



PENNSYLVANIA 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 Division (Peoples), Peoples Natural Gas Company – Equitable Division (Equitable), Peoples Gas Company (Peoples Gas), UGI Utilities (UGI or UGI Util.), UGI Central Penn Gas (UGI – CPG), UGI Penn Natural Gas (UGI – PNG), 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 2017 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.

National Summary

The national natural gas storage inventory peak for the 12 months prior to this winter heating season⁴ was 3.8 trillion cubic feet (Tcf). This was 0.2 Tcf lower than the peak from the prior injection season. Domestic dry natural gas production in the U.S. averaged 73.6 billion cubic feet per day (Bcfd) in 2017, which was an increase of 1 percent from 2016. Production had decreased by 1 percent in 2016 as compared to 2015.⁵ Domestic consumption in 2017 was 74.3 Bcfd, which is a decrease of 0.6 Bcfd from 2016. This was a leveling off of domestic consumption after seven years of consecutive increases.⁶ Henry Hub spot prices averaged \$2.99 per million British thermal units (MMBtus) in 2017, which is a significant increase of 18.7 percent from \$2.52 in 2016.⁷ An analysis of Henry Hub natural gas futures contracts in comparison to Henry Hub spot prices⁸ shows an expected decline in prices over the next 2 years; producing a national average price of \$2.83/MMBtu for 2019 and a further decline to \$2.64/MMBtu in 2020.⁹

⁴ 2017-2018 heating season

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

⁶ EIA, *EIA Natural Gas Consumption by End Use*, available at <http://www.eia.gov>.

⁷ 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.

⁸ CME Group, available at <http://www.cmegroup.com/trading/energy/natural-gas/natural-gas.html>.

⁹ EIA, *EIA Short Term Energy Outlook*, available at <http://www.eia.gov>.

Pennsylvania Summary

There are nearly 3 million natural gas customers in Pennsylvania, with about 2.75 million residential customers.¹⁰ There are 31 regulated natural gas utility companies in Pennsylvania,¹¹ and 10 of these are major distribution companies with gross revenues greater than \$40 million per year.¹² 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 July 6, 2018, 25,731 unconventional drilling permit applications have been filed with the Pennsylvania Department of Environmental Protection (1,698 new applications over the prior 12 months).¹³ Of those applications, 11,346 unconventional wells have been drilled (828 new wells drilled over the prior 12 months).¹⁴ As of July 13, 2018, there were 37 rotary rigs active in Pennsylvania, which is a 9 percent increase in the number of active rigs from 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.¹⁵ The EIA estimates that there were 66,304 producing shale and conventional gas wells in Pennsylvania in 2016, which is a 5 percent decrease from 2015.¹⁶

¹⁰ EIA, *EIA Number of Natural Gas Consumers*, available at <http://www.eia.gov>.

¹¹ 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. See Docket No. A-2018-3000381, Order Entered 9-20-18.

¹² \$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.

¹³ 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.

¹⁴ See *PA DEP Well Permit Workload Report*, available at <http://www.dep.pa.gov/DataandTools/Reports/Oil%20and%20Gas%20reports/Pages/default.aspx>.

¹⁵ Baker Hughes, Baker Hughes Rotary Rig Count, available at <http://www.bakerhughes.com/rig-count>.

¹⁶ 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 2007 through 2017. 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 nearly 5.5 Tcf in 2017, up from only 80 Bcf (0.08 Tcf) in 1997.
- Gas deliveries for Pennsylvania electric generation have increased markedly from 3 percent of total deliveries in 1997, to 45 percent in 2017, or 20 Bcf in 1997 as compared to 441 Bcf in 2017.¹⁷

¹⁷ 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.¹⁸

Marcellus shale production in the northeast U.S. has risen from 0.6 Bcfd in January 2010 to 20.5 Bcfd in August 2018. Of this production increase, 3.5 Bcfd occurred in the prior 12 months, from August of 2017 to August of 2018. 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 13.7 Bcfd of pipeline projects that have been, or are scheduled to be, placed in service in the Northeast region in 2018. A further 9.4 Bcfd of projects are scheduled to be placed in service in 2019, 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.¹⁹

¹⁸ EIA, Natural Gas Pipelines in the Northeast Region, *About U.S. Natural Gas Pipelines*, available at <http://www.eia.gov>.

¹⁹ EIA, *EIA Marcellus Region Drilling Productivity Report*, available at <http://www.eia.gov>.

