



PENNSYLVANIA NATURAL GAS OUTLOOK REPORT

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Section 1 - Exposition

I. Introduction

The Public Utility Code requires natural gas distribution companies (NGDCs) to file annual financial reports with the Pennsylvania Public Utility Commission (PUC).¹ These Reports detail financial and accounting data, including revenues and expenses. NGDCs are also required to file annual resource planning reports (ARPR) with the PUC.² NGDCs with sales of 8 billion cubic feet (Bcf) of gas per year or more must file these reports, which include the past year's historical data, program changes and the next three-year forecast of demand requirements.³

This report has been prepared using information filed by the NGDCs, including the information in the reports noted above, as well as the U.S. Energy Information Administration (EIA) and other sources. The most recent available data is reported, although much of the EIA production and reserves data has a one-year lag for reporting. With the uncertainty of the unconventional gas supplies, EIA has not presented proven reserves information since 2009.

¹ 52 Pa. Code § 59.48.

² 52 Pa. Code § 59.81.

³ The NGDCs in PA with sales of 8 Bcf or more include Philadelphia Gas Works (PGW), PECO Energy Company (PECO), Columbia Gas of PA (Columbia), Peoples Natural Gas Company (Peoples), Peoples Gas Company (Peoples Gas), UGI, and National Fuel Gas Distribution Company (NFG).

II. Executive Summary

The PUC's Bureau of Technical Utility Services has prepared this report to summarize the 2018 financial and supply and demand data for the Pennsylvania NGDCs. This report also presents several topics of interest regarding the Pennsylvania natural gas industry. National trends in the natural gas industry are affected by trends and events in Pennsylvania. Therefore, macroeconomic and industry data for the entire U.S. are included in this report.

Dry natural gas production in the U.S. averaged 83.4 Bcfd in 2018. This was an increase of 11.5% from 2017.

National Summary

The national natural gas storage inventory peak for the 12 months prior to this winter heating season⁴ was 3.2 trillion cubic feet (Tcf). This was 0.6 Tcf lower than the peak from the prior injection season. Domestic dry natural gas production in the U.S. averaged 83.4 billion cubic feet per day (Bcfd) in 2018, which was an increase of 11.5% from 2017. Production had increased by 1% in 2017 as compared to 2016.⁵ Domestic consumption in 2018 was 81.9 Bcfd, which is a decrease of 7.6 Bcfd from 2017. Henry Hub spot prices averaged \$3.15 per million British thermal units (MMBtus) in 2018, which is an increase of 5.4% from \$2.99 in 2017.⁶ An analysis of Henry Hub natural gas futures contracts in comparison to Henry Hub spot prices⁷ shows an expected decline in prices in 2020; producing a national average price of \$2.40/MMBtu for 2020.⁸

⁴ 2017-2018 heating season.

⁵ EIA, *EIA Natural Gas Gross Withdrawals and Production*, available at <http://www.eia.gov>.

⁶ Henry Hub is a distribution hub in Louisiana. The price at this delivery point is frequently used by industry and trading markets as a benchmark for natural gas prices.

⁷ CME Group, available at <http://www.cmegroup.com/trading/energy/natural-gas/natural-gas.html>.

⁸ EIA, *EIA Short Term Energy Outlook*, available at <http://www.eia.gov>.

Pennsylvania Summary

There are over 3 million natural gas customers in Pennsylvania, with about 2.5 million residential customers.⁹ There are 31 regulated natural gas utility companies in Pennsylvania,¹⁰ and 10 of these are major distribution companies with gross revenues greater than \$40 million per year.¹¹ Pennsylvania's natural gas infrastructure includes intrastate pipelines, interstate pipelines, landfill gas pipeline projects, propane facilities and liquefied natural gas (LNG) facilities. Infrastructure needs are being met by expansion and replacement of existing pipelines, with new pipelines and compressor stations being constructed.

As of Oct. 4, 2019, 27,726 unconventional drilling permit applications have been filed with the Pennsylvania Department of Environmental Protection (1,091 new applications YTD 2019).¹² Of those 27,726 applications, 12,164 unconventional wells have been.¹³ As of October 4, 2019, there were 36 rotary rigs active in Pennsylvania, a 20% decrease in of the number of active rigs a year ago. Rotary rigs are a piece or set of equipment, usually mobile, that is used to provide the rotational force needed to drill a borehole. The rotary rig count is an indicator of how many rigs are in service and the demand for drilling equipment.¹⁴ The EIA estimates that there were 67,209 producing shale and conventional gas wells in Pennsylvania in 2017, which is a 1.8% decrease from 2016.¹⁵

⁹ EIA, *EIA Number of Natural Gas Consumers*, available at <http://www.eia.gov>.

¹⁰ One of the distribution companies is the Equitable Division of Peoples Natural Gas. While it is still separately certificated, Peoples is running both divisions as one company. Additionally, UGI Utilities, Inc – Gas Division recently consolidated UGI Penn Natural Gas and UGI Central Penn Gas into one company, with three separate rate divisions, but they are still separately certificated. See Docket No. A-2018-3000381, Order Entered September 20, 2018.

¹¹ \$40 million in gross revenue is the threshold over which an NGDC files under 66 Pa. C.S. § 1307(f) to recover natural gas costs.

¹² A conventional gas well is typically shallower than an unconventional well, and drills into a pocket or reservoir of gas. Such wells generally rely on the natural pressure to extract the gas once the well is drilled. An unconventional well uses more sophisticated means to extract gas from underground deposits, typically by hydraulic fracturing of shale structures (fracking). These unconventional wells also tend to require drilling to much greater depths than conventional wells.

¹³ See *PA DEP Well Permit Workload Report*, available at <http://www.dep.pa.gov/DataandTools/Reports/Oil%20and%20Gas%20reports/Pages/default.aspx>.

¹⁴ Baker Hughes, rotary rig count, available at <http://www.bakerhughes.com/rig-count>.

¹⁵ EIA, *Number of Producing Gas Wells*, available at <http://www.eia.gov>.

Financial statistics taken from the Gas Annual Reports of the NGDCs are presented in Section VII, in time series fashion from 2008 through 2018. Sections V through VII present broad category financial data for several categories, including revenue, expenses, plant in service, depreciation, maintenance, and gas costs. Data on the number of customers, reserves, wellhead prices, Pennsylvania production and average consumption is also provided.

The following are a few of the notable statistics contained in this report:

- Total natural gas consumption in Pennsylvania has increased from 706.2 Bcf in 1997 to 1,264 Bcf in 2017.
- Pennsylvania gas production reached 6.2 Tcf in 2018, up from only 80 Bcf (0.08 Tcf) in 1997, and up 13.6% from 2017.
- Gas deliveries for Pennsylvania electric generation have increased markedly from 3% of total deliveries in 1997, to 45% in 2018, or 20 Bcf in 1997 as compared to 546 Bcf in 2018.¹⁶ This has accelerated dramatically in recent years, with an increase of 24.1% year over year, from 440 Bcf in 2017 to 546 Bcf in 2018.

¹⁶ EIA, *Natural Gas Consumption by End Use*, available at <http://www.eia.gov>.

III. Pennsylvania Natural Gas Infrastructure

Pipelines

Twenty interstate natural gas pipelines exist in the Northeast Region, which includes Connecticut, Delaware, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Virginia and West Virginia. These interstate pipelines deliver to several intrastate pipelines and more than 50 local distribution companies (LDCs). They also deliver to natural gas-fired electric generating facilities and large industrial customers. The pipelines in Pennsylvania have access to natural gas production from the South and Midwest, from the Rocky Mountains via the Rockies Express Pipeline, from Canada, and from the Marcellus and Utica Shales that span large portions of Pennsylvania, Ohio, and West Virginia.¹⁷

Marcellus shale production in the northeast U.S. has risen from 0.5 Bcfd in January 2010 to 22.5 Bcfd in August 2019. Despite this vast increase in production, many portions of eastern Pennsylvania and New England are still subject to higher priced gas, as well as dramatic spikes in price during cold snaps in the winter heating season. These price differences are mostly caused by a lack of pipeline capacity to transport supply to the markets with demand. There are 97.5 Bcfd of pipeline projects that have been, or are scheduled to be, placed in service in the Northeast region in 2019. A further 105.9 Bcfd of projects are scheduled to be placed in service in 2020, as shown in Tables 1 and 2 below, respectively. The additional pipelines are intended to remove some of the above-mentioned constraints and may assist in stabilizing regional prices by moving the increased Marcellus Shale gas production to market or linking other sources of gas to the Northeast region.¹⁸

¹⁷ EIA, Natural Gas Pipelines in the Northeast Region, *About U.S. Natural Gas Pipelines*, available at <http://www.eia.gov>.

¹⁸ EIA, *EIA Marcellus Region Drilling Productivity Report*, available at <http://www.eia.gov>.

Table 1: Proposed Pipeline Infrastructure for 2019 In-Service¹⁹

Project Name	Pipeline Operator Name	State(s)	Additional Capacity (MMcf/d)
Adelphia Gateway Project	Adelphia	PA	775
Appalachian Lease Project (TEAL) Phase 2	Texas Eastern Transmission	OH	313
Eastern Market Access Project	Dominion Cove Point LNG PL Co	MD, VA	150
Eastern Shore 2017 Expansion	Eastern Shore Natural Gas	PA, MD, DE	61
Eastern System Upgrade Project	Millennium Pipeline	NY	223
Empire North Expansion Project	Empire Pipeline	PA, NY, ON	300
Equitrans Expansion Project	Equitrans LP	PA, WV	600
Lambertville East Expansion Project	Texas Eastern Transmission	NJ	60
Line KNYS Uprate Project	National Fuel Gas Supply Corp	NY, PA	15
Line N to Monaca Project	National Fuel Gas Supply Corp	PA	133
Mountaineer XPress Pipeline Phase 1	Columbia Gas Transmission	WV, KY	700
Mountaineer XPress Pipeline Phase 2	Columbia Gas Transmission	WV, KY	2,200
Northeast Supply Enhancement Project	Transcontinental Gas Pipeline	PA, NJ, NY	400
PennEast Pipeline Co	PennEast Pipeline Co	PA, NJ	1,107
Portland Xpress Project Phase 2	Portland Natural Gas Transmission System	ME, NH, MA	11
Risberg Line	RH energytrans LLC	PA, OH	55
Rivervale South to Market Project	Transcontinental Gas Pipeline	NJ	190
Southside Connector Distribution Project	Virginia Natural Gas	VA	
Supply Header Project	Dominion Transmission	PA, WV	1,500
Sweden Valley Project	Dominion Energy Transmission Co	PA, OH	120

¹⁹ EIA, EIA Natural Gas Pipeline Projects, available at <http://www.eia.gov>

Table 2: Proposed Pipeline Infrastructure for 2020 In-Service²⁰

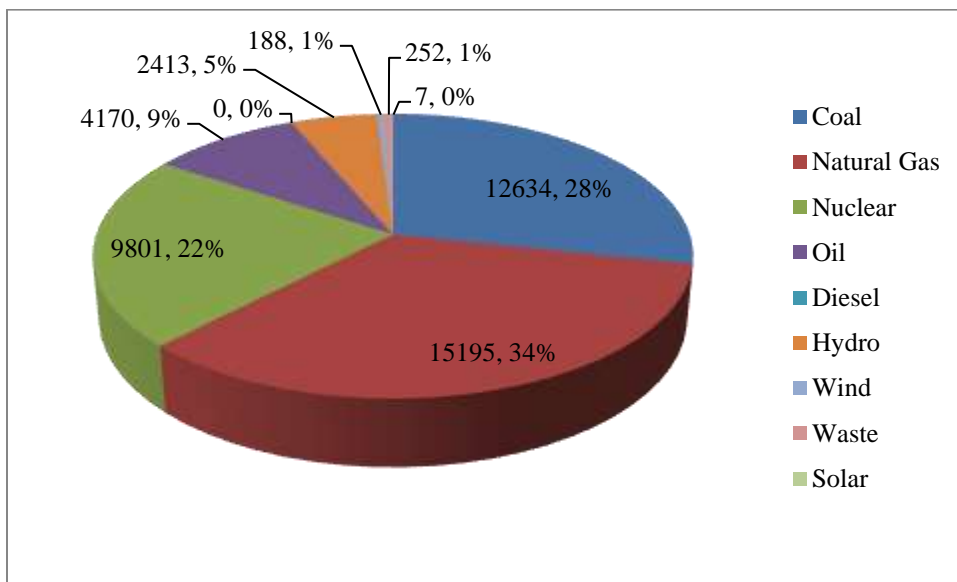
Project Name	Pipeline Operator Name	State(s)	Additional Capacity (MMcf/d)
Atlantic Coast Pipeline	Atlantic Coast Pipeline	WV, VA, NC	1,500
Bernville Compressor Station Project	Texas Eastern Transmission	PA	0
Buckeye Xpress	Columbia Gas Transmission	OH, WV, KY	275
Central Corridor Pipeline Extension	Duke Energy Ohio	OH	1
Compressor Station 261 Upgrade Project	Tennessee Gas Pipeline Co	MA, CT	72
Constitution Pipeline	Constitution Pipeline Co	PA, NY	650
Del-Mar Energy Pathway Project	Eastern Shore Natural Gas	MD, DE	14
Diamond East Project	Transcontinental Gas Pipeline	PA, NY	1,000
Eastern Panhandle Expansion Project	Columbia Gas Transmission	PA, WV	48
EQT H-320 Pipeline Project	Equitrans LP	WV	85
Greene Interconnect Project	Mountain Valley Pipeline, LLC	WV	0
Mountain Valley Pipeline	Mountain Valley Pipeline, LLC	WV, VA	2,000
MVP Southgate Project	Mountain Valley Pipeline, LLC	VA, NC	300
Southeastern Trail Expansion Project	Williams Transco	VA, NC, SC, GA, AL, MS, LA	296
VNG Suffolk No. 3 Meter Station Expansion Project	Columbia Gas Transmission	VA	8
Wright Interconnect Project	Iroquois Pipeline Co	NY	650
Yorktown Meter Station Upgrade	Algonquin Gas Transmission	NY	21

