per customer for the twelve months ending December 2017 was 81.7 Dth. The Company projects an average of 80.8 for the 2018-2019 IRP year. The overall downward trend in average consumption is expected to continue through the 2027-2028 IRP year as the pace of new dwelling construction increases and energy efficiency programs continue to incentivize greater efficiency (see Exhibit 3.3).

The Company employs several statistical methods to analyze and forecast residential gas demand. These methods include univariate and multivariate time series modeling of demand and such explanatory variables as demand history, customer growth and commodity price. SAS STAT 14.1 and SAS Enterprise Time Series 14.1 are the software tools used for the statistical time series modeling.

The Company also studies residential consumption by end use such as space heating, water heating and cooking with respect to dwelling size, region, appliance efficiencies, and other such variables. This end use analysis makes extensive use of data collected by the Company's Energy Efficiency Experts as they conduct in-home energy audits through the Energy Efficiency Program as well as regional data from the U.S. EIA and U.S. Census Bureau.

Wyoming

During the twelve months ending December, 2017, the Wyoming residential customer base grew by 99 service agreements. This is a substantial gain since the slowdown in housing construction in that service area that began in the spring of 2014. The Company is forecasting moderate growth and projects about 100 new additions in the 2018-2019 IRP year and 130 in the 2019-2020 IRP year.

The average annual usage per residential customer in Wyoming was 88.7 Dth in calendar year 2017, a decrease of 2.5 Dth from the year prior. The Company forecasts an average of 87.2 Dth during the 2018-2019 IRP year and then a continuation of the long-term downward trend perpetuated by greater appliance and housing shell efficiencies. This long-run decline brings the average to 80.6 in the 2027-2028 IRP year (see Exhibit 3.6).

Small Commercial Usage and Customer Additions

Utah

Temperature-adjusted Utah GS commercial usage per customer for the twelve months ended December 2017 was 457.7 Dth. This year's forecast again reflects the anticipation of a number of GS commercial customers shifting to transportation service rate schedules beyond the coming IRP year. An average of 436.0 Dth by the end of the 2018-2019 IRP year is projected, followed by 419.5 Dth average in the 2019-2020 IRP year (see Exhibit 3.4).

Utah GS commercial customer additions are expected to increase along with the residential level. The Company forecasts approximately 1,300 additions through the 2018-2019 IRP year and about 1,400 in the 2019-2020 IRP year (see Exhibit 3.7).

Wyoming

Usage among commercial GS customers in Wyoming for the twelve months ended December 2017 averaged 473.5 Dth. The Company projects an average of 460.9 by the end of the 2018-2019 IRP year and 459.3 during the 2019-2020 IRP year. The average is expected to continue its long-run decline through the forecast period.

The forecast projects about 10 additions in the 2018-2019 IRP year, and about the same amount in the following IRP year.

Non-GS Commercial, Industrial and Electric Generation Gas Demand

As shown in Exhibit 3.8, annual gas demand among non-GS commercial customers and industrial customers is growing with the continued shifting of some commercial GS customers to transportation service. The Company expects demand in that sector to grow from 55.7 MMDth in the 2018-2019 IRP year to 58.9 MMDth in the 2027-2028 IRP year.

Annual demand among electric generation customers decreased over the prior year by about 38% in 2017. Much of the total demand is used for peaking load generation and can vary considerably over time making accurate forecasting difficult. In addition, baseload generation has been frequently supplemented with open-market procurement over the last couple of years. The forecast assumes a steady electric generation demand at the current level of about 36 MMDth per year – an average of generation demand over the last three years. This is a midpoint of the range of electric generation demand over that period of time.

Firm Customer Design-Peak Day Gas Demand

The Design-Peak Day firm customer demand projection is based on a gas day when the mean temperature is –5 degrees Fahrenheit at the Salt Lake Airport weather station.

Wind speed, temperature, the day of the week, and prior-day demand are significant factors in the prediction of daily gas sales during the winter heating season. Note that the Design-Peak Day demand projection distinguishes between firm sales and firm transportation demand for gas supply and system capacity planning purposes.

As shown in Exhibit 3.9, the firm sales and firm transportation demand for the heating seasons of 2013-2014 through 2017-2018 show actual firm sendout for the coldest day in each season. Design-Peak Day conditions did not occur during those time periods. However, January 2017 represented the 2nd highest total sendout month for the Company and included the 2nd and 3rd highest total sendout days on record. The firm sales Design-Peak Day gas supply projection for the 2018-2019 heating season is 1.330 MMDth and grows to 1.418 MMDth in the winter of 2027-2028.