Table 1: Proposed Pipeline Infrastructure for 2018 In-Service²⁰

Project Name	Pipeline Operator Name	State(s)	Additional Capacity (MMcf/d)
Appalachian Lease Project (TEAL) Phase 1	Texas Eastern Transmission	PA,WV,OH	638
Appalachian Lease Project (TEAL) Phase 2	Texas Eastern Transmission	PA,WV,OH	313
Atlantic Bridge project Phase 2	Algonquin Gas Transmission	NJ,NY,CT,RI,MA	93
Atlantic Sunrise Project Phase 1B	Transcontinental Gas Pipeline	PA,MD,VA,NC,SC,GA,AL	450
Atlantic Sunrise Project Phase II	Transcontinental Gas Pipeline	PA,MD,VA	850
Bayway Lateral Project	Texas Eastern Transmission	NJ	300
Birdsboro Pipeline Project	DTE Midstream Appalachia, LLC	PA	79
Broad Run Expansion Project	Tennessee Gas Pipeline Co	WV,KY,TN,MS,AL,LA	200
Central Virginia Connector	Columbia Gas Transmission	VA	45
Constitution Pipeline	Constitution Pipeline Co	PA,NY	650
CPV Valley lateral project	Millennium Pipeline	NY	130
Eastern Market Access Project	Dominion Cove Point LNG PL Co	MD,VA	294
Eastern Shore 2017 Expansion	Eastern Shore Natural Gas	PA,MD,DE	61
Eastern System Upgrade Project	Millennium Pipeline	NY	223
Equitrans Expansion Project	Equitrans LP	PA,WV	600
Garden State Expansion Phase 2	Transcontinental Gas Pipeline	NJ	120
Leach XPress project	Columbia Gas Transmission	OH,PA,WV,KY	1,530
NEXUS Gas Transmission	Spectra Energy	OH,MI	1,500
Panhandle Backhaul Project	Panhandle Eastern Pipeline Co	OH,IN,IL	750
Portland Xpress Project Phase 1 (ME to MA)	Portland Natural Gas Transmission System	ME,NH,MA	2
Revolution Pipeline Project	Energy Transfer Company	PA	440
Risberg Line	RH energytrans LLC	PA,OH	55
Rover Pipeline Project Phase 2	ET Rover Pipeline	PA,WV,OH,MI	1,550
Supply Header Project	Dominion Transmission	PA,WV	1500
Tennessee Gas Abandment Capacity and Restoration Project (Gas-to-NGL pipe)	Tennessee Gas Pipeline Co	OH,KY,TN,MS,LA	
WB (West Bound) Xpress (East)	Columbia Gas Transmission	WV,VA,MD	500
WB (West Bound) Xpress (west)	Columbia Gas Transmission	WV	800

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

Table 2: Proposed Pipeline Infrastructure for 2019 In-Service²¹

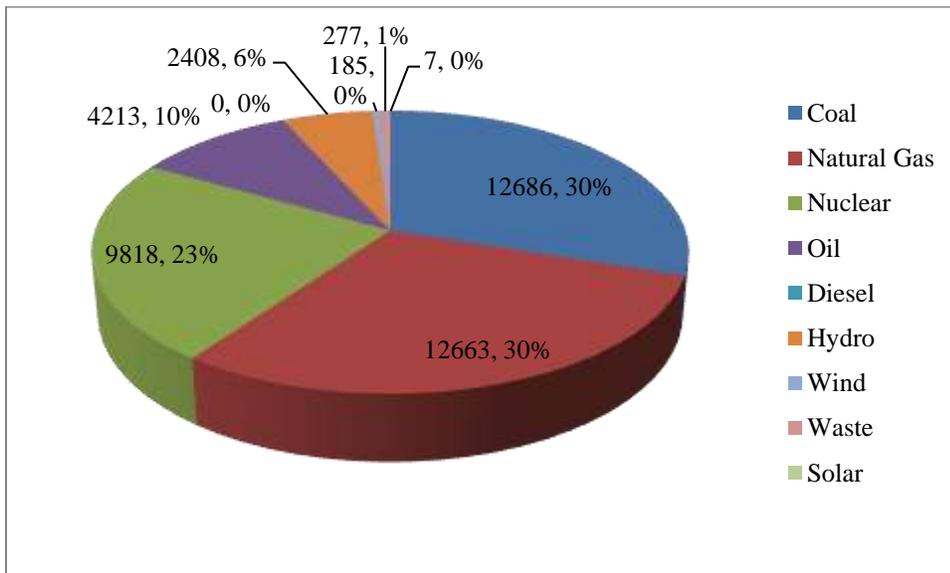
Project Name	Pipeline Operator Name	State(s)	Additional Capacity (MMcf/d)
Adelphia Gateway Project	Adelphia	PA	775
Atlantic Coast Pipeline	Atlantic Coast Pipeline	WV,VA,NC	1,500
Eastern Panhandle Expansion Project	Columbia Gas Transmission	PA,WV	48
Empire North Expansion Project	Empire Pipeline	PA,NY,ON	300
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
Mountain Valley Pipeline	Mountain Valley Pipeline, LLC	WV,VA	2,000
Mountaineer XPress Pipeline	Columbia Gas Transmission	WV,KY	2,700
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
Rivervale South to Market Project	Transcontinental Gas Pipeline	NJ	190
Sweden Valley Project	Dominion Energy Transmission Co	PA,OH	120