²⁰ EIA, EIA Natural Gas Pipeline Projects, available at <http://www.eia.gov>

IV. Natural Gas Generation and End Uses in Pennsylvania

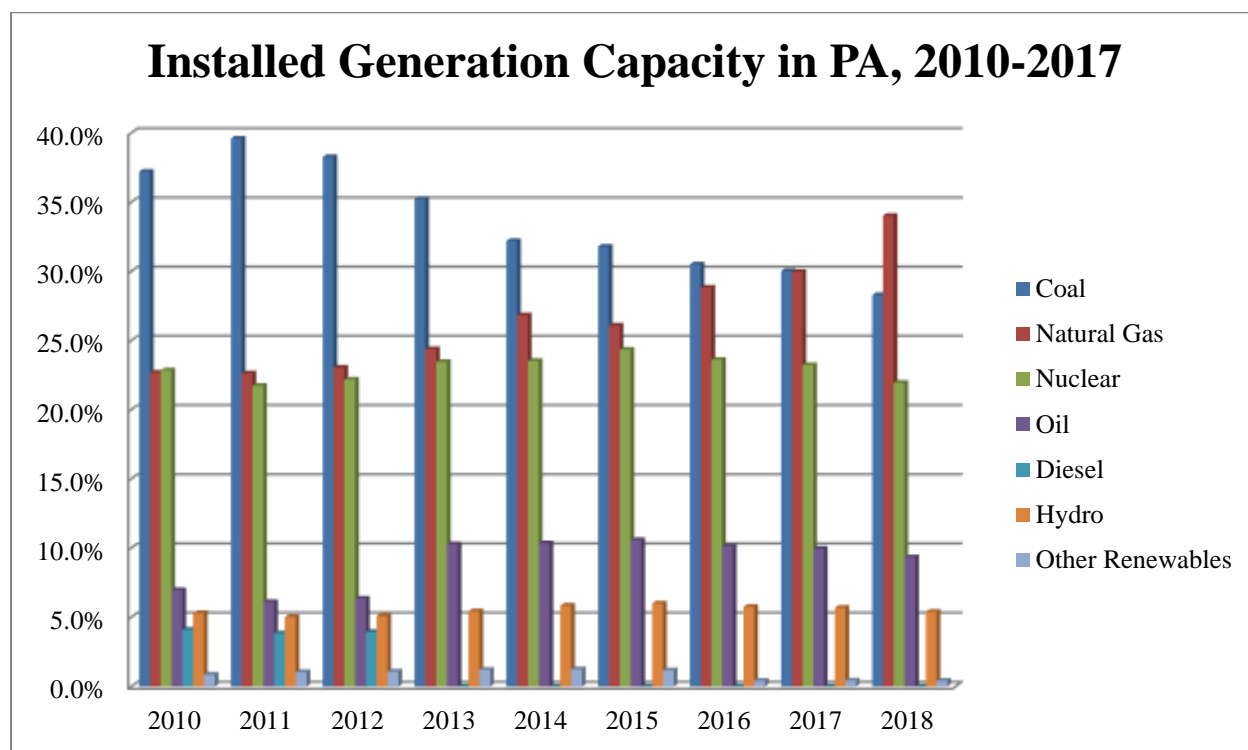
By the end of 2018, Pennsylvania had 15,195 megawatts (MWs) of natural gas fired electric generation installed capacity, as shown by comparison to other capacity fuel sources in Chart 1, below.²¹ These facilities constitute 34% of Pennsylvania’s generating capacity, up from 30% the prior year, making natural gas the largest portion of Pennsylvania’s generation mix for the first time, overtaking coal. All other generation sources stayed relatively flat or had slight declines, so the change in the share of natural gas capacity was caused almost entirely by the 2,532 MW increase in natural gas capacity. Chart 2, below, shows the percentage of generation capacity by fuel source over time, from 2010 through 2018. Chart 2 also shows that natural gas has been steadily increasing as a share of the total capacity in PA, firmly overtaking coal in 2018.

Chart 1: Capacity in Pennsylvania by Fuel Type at Year End 2018 (MW)



²¹ Data from PJM’s 2018 PA State Report

Chart 2: Installed Generation Capacity in PA, 2010-2018



Charts 3 and 4, below, summarize the PJM queue for new electric generation capacity for Pennsylvania as of Dec. 31, 2018. The queue includes 11,467 MW of proposed new natural gas fired capacity, making up 74% of the PJM queue for Pennsylvania. However, PJM treats intermittent energy sources, such as solar, wind, and storage facilities differently than other generation sources when bidding into PJM’s capacity market. These facilities are assigned an Unforced Capacity value (UCAP) by PJM, which is a fraction of the Installed Capacity (ICAP), or nameplate value for the facility. For wind resources, UCAP is roughly 15% of ICAP on average, and for solar resources it is roughly 50% of ICAP. With this in mind, Chart 4 shows the PJM queue with UCAP values for the appropriate resources in the queue. In Chart 4, we can see that natural gas takes up 74% of the PJM queue for Pennsylvania.^{22 23} Of note this year is the

²² PJM Pennsylvania State Report 2018

²³ The largest component of the “Other” fuel types based is Storage (144 MW), followed by Nuclear (94 MW).

increase in Solar and Hydro projects in the queue. Typically, about 25% of the projects in PJM's queue are actually built.²⁴

Chart 3: Queued Capacity (ICAP) in Pennsylvania by Fuel Type (MW)

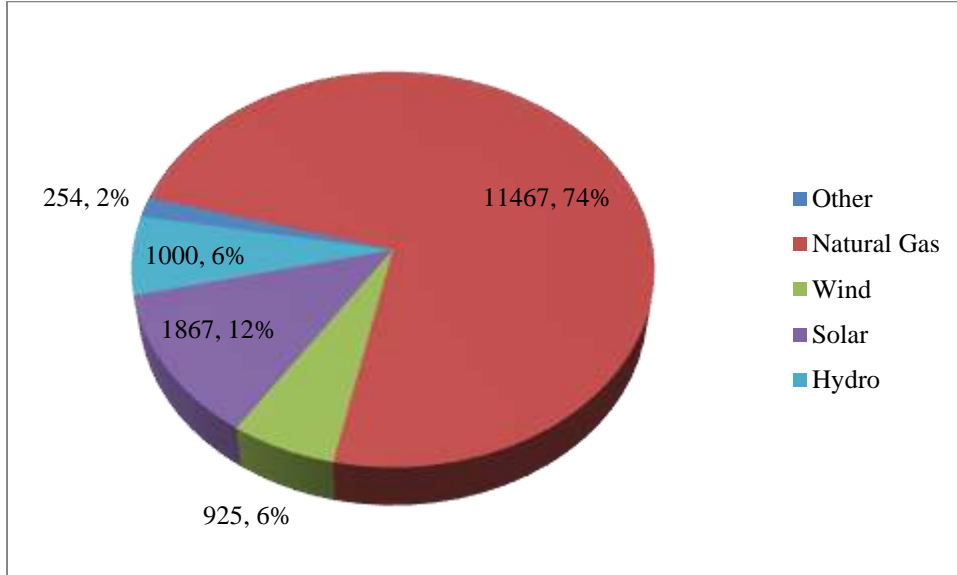
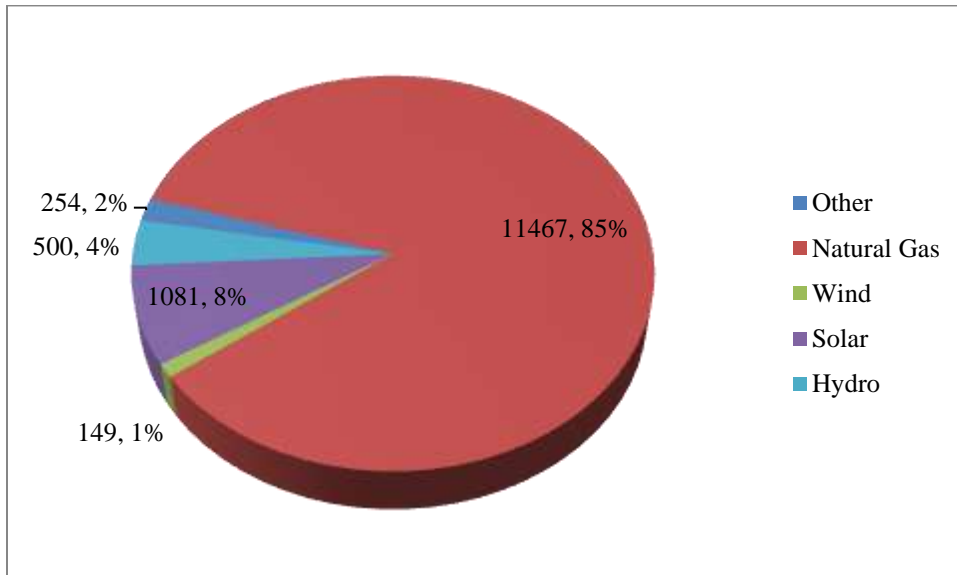


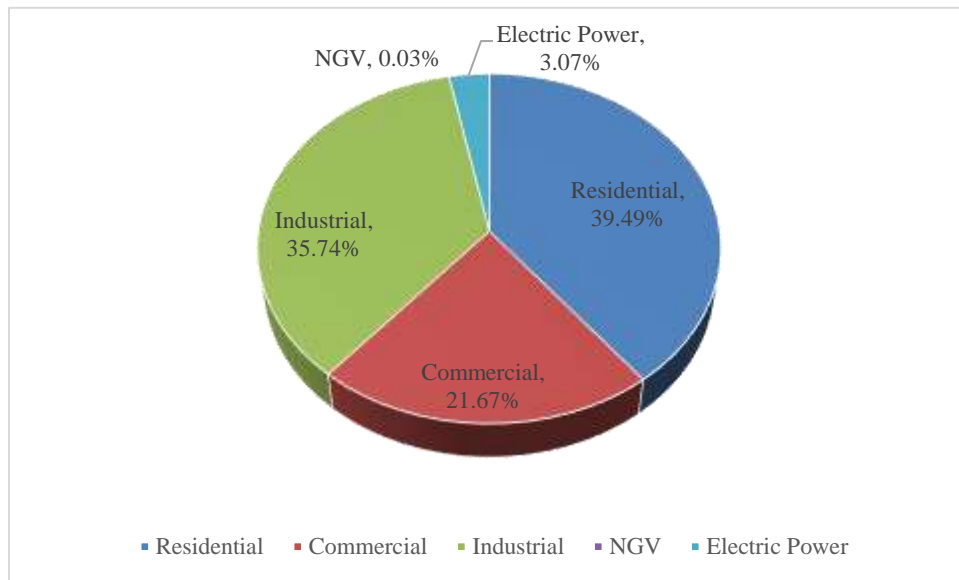
Chart 4: Queued Capacity (UCAP) in Pennsylvania by Fuel Type (MW)



²⁴ PJM, *PJM Regional Transmission Expansion Plan Report*, available at <http://www.pjm.com>.

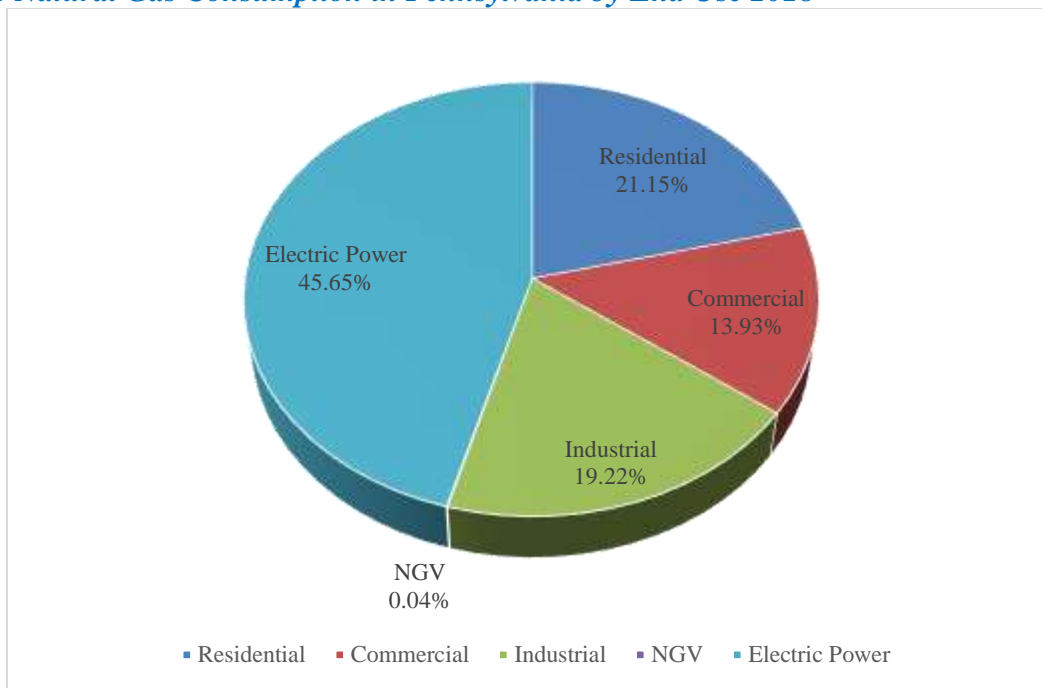
Charts 5 and 6, below, compare the gas consumed in Pennsylvania for electric generation compared to other end-uses in 1997 and 2018, respectively. As depicted, the fraction of natural gas usage for electric generation has dramatically increased. Reasons for this increase include: greater supply of natural gas and the resultant lower cost for natural gas; the advancement of efficient natural gas fueled electric generation technology; and retirements of older coal-fired plants. As the composition of the generating fleet changes to more gas-fired units, pressure will increase on the natural gas industry to augment production and transportation capacity.