Periods of Interruption

The Company does not plan to use supply from interrupted customers during periods of interruption. While the Company has the option to buy excess supplies from interrupted customers, and the customers have the option to sell excess supplies, the Company does not know how much of that supply, if any, will be available.

On January 6, 2017, the Company issued an interruption and curtailment notice to its interruptible sales and transportation customers in Utah and Wyoming. The interruption and curtailment was necessary because multiple freeze-offs at processing plants and upstream pipelines resulted in supply uncertainty. About 50% of the customers receiving notification were either unable or unwilling to curtail to the lower of their firm demand or delivered quantities. The Company imposed penalties on those customers who failed to curtail pursuant to the Tariff. The results of the interruption attempt highlight the Company's concern that it may not be able to depend upon its interruptible customers to reduce their demand during a peak event.

Source Data

Where available, the Company has obtained economic, demographic and other data from state and local sources such as the University of Utah's Kem C. Gardner Policy Institute. When current local data were not available, the Company used nationally recognized sources such as IHS, the EIA, and the U.S. Census Bureau.

Utah and Wyoming Economic Outlook

Table 3.1 and Table 3.2 below show the recent history and the current economic outlook for Utah and Wyoming:

Table 3.1: Summary of Utah Economy
Annual Percentage Change

Description	2012 – 2017	2017 - 2018	2017 - 2022	2017 – 2025
Population	1.7%	1.8%	1.7%	1.6%
Personal Income	4.7%	5.7%	6.1%	5.7%
Construction Employment	7.1%	6.7%	6.2%	5.1%
Manufacturing Employment	2.0%	1.4%	0.8%	0.5%
Non-Manufacturing Employment	3.4%	2.8%	2.4%	1.9%
Total Employment	3.3%	2.7%	2.2%	1.7%
Average Housing Starts	18,168	24,993	25,291	25,468

Source: Spring 2018 Long-term Forecasts by IHS

Table 3.2: Summary of Wyoming Economy
Annual Percentage Change

Description	2012 – 2017	2017 - 2018	2017 - 2022	2017 – 2025
Population	0.1%	-0.5%	0.0%	0.1%
Personal Income	1.8%	5.3%	5.2%	4.9%
Construction Employment	-1.9%	0.3%	1.8%	1.4%
Manufacturing Employment	0.1%	2.2%	1.0%	0.6%
Non-Manufacturing Employment	-0.7%	1.5%	1.1%	0.8%
Total Employment	-0.7%	1.5%	1.1%	0.8%
Average Housing Starts	1,909	1,679	1,728	1,771

Source: Spring 2018 Long-term Forecasts by IHS

U.S. Economic Outlook

Table 3.3 is a review of recent history and Table 3.4 shows the consensus economic outlook:

Table 3.3: **U.S. MACROECONOMIC FORECAST**
Source: IHS Review of the U.S. Economy – April 2018

						Forecast	
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Real Gross Domestic Product 1/	2.2	1.7	2.6	2.9	1.5	2.3	2.7
GDP Price Index - Chain Wt. 1/	1.8	1.6	1.8	1.1	1.3	1.8	2.0
CPIU 1/	2.1	1.5	1.6	0.1	1.3	2.1	2.3
Real Disposable Income 1/	3.1	-1.4	3.6	4.2	1.4	1.2	2.6
Pre-tax Profits 1/	10.0	1.7	5.3	-1.1	-2.1	4.4	2.7
Unemployment Rate 3/	8.1	7.4	6.2	5.3	4.9	4.4	3.9
Housing Starts 4/	0.8	0.9	1.0	1.1	1.2	1.2	1.3
3-month Treasury Bills 3/	0.1	0.1	0.0	0.1	0.3	0.9	1.8
30-Year Fixed Mortgage Rate 3/	3.7	4.0	4.2	3.9	3.7	4.0	4.5
Trade Balance 2/	-426	-350	-374	-435	-452	-466	-609
Vehicle Sales – Total 4/	14.4	15.5	16.5	17.4	17.5	17.2	16.9
Real Non-Res Fixed Investment 1/	9.0	3.5	6.9	2.3	-0.6	4.7	5.8
Industrial Production 1/	3.0	2.0	3.1	-1.0	-1.9	1.6	5.2