Chart 5: Natural Gas Consumption in Pennsylvania by End Use 1997²⁵



²⁵ NGV = Natural Gas Vehicles

Chart 6 Natural Gas Consumption in Pennsylvania by End Use 2018

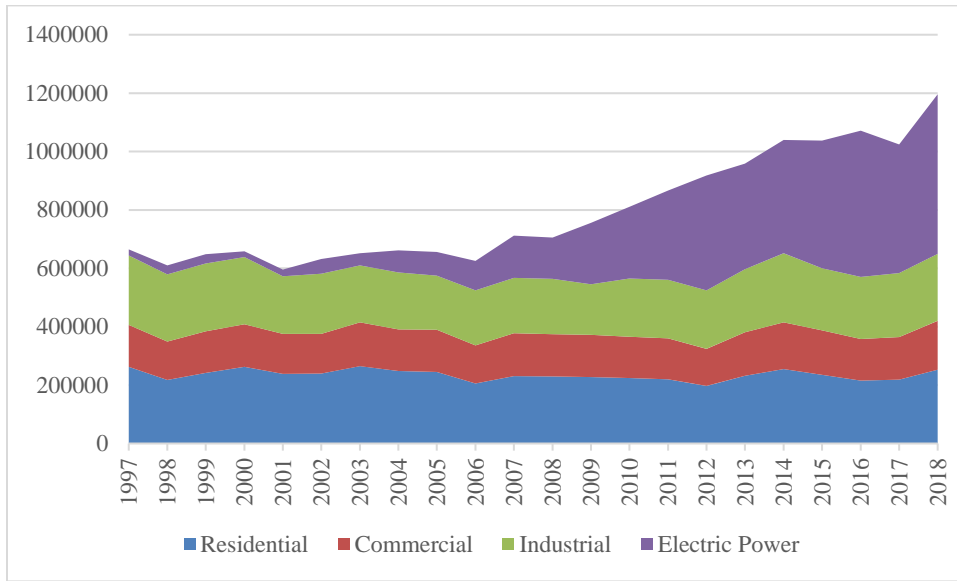


The dramatic shift in the use of natural gas from primarily residential, commercial, and industrial uses to electric power generation has been occurring steadily over the period from 1997 through 2018, with a marked acceleration beginning in 2008 as Marcellus Shale production ramped up, as seen in Figure 1, below. Notably, natural gas usage for electric generation increased just over 50% from 2013 to 2018, rising 183 Bcf, while total usage increased 238 Bcf over the same period.²⁶ Gas usage for all other end uses also increased over this period. Electric consumption was up year over year, with a 3.92% increase in 2018 as compared to 2017.²⁷

²⁶ Usage for NGVs actually increased over this time period, but since the amount going to this sector is so small, it is negligible for the purposes of the analysis in this section. NGV usage went from 312 MMcf to 537 MMcf, an increase of 72% from 2013-2018.

²⁷ PUC *Electric Power Outlook Report*, August 2018

Figure 1: Natural Gas Deliveries in Pennsylvania by End Use 1997-2018

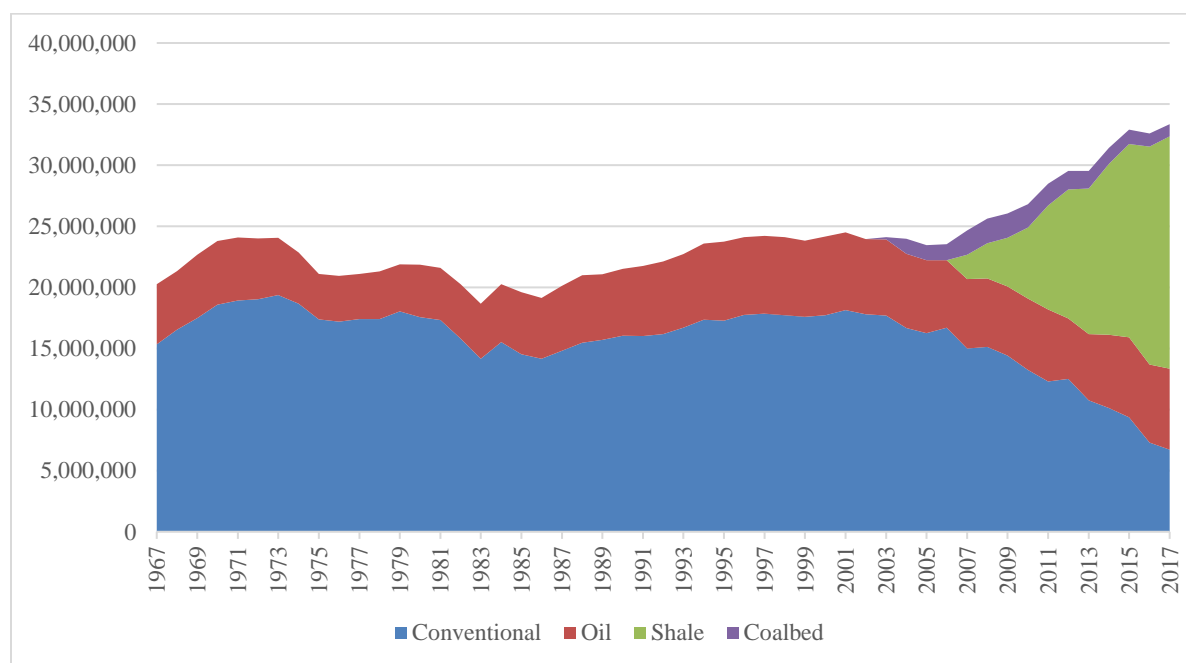


V. Natural Gas Production, Consumption, Reserves, and Prices

United States

Total U.S. withdrawals of natural gas were 33.4 Tcf in 2017, of which, gross withdrawals of unconventional shale gas were 19 Tcf.²⁸ As shown in Figure 2 below, this is the fifth consecutive year in which unconventional shale gas withdrawals outpaced conventional gas wells in the U.S. This trend is accelerating, with the spread between shale and conventional gas production increasing from 1.2 Tcf in 2013 to 12.3 Tcf in 2017. Total US withdrawals of natural gas increased to 37 Tcf in 2018, a 10.8% increase over 2017.

Figure 2: US Gross Natural Gas Withdrawals (MMcf), 1967-2017²⁹



²⁸ EIA, *EIA Natural Gas Summary*, available at <http://www.eia.gov>.

²⁹ EIA did not have a breakdown of production by well type for 2018 at the time this report was generated.

The national storage inventory peak for the prior heating season was 3.2 Tcf and was reached in November 2018. This is down from the peak from the prior injection season of 3.8 Tcf in November 2017. Dry natural gas production in the U.S. averaged 83.4 Bcfd in 2018. This was an increase of 11.5% from 2017. Over the past decade, U.S. domestic dry natural gas production has increased an average of 4.2% per annum.³⁰ Domestic natural gas consumption was 81.9 Bcfd in 2018, up 7.6 Bcfd from 2017.³¹ Henry Hub spot prices averaged \$3.15 in 2018, an increase of 5.4% from \$2.99/MMBtu in 2017.

An analysis of Henry Hub natural gas futures contracts in comparison to Henry Hub spot prices³² shows an expected decline in price over the coming year; 2019 has averaged \$2.62/MMBtu so far, while the average projected price is \$2.40/MMBtu for 2020.³³ Although the Henry Hub price is frequently used as a benchmark for the “price” of natural gas, there are significant differences in price at delivery points based on geography. For example, the Dominion South Hub is located in southwestern Pennsylvania, which is in the middle of the Marcellus and Utica Shale plays. Figure 3, below, shows the futures prices for Henry Hub and Dominion South Hub through May 2021 delivery dates. Henry Hub prices are consistently higher, with an average basis spread over the 12 months ending May 2021 of \$0.46/MMBtu.³⁴

³⁰ EIA, *Natural Gas Gross Withdrawals and Production*, available at <http://www.eia.gov>.

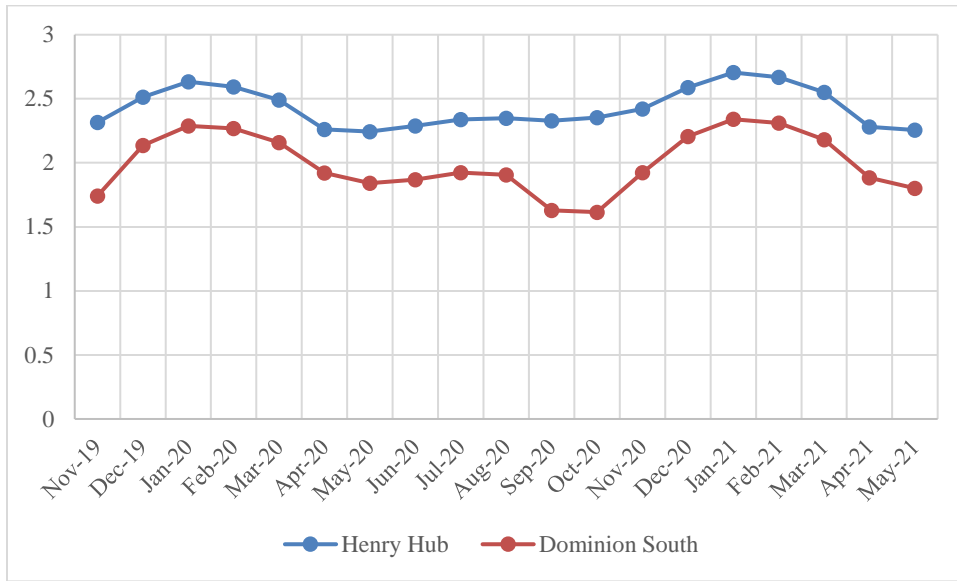
³¹ EIA, *Natural Gas Consumption by End Use*, available at <http://www.eia.gov>.

³² CME Group, available at <http://www.cmegroup.com/trading/energy/natural-gas/natural-gas.html>.

³³ EIA, *EIA Short Term Energy Outlook*, available at <http://www.eia.gov>.

³⁴ CME Group, available at <http://www.cmegroup.com/trading/energy/natural-gas/natural-gas.html>.

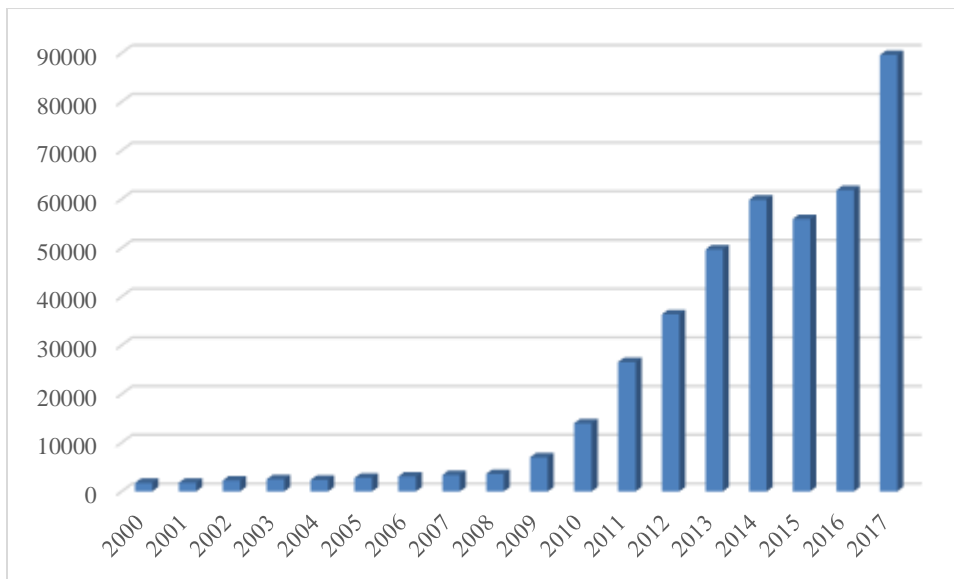
Figure 3: Henry Hub and Dominion South Hub Futures Prices (\$/MMBtu)



Pennsylvania

This section presents Pennsylvania specific data. The data includes sales by NGDCs, deliveries by NGDCs for competitive suppliers and production of natural gas in Pennsylvania. Dry proved reserves for Pennsylvania as of Dec. 31, 2017, were 89.6 Tcf, a significant increase of 44.9% from 2016. Pennsylvania's dry proved reserves since 2000 can be seen in Figure 4, below.

Figure 4: Pennsylvania's Dry Proved Reserves (Bcf), 2000-2017³⁵



The EIA estimates that there were 67,200 producing natural gas wells in Pennsylvania in 2017.³⁶ As of Oct. 4, 2019, 27,726 unconventional drilling permit applications had been filed with the Pennsylvania Department of Environmental Protection. Of those applications, 12,151 unconventional wells have been drilled.³⁷ As of Oct. 4, 2019, there were 36 rotary rigs active in Pennsylvania, a 20% decrease in of the number of active rigs a year ago. Rotary rigs are a piece or set of equipment, usually mobile, that is used to provide the rotational force needed to drill a

³⁵ 2018 Data was not yet available.

³⁶ EIA, *Natural Gas Annual*, available at <http://www.eia.gov>.

³⁷ Pennsylvania Department of Environmental Protection Well Permit Workload Report, available at http://www.portal.state.pa.us/portal/server.pt/community/oil_and_gas_reports/20297.

borehole. The rotary rig count is an indicator of how many rigs are in service and the demand for drilling equipment.³⁸ Table 4, below, illustrates that Pennsylvania’s production in 2018 greatly exceeded its deliveries to consumers in the state, specifically by nearly a factor of 5 in 2018.

Table 4 Historical Pennsylvania Deliveries, Transportation and Production (Bcf)³⁹

Year	Gas Delivered to Consumers	Delivered for the Account of Others (Transport)	PA Gross Gas Production
1997	664.8	261.2	80.0
1998	609.8	273.4	130.3
1999	648.2	293.5	174.7
2000	659.0	292.0	150.0
2001	596.0	254.2	130.9
2002	632.0	270.6	157.8
2003	651.9	264.3	159.8
2004	662.5	258.2	197.2
2005	656.1	246.8	168.5
2006	625.9	247.3	176.0
2007	711.9	259.1	182.3
2008	705.3	260.6	198.3
2009	755.9	253.3	273.9
2010	811.2	283.2	572.9
2011	866.8	287.6	1,310.6
2012	918.5	293.5	2,256.7
2013	959.0	331.4	3,259.0
2014	1,039.9	362.7	4,257.7
2015	1,038.3	332.5	4,813.0
2016	1,072.1	326.3	5,210.2
2017	1,025.0	335.2	5,463.9
2018	1,196.6	N/A	6,206.9

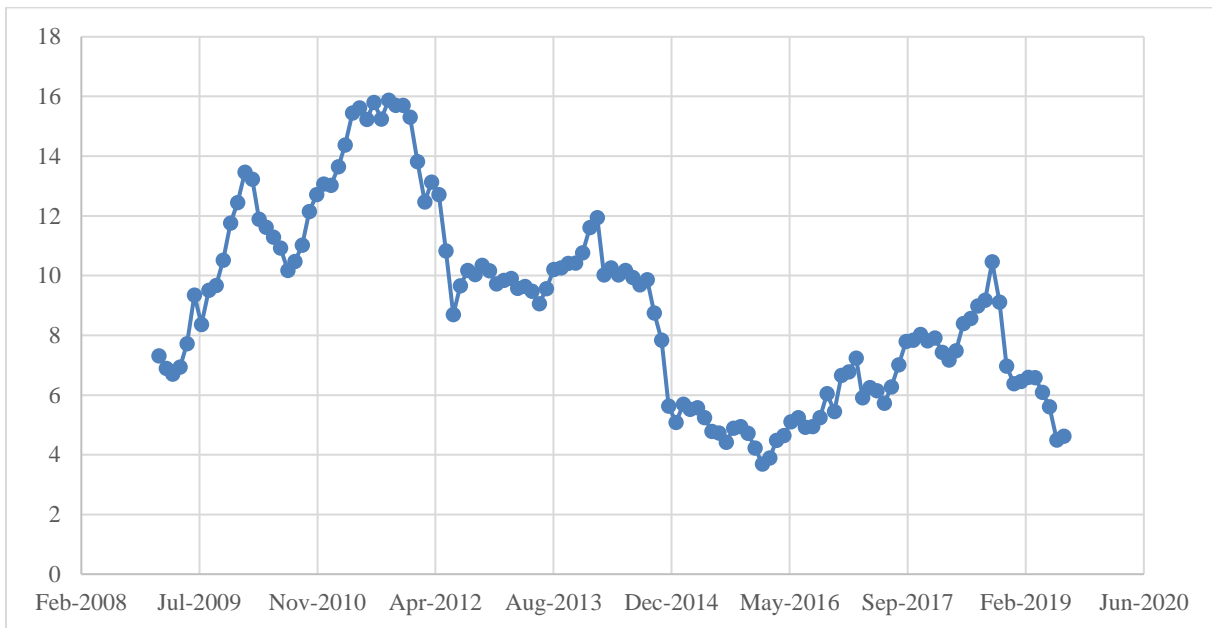
³⁸ Baker Hughes, rotary rig count, available at <http://www.bakerhughes.com/rig-count>.

³⁹ EIA, <http://www.eia.gov>.

NGLs

Natural gas liquids (NGLs) prices have been declining through 2019 as production increased, and as more drillers had shifted to areas of higher NGL content.⁴⁰ Meanwhile, pipeline capacity to move the NGLs to markets has not caught up with production, further exacerbating the oversupply of NGLs that cannot be delivered to demand centers. Figure 5, below shows the NGL Composite price from January 2009 through June 2019.⁴¹

Figure 5: NGL Composite Price (\$/MMBtu)⁴²



Based on the pricing trend shown in Figure 5, and as explained below, it appears that there is still likely an insufficient local market for the NGLs in the Marcellus shale area, mostly due to limited local processing and transportation capacity. Sunoco Logistics Partners LP (Sunoco) is looking to fill this void in the NGL marketplace by investing in the Mariner East II pipeline project. Sunoco had previously boosted its capability for the transportation of NGLs by repurposing its previously existing Mariner East I pipeline, allowing it to transport propane

⁴⁰ NGLs are hydrocarbons with a higher molecular weight than methane. Some examples include ethane, propane, and butane.

⁴¹ Just as the Henry Hub has historically been a standard for natural gas pricing because it is geographically near the production centers in the south, Mont Belvieu is similarly situated geographically.

⁴² EIA, Natural Gas Futures Prices (NYMEX), available at <http://www.eia.gov>.

beginning in 2014, and ethane beginning in 2016. Sunoco had planned to complete the Mariner East II project in the third quarter of 2017, bringing a total capacity of approximately 350,000 barrels per day of NGLs online.⁴³ In August of 2019, the Mariner East II pipeline came on line, transporting ethane, propane, and butane from the Marcellus and Utica shale regions to eastern markets, principally including the Marcus Hook industrial complex along the Delaware River. It remains to be seen if this additional transportation capacity will cause a rise in NGL prices going forward.

⁴³ Sunoco Logistics, information available at <http://www.sunocologistics.com/Customers/Business-Lines/Natural-Gas-Liquids-NGLs-Segment/257/>.

NGLs and the Natural Gas Market

At this time, a significant amount of NGLs are still simply sold directly into the natural gas system, owing to a lack of supply transportation to other markets, i.e., manufacturing, retail sales, etc. With natural gas prices still relatively low, this adds to the downward pressure on NGL prices. However, over the past two years, the pricing for NGLs has begun to rise, as Mariner East I came online for ethane service, and some energy companies have begun transporting additional quantities of NGLs through other means, such as rail and road transportation.⁴⁴ These transportation options have allowed more NGLs to be sold to higher priced markets, such as manufacturing. Also, the price of natural gas has risen somewhat over the previous two years, boosting the price received for NGLs sold back into the natural gas pipelines.

As additional new pipelines are placed in service, it is possible that a substantial shift in the relationship between NGL supplies and the natural gas market could develop. Currently, there is a substantial, though unmeasured, volume of NGLs within the natural gas system, both in Pennsylvania and throughout the U.S. This causes variation in the heat content of natural gas being delivered to consumers. Heat content is a measure of the amount of energy derived from a given quantity of gas when it is combusted, usually measured in Btu. For example, pure methane, the primary component of natural gas, has a heat content of 1,010 Btu/ft³.⁴⁵ Ethane, the most common NGL to be produced from natural gas wells by volume, has a much higher heat content of 1,783 Btu/ft³. Other potential impurities in natural gas, such as carbon monoxide, have much lower heat content.⁴⁶

It is possible for the heat content of the mixture that is delivered to a customer to have a heat content either higher or lower than that of pure methane, depending on the amounts of these various impurities within a given sample of natural gas. If it is higher, an estimate can be made of the amount of NGLs present in the gas. To prepare estimates of the amount of NGLs in gas produced in Pennsylvania, two assumptions have been made:

⁴⁴ <https://www.reuters.com/article/us-range-resources-npls-mariner-east/range-finds-alternatives-to-ship-npls-due-penn-mariner-east-shutdown-idUSKCN1J42EK>

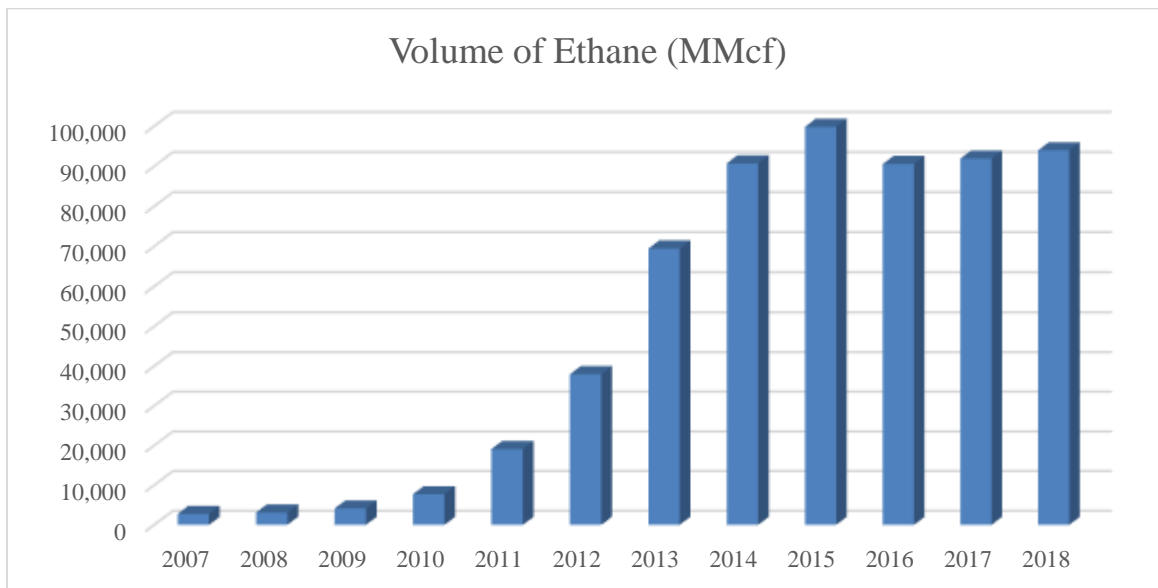
⁴⁵ In the natural gas industry, the heat content of natural gas is often approximated to be 1,000 Btu/ft³.

⁴⁶ Carbon monoxide has a heat content of 323 Btu/ft³.

1. The heat content of gas consumed in Pennsylvania is the same as the heat content of the gas being produced in Pennsylvania. This assumption is necessary since EIA only provides data on the heat content of gas consumed.
2. The only NGL in the gas is ethane, and there are no other low-heat content impurities in the gas. This is done for simplicity. While there may be other impurities, including a small quantity of larger hydrocarbons, i.e., propane, butane, etc., ethane is used to try to derive an estimate of the overall amount of NGLs in the natural gas.

Using these assumptions, Figure 6, below, shows the theoretical quantity of ethane produced and fed into the natural gas system by Pennsylvania producers. These estimates were determined using the average heat content of natural gas delivered in Pennsylvania, combined with the gross production of natural gas in Pennsylvania.⁴⁷ Using the assumptions, above, it then follows that any additional heat content above 1,010 Btu/ft³ of methane is derived purely from ethane, and the exact quantity of ethane injected into the natural gas system can be determined.

Figure 6: Hypothetical Volume of Ethane Injected into the Natural Gas System by Pennsylvania Producers (MMcf)



⁴⁷ EIA, *Heat Content of Natural Gas Delivered to Consumers, and Natural Gas Gross Withdrawals*, both available at <http://www.eia.gov>.

Projects such as the Mariner East II may relieve this oversupply of NGLs. This should stabilize or raise the prices for these commodities. In 2019, this would mean that an estimated 94 million cubic feet (MMcf) of NGLs currently being fed into the natural gas system would be redirected, possibly causing the prices of both NGLs and natural gas to rise, creating incentive for additional production in Pennsylvania.

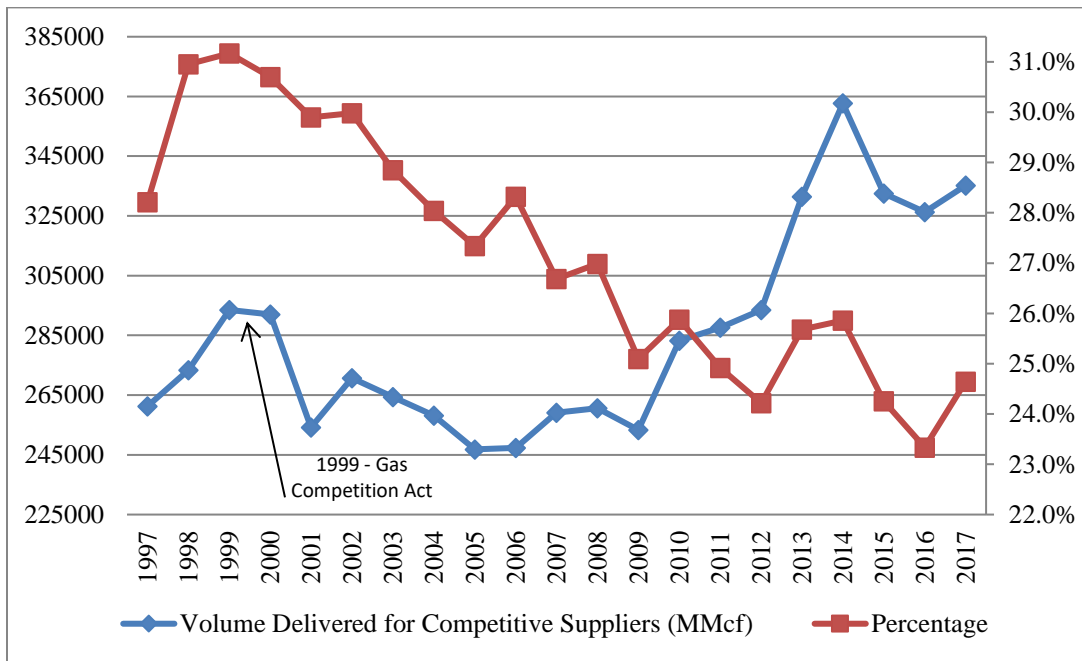
Figure 7, below, shows Pennsylvania deliveries of natural gas for competitive suppliers, often called transportation gas, as a percentage of total gas delivered. In 2016, 24.9% of the total natural gas delivered was for competitive suppliers in Pennsylvania. In 2017, the percentages of gas delivered for competitive suppliers by customer class were as follows:⁴⁸

Residential: 12.3%
Commercial: 62.6%
Industrial: 99.1%

⁴⁸ Natural Gas Delivered on Account of Others.

https://www.eia.gov/dnav/ng/ng_cons_acct_a_EPG0_VRT_mmcf_a.htm. 2018 data was not available.