1/ Annual Rate of Change (Percent)
2/ Billions of 1996 chained dollars
3/ Percent
4/ Million Units

Table 3.4: Long-term U.S. Economic Outlook
Source: IHS GLOBAL INSIGHT Review of the U.S. Economy – April 2018

	2019	2020	2021	2022	2023	2024	2025
Real Gross Domestic Product 1/	2.9	2.1	1.7	1.6	1.7	1.7	1.7
GDP Price Index - Chain Wt. 1/	2.5	2.7	2.6	2.5	2.4	2.3	2.3
CPIU 1/	1.7	2.9	2.5	2.3	2.4	2.3	2.3
Real Disposable Income 1/	3.6	2.4	2.2	2.1	2.4	2.2	1.9
Pre-tax Profits 1/	6.2	3.2	2.5	2.9	1.8	3.4	4.8
Unemployment Rate 3/	3.6	3.6	3.7	4.0	4.3	4.6	4.7
Housing Starts 4/	1.4	1.4	1.4	1.4	1.4	1.4	1.4
3-month Treasury Bills 3/	2.6	3.1	3.2	3.2	3.0	2.8	2.7
30-Year Fixed Mortgage Rate 3/	5.0	5.3	5.4	5.4	5.3	5.3	5.3
Trade Balance 2/	-610	-667	-675	-662	-648	-622	-607
Vehicle Sales - Total 4/	16.8	16.7	16.5	16.5	16.6	16.6	16.8
Real Non-Res Fixed Investment 1/	6.3	4.5	3.2	2.4	1.8	1.3	1.4
Industrial Production 1/	3.3	2.1	1.6	1.4	1.5	1.3	1.5

1/ Annual Rate of Change (Percent)
2/ Billions of 1996 chained dollars
3/ Percent
4/ Million Units

Alternatives to Natural Gas

The Company customers have alternatives to using natural gas for virtually every application. Some customer end-use applications are dominated by other energy sources (cooking and clothes drying) while others are dominated by natural gas (space and water heating). A material shift in available competitive energy options would affect future demand and load profiles.

Full Fuel-Cycle Efficiency

Natural gas remains the most efficient and least expensive form of energy for use in space heating, water heating, cooking, and clothes drying applications. This is particularly evident when compared to electricity through a full fuel-cycle analysis. Full fuel-cycle analysis looks at the journey of different forms of energy, and their associated losses, from the point of production to the point at which the customer receives and uses the energy. Figure 3.1 shows that for each 100 MMBtu of natural gas extracted, 92

MMBtu are delivered to the customer for direct use. Conversely, for each 100 MMBtu of other energy sources extracted for conversion to electricity, 32 MMBtu are ultimately delivered to the customer for direct use. In other words, converting any fuel source into electricity to power comparable electric end-use products only maintains 32% of usable energy.

Figure 3.1 – Full Fuel-Cycle Analysis
(Source: American Gas Association 2017 Playbook)

Solar

Although solar penetration is a significant issue for electric utilities, the Company does not currently anticipate that solar-powered space or water heat will have a significant impact in the Company's natural gas service territory. However, as battery technology improves and solar panels become more affordable with lower material cost and continued federal and state tax credits, their application will become more prevalent in the residential and commercial markets.

The Company will continue to monitor this issue and participate in studies with the Gas Technology Institute (GTI), NYSEARCH, and AGA and will report any impacts on the service territory in future IRPs.

Heat Pumps

In the 2016-2017 IRP, the Company provided information and presented the results of a study on potential regulatory issues related to heat pumps. That study can be found in pages 9 through 16 of the Customer and Gas Demand Forecast section in Docket No. 16-057-08. The Company has seen no substantial changes in this area since the publishing of the study.

Lost and Unaccounted For Gas

The Company calculates the portion of gas that is lost or unaccounted for using a moving three-year average of annual proportions that it derives by dividing the total of system receipts for the twelve-month period ending June 30 into the sum of Company use gas (accounts 810 and 812), loss from tear-outs, and volumes that are unaccounted for during the same period. The updated average is 0.46% and reflects meter-level compensation for temperature and elevation in the Utah service territory that began in August of 2010 and in the Wyoming service territory in October of 2012.

The current calculation for the most recent three years is included in Table 3.5.