Figure 7: Natural Gas Delivered for Competitive Suppliers by Pennsylvania NGDCs ^{49 50}



Since 2009, total transportation gas had been increasing every year, until 2015, during which the volume delivered leveled off. In recent years, the volume of gas being delivered for competitive suppliers seems to have stalled. Total deliveries have also seemed to stay relatively steady, meaning that it is likely that the percentage of competitive supplier deliveries stay at roughly the same level for the time being.

⁴⁹ Natural Gas Delivered on Account of Others,

https://www.eia.gov/dnav/ng/ng_cons_acct_a_EPG0_VRT_mmcf_a.htm

⁵⁰ The Natural Gas Choice and Competition Act was signed into law on June 22, 1999.

VI. Natural Gas Distribution Company (NGDC) Statistical Data

Customer Data

The information in Tables 5 and 6, below, is derived from data contained in the Gas Annual Reports and the ARPRs submitted to the Commission by those Pennsylvania NGDCs with greater than 8 Bcf of annual sales. The charts and data analysis in this section are derived from the raw data in these two tables.

Table 5: 2018 Customer Statistical Data

<i>Company</i>	<i>Number of Residential Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Commercial Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Industrial Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Transportation Customers</i>	<i>Average per customer usage (MCF)</i>
Columbia	331,837	85	26,078	359	62	2,306	75,210	587
Peoples	482,435	96	31,485	285	80	3,588	116,082	586
Peoples Gas	57,943	91	3,987	406	1	0	400	37,315
NFG	172,635	100	11,274	300	164	1,171	30,346	942
PECO	481,718	90	44,163	498	16	1,000	758	35,086
PGW	475,343	76	21,768	362	507	939	4,915	6,253
UGI Central	68,355	94	8,837	350	130	2,069	6,119	2,762
UGI North	147,435	109	12,980	391	62	1,371	11,239	8,340
UGI South	289,164	75	26,205	337	483	1,081	84,265	1,157

*Table 6: 2017 Customer Statistical Data*⁵¹

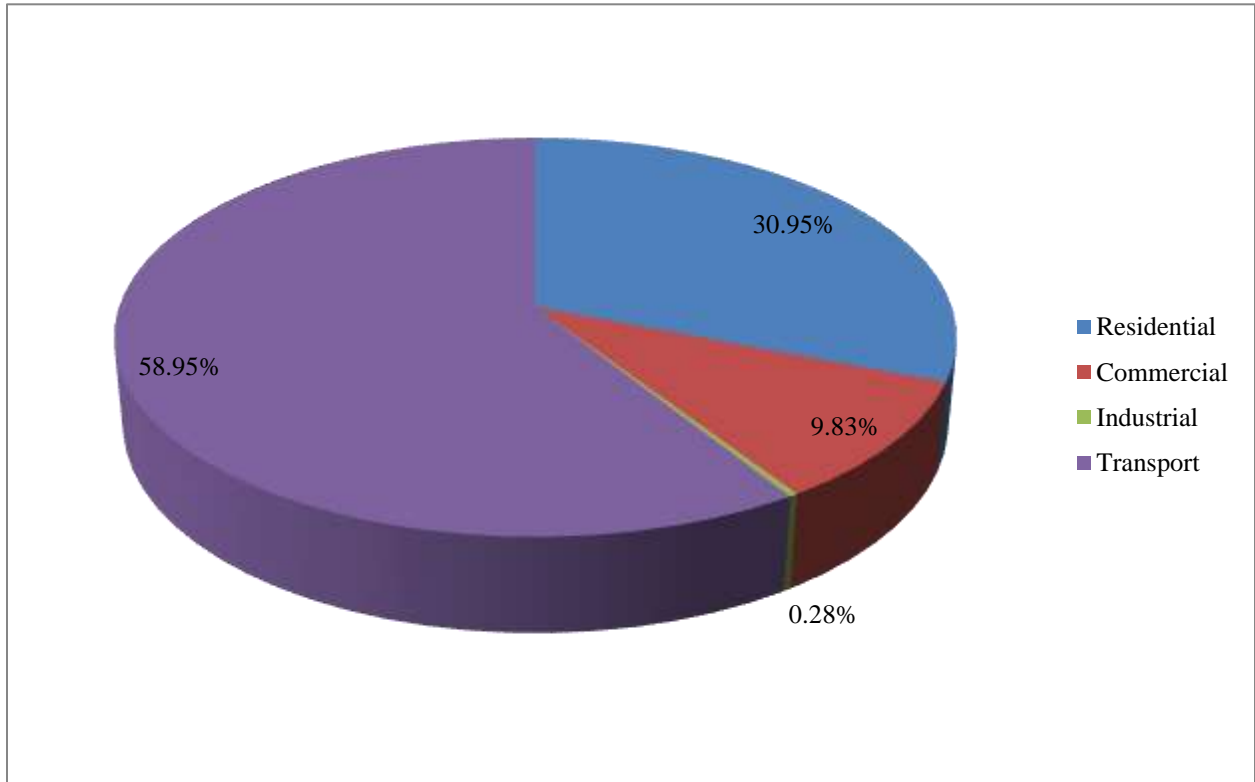
<i>Company</i>	<i>Number of Residential Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Commercial Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Industrial Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Transportation Customers</i>	<i>Average per customer usage (MCF)</i>
Columbia	320,081	76	26,477	313	56	2,357	83,233	506
Peoples	478,821	85	32,279	265	81	3,086	115,045	526
Peoples Gas	57,510	81	4,024	384	1	0	392	39,023
NFG	171,726	91	11,134	263	159	1,119	30,602	850
PECO	477,213	79	43,873	468	19	316	771	34,239
PGW	474,115	69	21,928	327	519	728	4,513	6,485
UGI Central	68,582	85	8,975	301	131	1,519	5,247	2,978
UGI North	147,134	101	12,622	337	58	1,500	10,980	6,829
UGI South	291,758	71	26,650	295	509	947	74,051	1,322

Chart 7, below, provides a breakdown of gas usage by customer class among Pennsylvania’s major NGDCs (those with more than 8 Bcf in sales per year). More than half of all sales volume was from transportation customers. These are typically larger customers that procure their own

⁵¹ The tracking of customer classes and natural gas usage are not necessarily done within one tracking system. Some customers may be classed in a certain category, but depending on their usage for the year, may end up assigned to a different rate class. This can create the appearance of a customer class with 0 Mcf of usage, when in actuality they had simply been shifted to a different rate class that year and are accounted for under a different category.

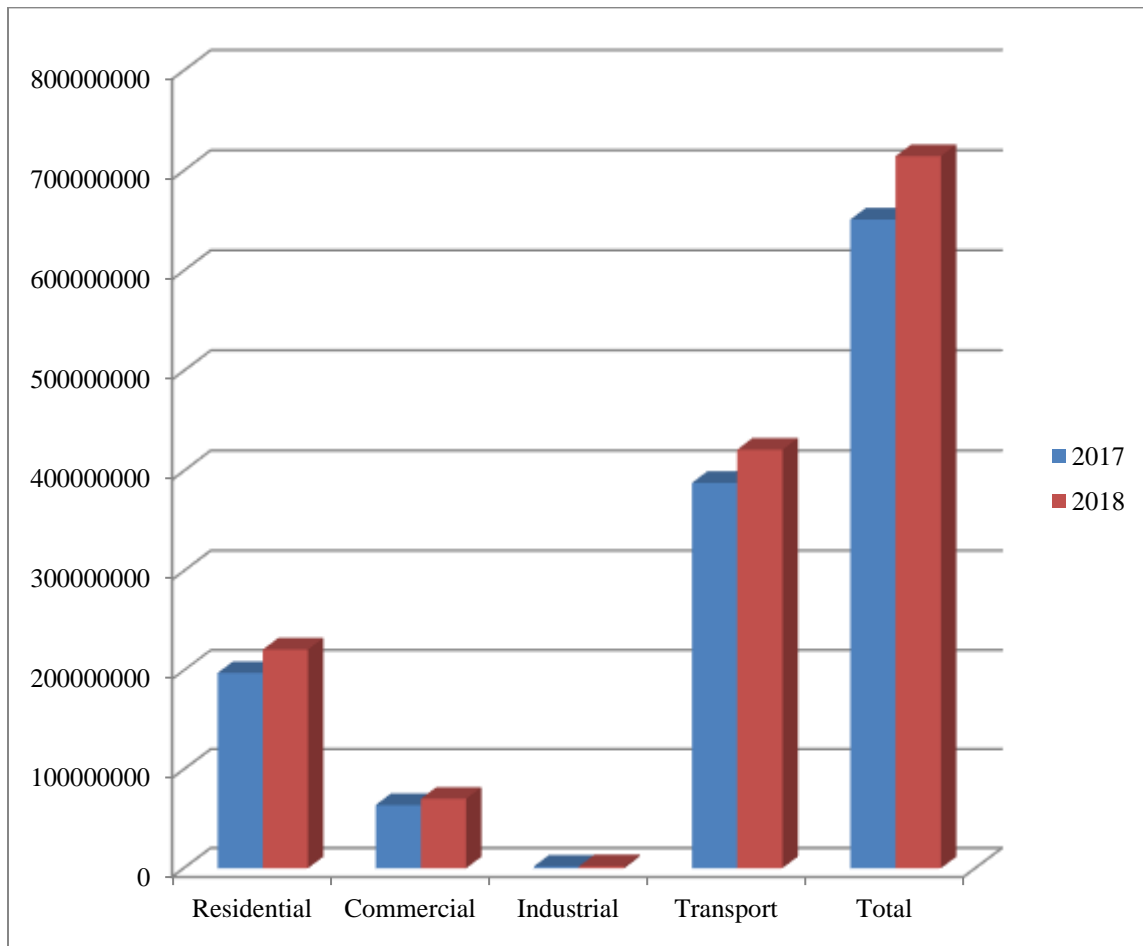
natural gas supply, and the utility delivers the natural gas to them. Transportation also includes residential and commercial customers that utilize an alternate natural gas supplier (NGS).

Chart 7: 2018 Pennsylvania Gas Usage by Customer Class within Major NGDCs



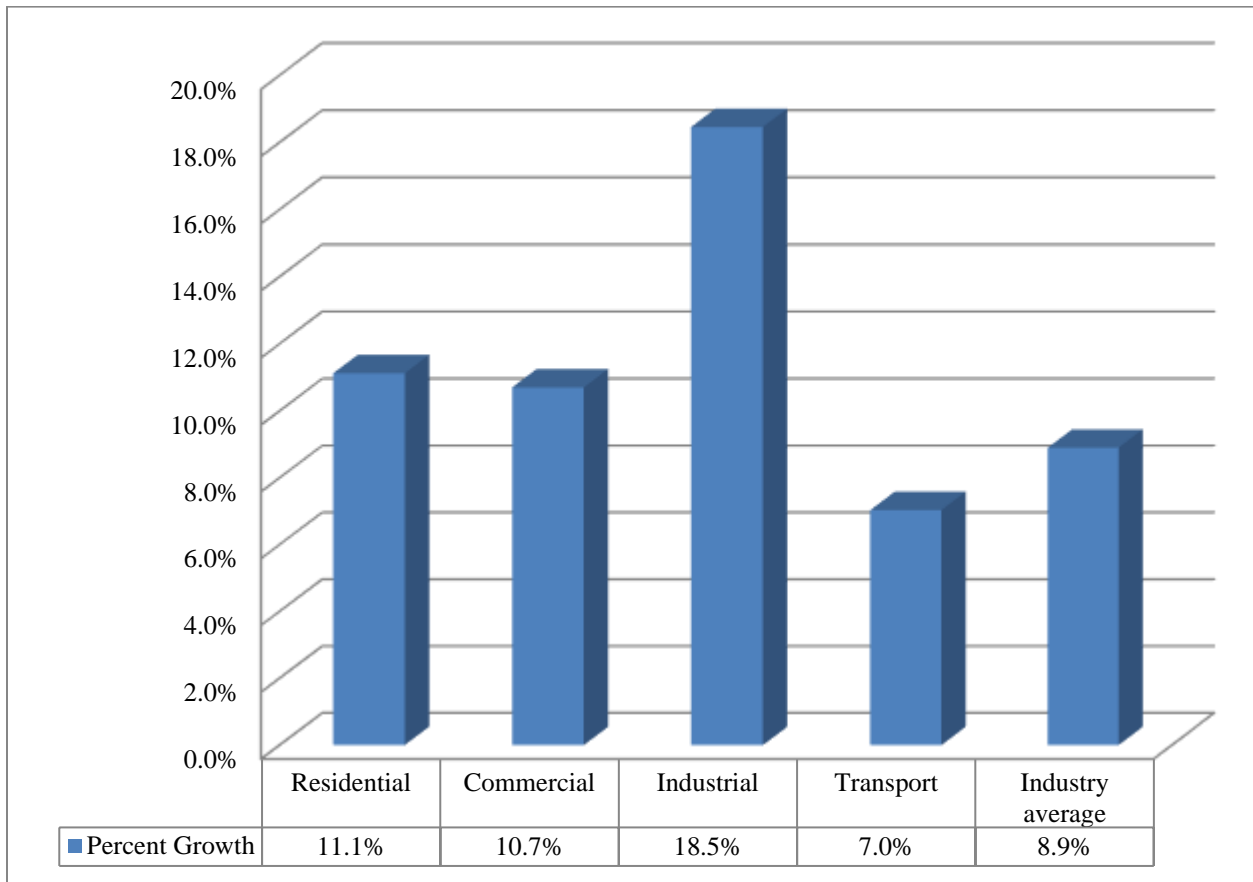
As seen in Figure 8, below, natural gas usage in 2018 was higher for each NGDC customer class as compared to 2017.

Figure 8: Pennsylvania Gas Usage by Customer Class within Major NGDCs: 2017-2018



In total, gas usage rose by 9.7% between 2017 and 2018, while the number of customers rose by 0.8%. This modest rise in usage was generally distributed across customer classes, with residential, commercial, and industrial usage all increasing in 2018 over 2017. Figure 9, below, illustrates the change in average gas usage by customer class.

Figure 9: Change in Average Customer Usage for Major NGDCs by Customer Class: 2017-2018



VII. Pennsylvania Natural Gas Distribution Company Gas Supply and Demand Balance

The following tables and charts provide natural gas supply and demand data for Pennsylvania's NGDCs. The NGDCs provided the supply and demand data for the 2018 delivery year. The data is presented for 2018 on an annual basis as well as for peak day. Peak day is non-coincident data such that demand for a specific customer class is not necessarily at the same time as the system peak. Data is derived from the ARPRs.⁵²

⁵² Some large users bypass the local distribution companies, buy gas at the wellhead or from suppliers, and receive the gas directly from the interstate pipelines. Gas-fired electric generation stations are usually bypass customers, and most of their gas consumption is not included in the PUC reports.

Table 7: 2018 Annual Gas Supply and Demand for Major Gas Utilities (MMcf)

	UGI North	UGI Central	UGI South	PGW	Columbia	NFG	PECO	Peoples	Peoples Gas
Gas Supply:									
Supply Contracts	28,643	12,494	51,043	44,240	23,978	13,526	52,664	34,709	3,823
Spot Purchases	4,655	2,370	11,570	0	13,819	7,884	14,553	23,294	4,240
Storage Withdrawal	0	0	0	12,385	0	0	0	0	0
LNG	0	0	0	2,517	0	0	0	0	0
Subtotal Gas Supply	33,298	14,864	62,613	59,142	37,797	21,410	67,217	58,003	8,063
Transportation	93,730	16,998	97,529	30,735	44,123	28,598	26,595	71,416	15,366
TOTAL GAS SUPPLY	127,028	31,862	160,142	89,877	81,920	50,008	93,812	129,419	23,429
Requirements:									
Firm Requirements	22,127	10,507	31,326	45,864	37,797	21,410	67,169	61,394	8,503
Liquefaction Interruptible Requirements	0	0	0	1,974	0	0	0	0	0
Storage Injections	0	0	0	11,074	0	0	0	0	0
Subtotal Firm & Interruptible	22,127	10,507	31,326	59,140	37,797	21,410	67,217	61,394	8,503
Transportation	93,730	16,998	97,529	30,735	44,123	28,598	26,595	68,025	14,926
Load Deductions	(11,171)	(4,357)	(31,287)	0	0	0	0	0	0
TOTAL GAS REQUIREMENTS	127,028	31,862	160,142	89,875	81,920	50,008	93,812	129,419	23,429
Surplus (Deficiency)	0	0	0	2	0	0	0	0	0

Chart 8: Pennsylvania Gas Utility Annual Supply 2018

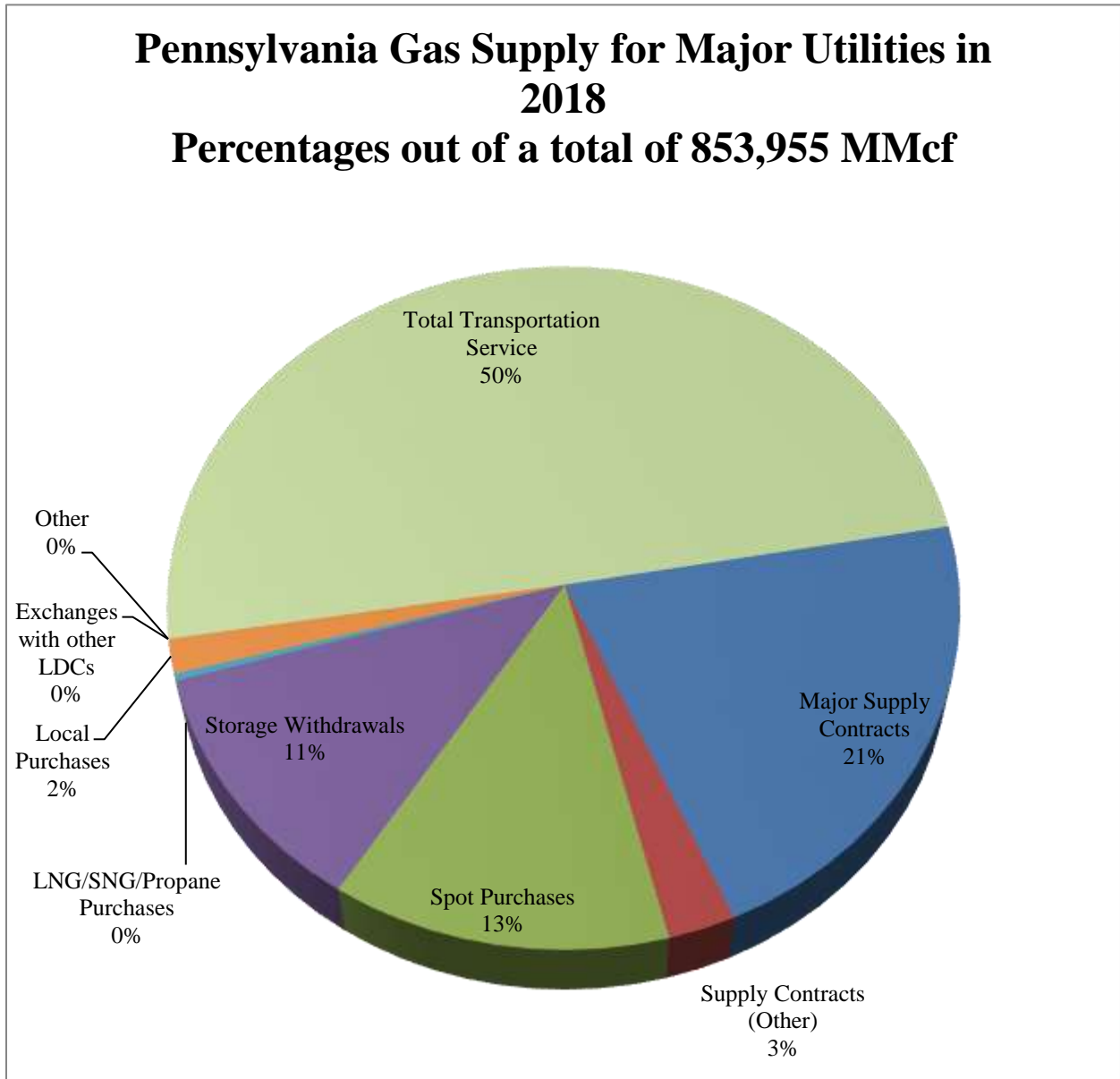
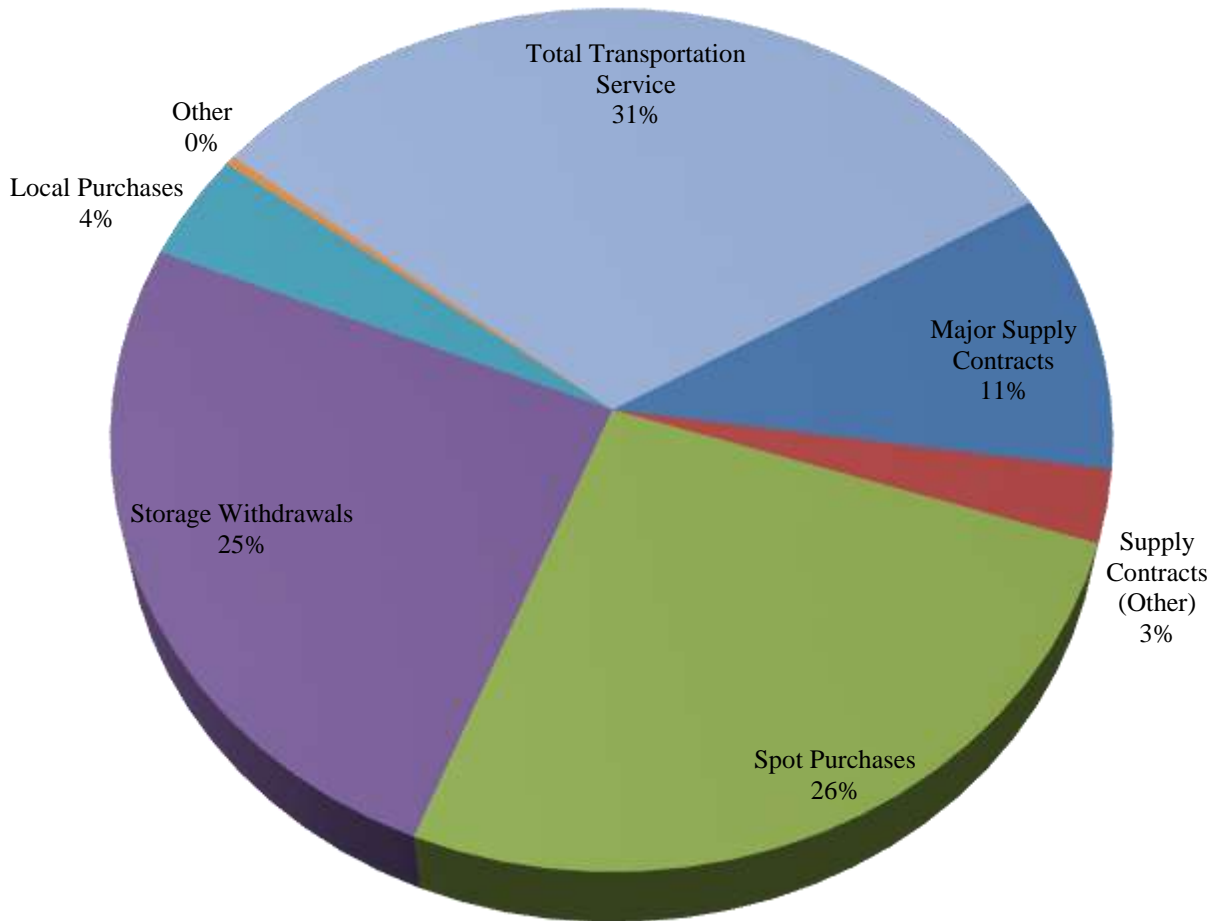


Table 8: 2018 Peak Day Gas Supply and Demand Balance for Major Gas Utilities (MMcf)

	UGI North	UGI Central	UGI South	PGW	Columbia	NFG	PECO	Peoples	Peoples Gas
Gas Supply:									
Supply Contracts	100	27	227	189	399	287	506	410	99
Spot Purchases	158	92	329	0	0	378	115	444	19
Storage Withdrawal	0	0	0	166	0	0	0	0	0
LNG	0	0	0	167	0	0	0	0	0
Subtotal Gas Supply	258	119	556	522	399	665	621	854	118
Transportation	278	86	291	162	298	136	155	239	28
TOTAL GAS SUPPLY	536	205	847	684	697	801	776	1,093	146
Requirements:									
Firm Requirements	222	110	328	518	399	720	708	604	95
Liquefaction	0	0	0	0	0	0	0	0	0
Interruptible Requirements	0	0	0	4	0	0	0	0	0
Storage Injections	0	0	0	0	0	0	0	0	0
Subtotal Firm & Interruptible	222	110	328	522	399	720	708	604	95
Transportation	284	76	353	162	298	81	68	488	51
Load Deductions	(10)	(18)	(166)	0	0	0	0	0	0
TOTAL GAS REQUIREMENTS	516	204	847	684	697	801	776	1,092	146
Surplus (Deficiency)	20	1	0	0	0	0	0	1	0

Chart 9: Pennsylvania Peak Day Supply 2018

**Pennsylvania Gas Peak Day Supply
for Major Utilities in 2018
Percentages out of a total of 5,379 MMcf**



Section 3 – Financial Data

VIII. Natural Gas Distribution Company Financial Statistics

Data Set

This section presents selected NGDC financial data taken from the Gas Annual Reports of the major NGDCs for an eleven-year period from 2008 through 2018.⁵³

The data in Tables 9 through 13 includes operating revenues and expenses, net operating income, gross plant in service, administrative and general expense, maintenance expense, depreciation expense and total gas cost, and average cost of gas purchased by the NGDC.

⁵³ Note: UGI Central Penn Gas was purchased from PPL Gas Utilities in 2007. UGI Penn Natural Gas was purchased from PG Energy in 2006. Equitable Gas Company merged with Peoples Natural Gas in 2013-2014 but is still being operated as a separate division of Peoples Natural Gas. For ease of comparison in the tables, the data for Peoples includes combined data Peoples and Equitable during the years when they were still separate companies. UGI now reports as a combined company, so for ease of comparison, totals across the 3 companies in prior years have been combined.