Table 3.5 Dominion Energy Estimated Use and Lost and Unaccounted for Gas Calculation

Three-Year Rolling Average (Dth)

Year	QGC Customer Sales	QGC Customer Transport.	Total Receipts	QGC Sales & Transportation	QGC Use Acct. 810&812	QGC Loss Due To Tearouts	QGC Lost & Unaccounted For Gas	Total Sales, Transport, Company Usage and L&U
2014-2015	95,655,542	77,559,159	173,214,701	172,029,397	192,616	29,117	963,572	173,214,701
2015-2016	106,441,947	86,054,640	192,496,587	192,108,233	102,160	30,991	255,203	192,496,587
2016-2017	104,715,760	81,800,370	186,516,130	185,610,886	181,865	30,744	692,635	186,516,130
Total	306,813,249	245,414,169	552,227,418	549,748,517	476,640	90,852	1,911,409	552,227,418

Lost-&-Unaccounted-For-Gas % 0.346%

Company Use and Lost-&-Unaccounted-For-Gas % 0.449%

The Company takes the following steps to minimize the volume of lost or unaccounted for gas:

- **Temperature and Elevation Compensation**. In August of 2010 the Company began compensating for meter-level temperature and elevation in the computation of Dth in its Utah Service Territory, in accordance with the Utah Commission's orders. It made the same change in the Wyoming service territory in October of 2012. As a result, the volume of lost and unaccounted for gas is lower.
- **Maintenance work on gas mains.** When scheduled maintenance work requires the Company to blow down a gas main, the Company allows the main to feed down to the lowest possible pressure before completely blowing it down. This minimizes the amount of gas that is blown down to the atmosphere. The Company records or estimates the pressure in order to calculate the amount of gas that it blows down.

- **Feeder line and belt line replacement projects.** The feeder line and belt line replacement projects replace aging infrastructure to ensure the safety and reliability of the distribution system.
- **Hot tapping.** The Company utilizes hot taps when making branch connections on the feeder line system to eliminate the need to blow down sections of the feeder line. The hot tapping process allows this work to be completed while the line remains in service.
- **Excess flow valves.** Beginning in 2006, the Company proactively began installing Excess Flow Valves (EFVs) on all new and replaced services to single family residences. In 2008, the Pipeline Hazardous Materials and Safety Administration (PHMSA) promulgated a rule requiring installation on all new and replaced service lines to single family residences. Beginning in 2013, the Company proactively began installing EFVs on service lines 2-inches and smaller with usage of 5,000 cfh and under. This year, PHMSA enacted a rule requiring, among other things, the installation of EFVs on all services 1,000 cfh and smaller. 49 CFR 192.383 and 49 CFR 192.385. PHMSA regulations also require operators like Dominion Energy to notify all customers in writing or electronically of the availability of EFVS. On April 6, 2017, the Company issued a letter to the Utah and Wyoming Commissions explaining its compliance with the new PHMSA rule related for excess flow valves. On April 7, 2017, the Company began publishing such notice on its website and it included further notice in its Gaslight News in the May, 2017 issue.
- **Leak survey and repair.** The Company regularly conducts leak surveys and performs system maintenance as required. The Company conducts additional leak surveys in Class 3 and Class 4 locations.
- **Response time to leak calls.** The Company continues to evaluate ways to reduce the response time to gas leak calls through efficiencies in how employees are dispatched to these gas leaks. The Company has implemented a Global Positioning System (GPS) to allow dispatchers the ability to dispatch personnel based on their geographic location with respect to the leak.
- **Leak detection equipment.** The Company utilizes advanced technologies for locating and identifying leaks. Examples include the remote methane leak detection (RMLD) and the Rover and SENSIT gas detector.
- **Research and Development.** The Company participated in a GTI study to identify factors for fugitive emissions from various types of facilities. Starting in April of 2018, the Research and Development team also began a project to use Global Positioning System (GPS) to track construction equipment in real-time near the Company's pipelines in the Geographic Information System (GIS).
- **Pressure Monitoring at Regulator Stations.** The Company is adding remote pressure monitoring at district regulator stations that takes the place of token relief valves and eliminates the potential release of gas.

Forecast Exhibits

The following charts summarize the 10-year customer and gas demand forecast. All charts contain temperature-adjusted data with forecast horizons summarized on an IRP-year basis (June 1 – May 31).