Table 9: Operating Revenue and Operating Expense

OPERATING REVENUE (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	781.9	388.8	821.7	1,163.7	1,167.7	886.0	151.9	5,361.7
2009	544.9	325.1	759.6	939.8	1,062.1	823.1	109.2	4,563.8
2010	559.2	255.5	686.8	736.1	1,058.0	749.2	100.2	4,145.0
2011	504.8	248.1	613.0	715.3	989.2	705.1	53.2	3,828.6
2012	406.3	215.9	545.4	634.2	784.7	642.6	47.4	3,276.4
2013	512.3	235.5	600.8	738.5	855.8	688.2	89.2	3,720.3
2014	563.3	248.3	646.8	835.5	973.9	746.6	110.6	4,125.0
2015	536.2	196.9	546.5	716.1	853.7	621.5	85.8	3,556.7
2016	493.9	175.0	463.4	588.3	739.7	629.0	78.7	3,168.1
2017	552.6	204.6	495.3	675.5	868.1	635.0	91.3	3,522.3
2018	590.2	215.3	569.8	724.5	1,002.0	697.2	95.5	3,894.4
OPERATING EXPENSE (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	741.7	359.8	779.5	1,025.5	1,072.1	824.2	142.3	4,945.1
2009	492.8	294.5	671.6	749.6	959.9	748.6	101.5	4,018.5
2010	495.7	220.4	599.8	613.6	939.3	655.3	93.5	3,617.6
2011	444.6	200.8	406.7	558.2	755.9	523.6	37.4	2,927.2
2012	337.6	176.9	350.2	452.3	549.2	473.3	33.6	2,373.1
2013	416.1	187.9	484.8	499.1	592.5	491.2	71.7	2,743.3
2014	478.5	209.0	525.7	707.3	841.8	627.3	89.7	3,479.3
2015	445.2	165.0	430.5	590.5	731.2	564.9	69.5	2,996.8
2016	400.2	143.3	340.1	476.5	609.5	520.7	62.1	2,552.3
2017	467.1	177.0	367.7	569.1	713.5	540.0	74.2	2,908.4
2018	450.2	187.1	421.8	594.7	837.9	563.3	72.5	3,127.5

Table 10: Net Operating Income and Administration & General Expense

NET OPERATING INCOME (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	40.2	29.0	42.2	90.3	95.6	9.0	9.6	315.9
2009	52.1	30.5	88.0	141.3	102.2	4.1	7.7	425.9
2010	63.5	35.1	87.0	91.6	118.7	26.5	6.7	429.1
2011	35.9	35.5	115.7	72.9	139.1	30.8	11.1	440.9
2012	45.2	27.9	106.3	101.4	135.3	32.7	9.3	458.3
2013	70.3	37.6	116.1	78.9	164.5	56.5	11.3	535.2
2014	97.0	45.8	121.0	138.9	182.9	67.7	26.4	679.8
2015	100.4	35.8	115.9	120.3	161.2	5.8	20.0	559.5
2016	66.8	24.0	123.2	72.2	109.7	63.3	12.0	471.3
2017	85.8	20.2	127.6	73.7	136.0	56.1	12.5	511.8
2018	105.8	21.8	148.0	86.7	127.2	97.7	17.8	605.0

ADMINISTRATION & GENERAL EXPENSE (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	39.9	26.7	30.4	52.0	72.4	101.9	9.9	333.2
2009	45.3	26.5	31.9	41.8	74.2	103.4	10.2	333.3
2010	53.4	27.1	29.4	60.9	75.3	120.3	12.3	378.7
2011	56.2	29.4	29.0	78.4	69.7	108.5	11.7	383.0
2012	47.4	28.9	32.7	70.9	61.4	124.1	9.6	375.0
2013	53.0	31.2	28.0	82.7	75.7	107.9	11.0	389.4
2014	58.9	27.7	27.4	66.0	79.8	110.9	9.3	380.0
2015	62.3	27.9	30.2	69.1	85.8	152.9	10.5	438.8
2016	70.5	24.5	31.3	55.3	72.8	168.3	8.0	430.7
2017	91.5	28.2	33.2	52.3	85.4	148.5	7.6	446.7
2018	64.8	30.3	33.8	52.7	91.0	133.0	7.9	413.4

Table 11: Maintenance Expense and Depreciation Expense

MAINTENANCE EXPENSE (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	13.8	4.2	22.5	33.0	24.7	21.0	6.5	125.7
2009	14.1	4.1	22.8	36.6	23.6	25.6	5.8	132.6
2010	14.1	4.0	23.7	35.5	22.9	25.7	6.2	132.1
2011	13.9	3.9	21.5	35.2	26.4	31.7	5.1	137.7
2012	14.4	3.3	20.8	36.6	27.5	29.8	4.8	137.2
2013	15.5	5.6	27.0	41.0	28.0	33.6	4.2	154.9
2014	18.3	6.1	26.8	43.4	31.9	40.5	4.2	171.2
2015	22.0	6.4	32.4	42.3	34.3	38.5	5.3	181.1
2016	23.6	5.9	29.5	38.1	30.8	41.0	4.4	173.4
2017	25.8	6.1	29.9	38.4	33.2	42.5	4.3	180.3
2018	22.3	6.4	28.7	43.6	38.4	45.8	5.1	190.3

DEPRECIATION EXPENSE (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	18.2	11.2	30.8	39.0	44.7	38.8	6.1	188.8
2009	21.0	11.1	31.5	39.2	45.9	37.2	6.1	192.0
2010	22.5	11.1	32.7	41.6	47.0	39.0	5.9	199.8
2011	25.0	11.3	33.5	44.9	45.8	39.6	6.5	206.7
2012	14.4	11.4	35.1	46.7	46.5	40.1	7.1	201.3
2013	33.4	11.4	36.7	48.7	49.2	41.5	6.3	227.3
2014	37.7	11.5	39.2	46.4	52.5	41.7	7.2	236.1
2015	42.1	12.0	42.0	45.9	56.8	44.6	7.4	250.8
2016	47.5	12.9	43.1	48.8	60.7	46.7	7.2	267.0
2017	52.0	14.2	47.2	52.3	66.9	48.6	7.6	288.9
2018	55.6	14.4	51.8	56.8	74.6	60.5	7.8	321.4

Table 12: Total Gas Costs and Average Cost of Gas Purchased

TOTAL GAS COSTS (\$ Million)									
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas		Total
2008	621.4	229.1	647.5	790.9	798.8	587.2	112.2		3,787.1
2009	250.2	174.3	384.4	498.3	701.6	392.6	63.8		2,465.2
2010	328.7	95.1	381.3	390.9	622.3	321.7	52.0		2,192.0
2011	332.2	96.6	314.5	371.1	596.4	303.8	48.8		2,063.5
2012	152.8	69.4	239.1	216.9	391.5	220.8	34.2		1,324.6
2013	265.3	79.3	275.5	312.0	467.0	258.9	30.5		1,688.5
2014	259.1	91.3	320.3	356.1	545.6	295.1	41.5		1,909.0
2015	182.6	44.5	189.2	288.6	361.1	196.8	23.2		1,286.0
2016	114.7	22.5	174.1	193.9	307.1	149.8	19.8		981.8
2017	176.4	54.3	190.9	277.6	401.7	187.9	29.7		1,318.5
2018	184.2	62.5	297.1	318.2	507.8	203.5	32.6		1,605.9

AVERAGE COST OF GAS PURCHASED (\$/MCF)									
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas		Ave.
2008	11.32	7.97	11.04	8.65	10.03	11.00	9.41		9.92
2009	6.00	7.76	6.79	7.30	9.76	7.44	7.00		7.44
2010	7.04	5.43	6.85	5.29	6.47	6.31	5.69		6.15
2011	7.51	4.72	6.18	5.25	6.16	5.74	6.29		5.98
2012	4.79	3.37	5.47	4.20	4.74	4.98	5.14		4.67
2013	5.75	3.81	5.51	4.60	5.29	5.29	3.42		4.81
2014	6.25	4.07	6.15	5.44	6.29	5.78	4.87		5.55
2015	4.90	2.10	4.09	4.11	4.34	4.17	3.06		3.82
2016	3.56	1.21	3.97	3.06	4.02	3.33	2.38		3.08
2017	5.22	2.85	4.39	4.71	4.55	4.28	3.64		4.23
2018	4.43	2.93	6.11	4.61	5.66	4.31	3.99		4.58

Table 13: Gross Utility Plant in Service

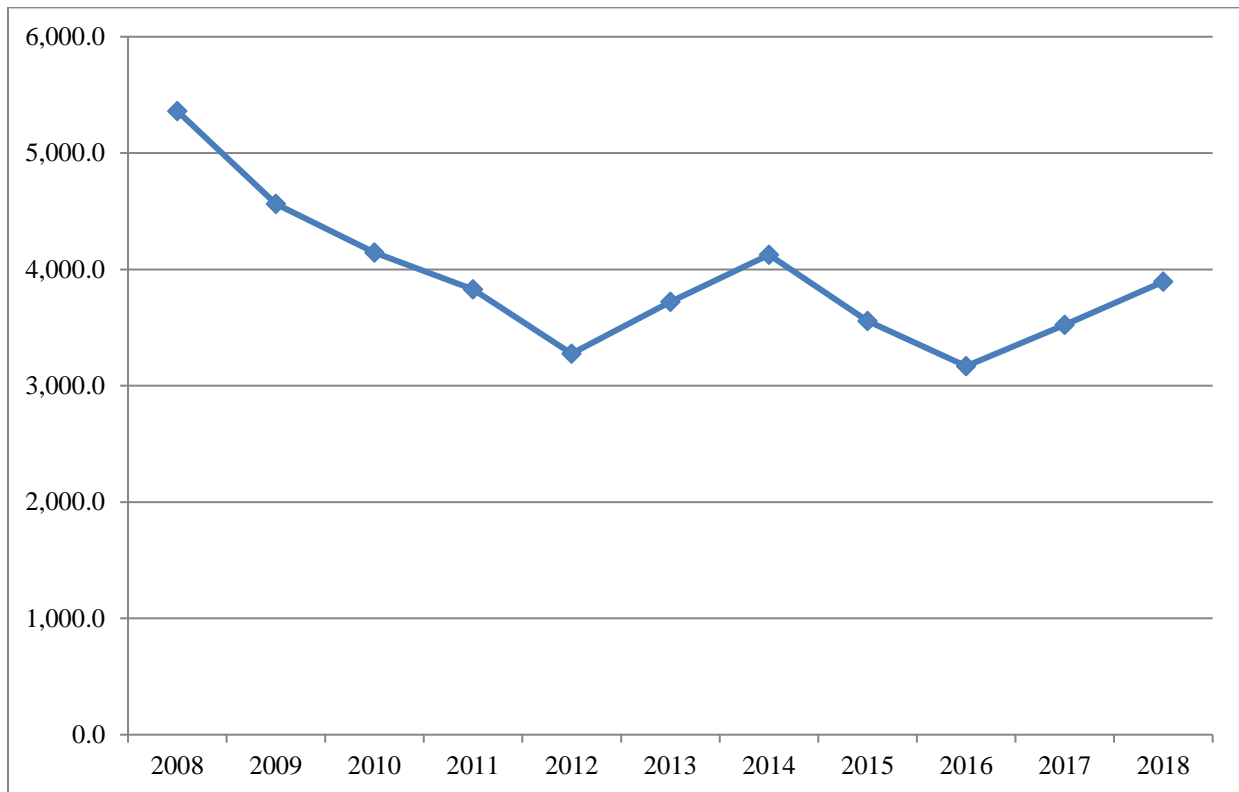
GROSS UTILITY PLANT IN SERVICE (\$ Million)								
	Columbia	NFG	PECO	Peoples	UGI	PGW	Peoples Gas	Total
2008	851.1	454.6	1,595.5	1,791.3	1,978.7	1,454.9	224.4	8,350.5
2009	925.1	465.7	1,646.8	1,858.2	2,050.2	1,502.0	229.4	8,677.4
2010	981.9	478.9	1,698.5	1,919.3	2,110.2	1,531.0	237.7	8,957.5
2011	1,073.6	491.5	1,792.9	2,032.5	2,033.4	1,555.1	245.2	9,224.2
2012	1,198.2	501.4	1,859.5	2,143.0	2,137.4	1,575.8	249.6	9,665.0
2013	1,335.7	511.7	1,932.4	2,077.3	2,262.9	1,596.6	273.3	9,989.9
2014	1,500.5	527.2	2,071.4	2,169.9	2,418.9	1,646.7	299.9	10,634.5
2015	1,660.1	542.5	2,205.4	2,278.2	2,581.9	1,685.2	311.5	11,264.7
2016	1,860.1	577.8	2,260.4	2,367.9	2,945.3	1,741.5	329.6	12,082.6
2017	2,074.1	594.5	2,503.6	2,544.0	3,035.8	1,793.6	348.4	12,893.9
2018	2,330.6	611.8	2,694.0	2,746.3	3,329.1	1,905.1	364.2	13,981.0

IX. Industry Trends

Many indicators of the financial status of the gas utilities in Pennsylvania are very closely correlated with current prices of natural gas. The single largest expense for NGDCs is the procurement of natural gas and the largest source of revenue is the sale of natural gas.⁵⁴

Therefore, as gas prices have plunged in recent years, so too have the sales revenues of the NGDCs. Figures 10 through 12, below, illustrate this correlation with very similar patterns for Operating Revenues, Operating Expenses, and the Average Cost of Gas Purchased for the major NGDCs since 2008.

Figure 10: Total Operating Revenue for All Major NGDCs (Millions of \$)



⁵⁴ Pennsylvania natural gas utilities do not derive any net earnings or profits from natural gas commodity prices. The cost of procuring natural gas for customers is purely a pass-through cost. NGDCs only earn a profit on the delivery of the commodity to customers.

Figure 11: Total Operating Expenses for All Major NGDCs (Millions of \$)

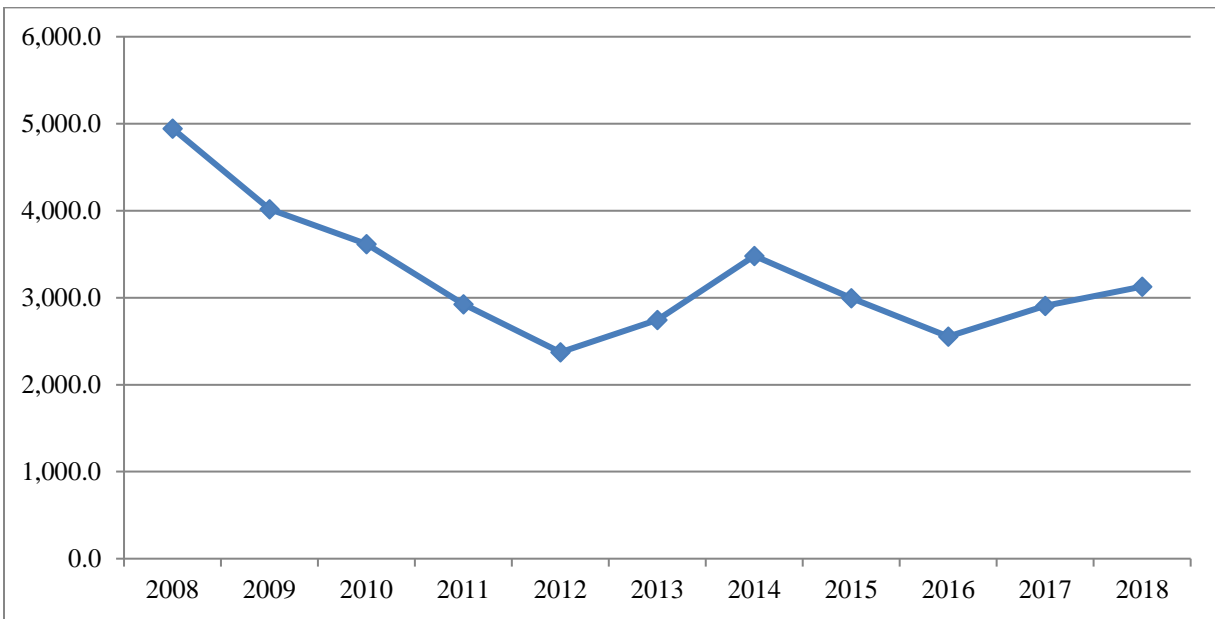
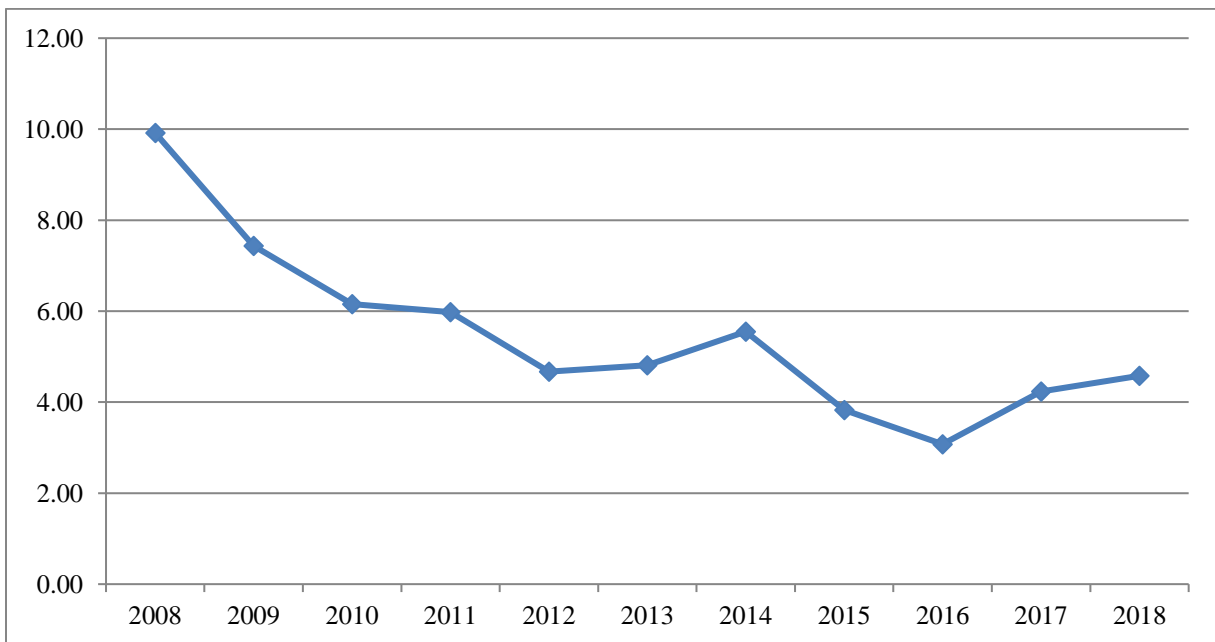


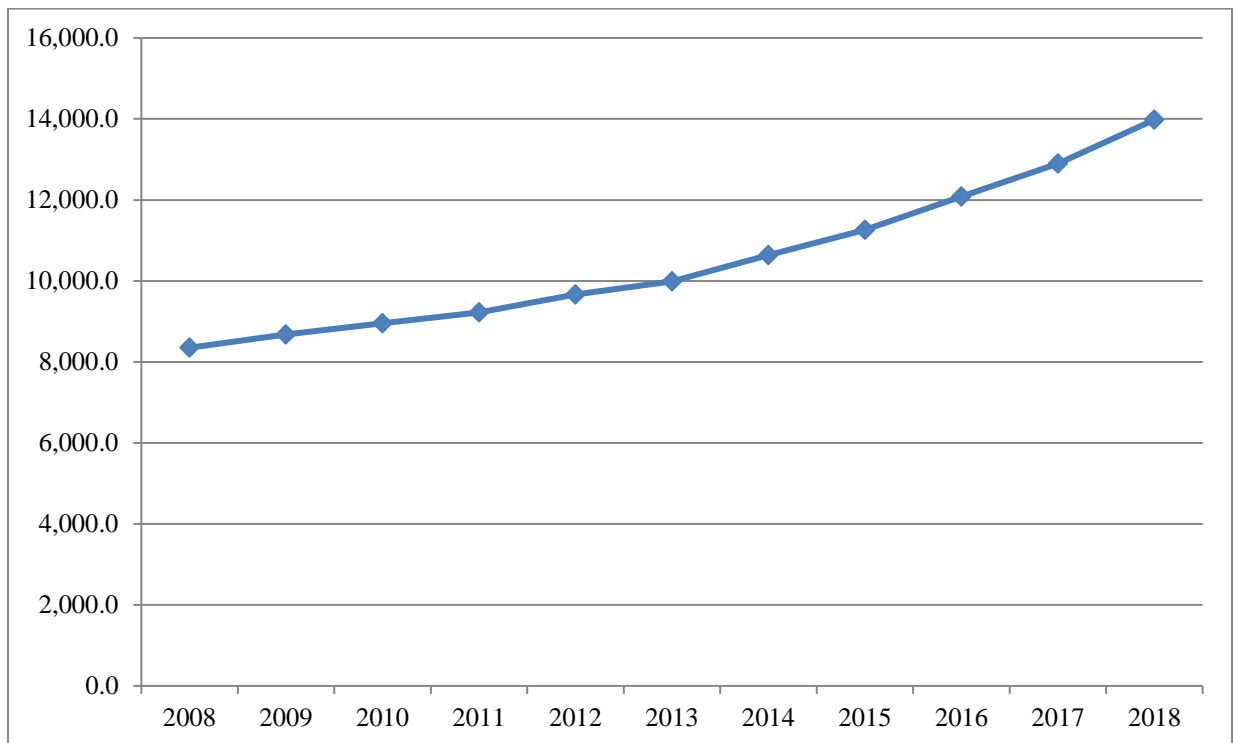
Figure 12: Average Cost of Gas Purchased for All Major NGDCs (\$/Mcf)



Over the past decade, NGDCs have been steadily investing in their infrastructure. Much of the recent increase in infrastructure spending was spurred by the implementation of Commission-approved Long-Term Infrastructure Improvement Plans (LTIIPs) and their corresponding

Distribution System Improvement Charge (DSIC) mechanisms for most of the major NGDCs.⁵⁵ Figure 13, below, shows that the major NGDCs have added approximately \$512 million per year to their total utility plant in service. This equates to a cumulative increase of 67.4% in plant in service for the total industry since 2008. Figure 14, below, shows that while all NGDCs have increased plant in service since 2008, Columbia has the fastest rate of increase, more than doubling its total plant in service with a 173.8% increase since 2008. PGW has the slowest rate of increase at 30.9% since 2008.⁵⁶

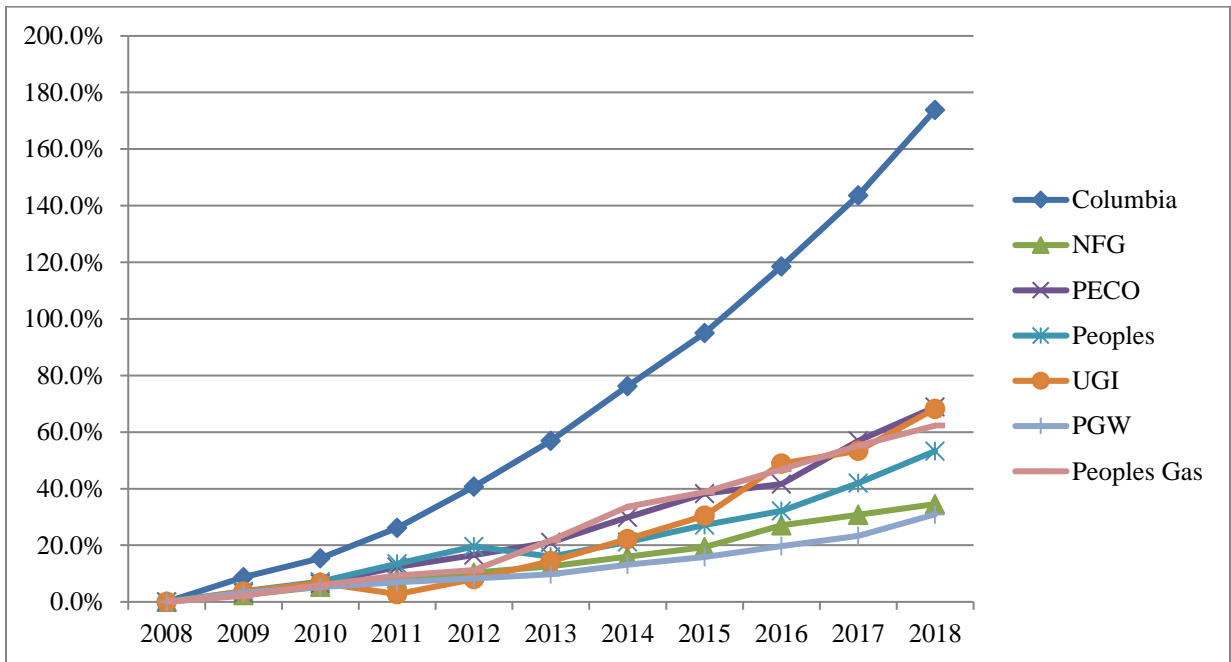
Figure 13: Total Utility Plant in Service for All Major NGDCs (Millions of \$)



⁵⁵ Final Implementation Order entered May 23, 2014 at Docket No. L-2012-2317274.

⁵⁶ All of the other major NGDCs besides PGW and Columbia have had an increase of roughly 50-60% since 2008. The notable exception is NFG, with an increase of only 34.6%. NFG is also the only major NGDC without a Commission-approved LTIP in Pennsylvania.

Figure 14: Cumulative Percentage Increase in Utility Plant in Service for All Major NGDCs (base year 2008)



Section 4 - Conclusion

X. Summary

Natural gas production and consumption have both continued to increase in Pennsylvania. While prices were relatively higher in 2018, it appears that natural gas prices will return to a decline over the next two years, through 2020. Natural gas has become the largest portion of Pennsylvania's electric power generation, and it seems likely that its share of the electric generation portfolio will continue to increase.

Some market developments to watch for in the next couple of years will involve NGL production and transportation capacity, as well as LNG production. With the completion of the Mariner East 2 pipeline, it is possible that prices for these products will rise over the coming years. Additionally, if one or more planned or proposed large LNG facilities comes online soon, this could reverse the expected price declines, and combined with additional NGL sales markets, potentially spur incentives for additional unconventional natural gas production.

In general, it appears that the natural gas industry in Pennsylvania is robust and working to relieve some lack of adequate transportation capacity, both for natural gas and for natural gas liquids. As these challenges are met, and additional transportation capacity comes online, it is likely that production and consumption will resume their previous increasing trends. Natural gas utilities in Pennsylvania are making significant investments in their infrastructure, to ensure that they will be prepared to meet this increased demand in the future, providing the residents and businesses of the Commonwealth with safe and reliable natural gas service.

Acronyms

ARPR	= Annual Resource Planning Report
Bcf	= Billion cubic feet
Bcfd	= Billion cubic feet per day
EIA	= Energy Information Administration
GSC	= Gas Supply Cost
LDC	= Local Distribution Company
LNG	= Liquefied Natural Gas
Mcf	= Thousand cubic feet
MMBtu	= Million British Thermal Units
MMcf	= Million cubic feet
MW	= Megawatt
NGDC	= Natural Gas Distribution Company
NGL	= Natural Gas Liquids
NGS	= Natural Gas Supplier
NYMEX	= New York Mercantile Exchange
PUC	= Public Utility Commission
Tcf	= Trillion cubic feet