²¹ EIA, EIA Natural Gas Pipeline Projects, available at <http://www.eia.gov>

IV. Natural Gas Generation and End Uses in Pennsylvania

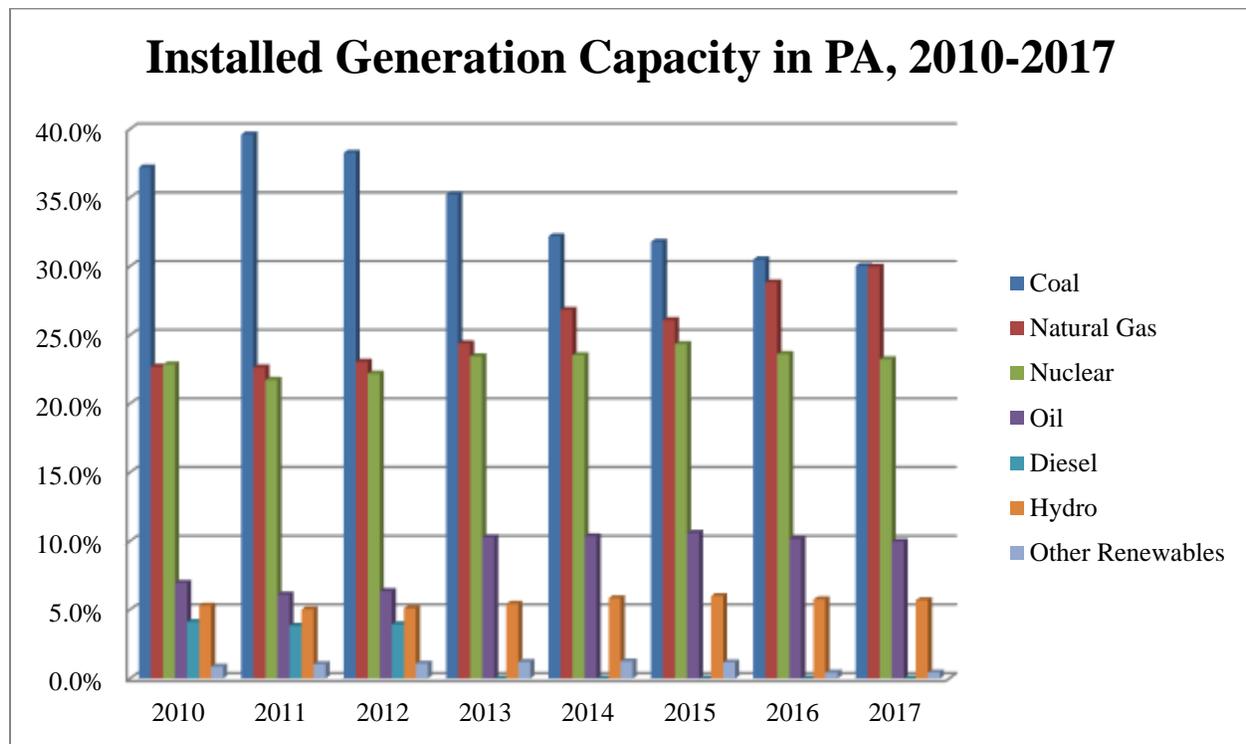
By the end of 2017, Pennsylvania had 12,663 megawatts (MWs) of natural gas fired electric generation installed capacity, as shown by comparison to other capacity fuel sources in Chart 1, below.²² These facilities constitute 30 percent of Pennsylvania’s generating capacity, up from 29 percent the prior year. All other generation sources stayed relatively flat, so the change in the share of natural gas capacity was caused almost entirely by the 672 MW increase in natural gas capacity. Chart 2, below, shows the percentage of generation capacity by fuel source over time, from 2010 through 2017. Chart 2 also shows that natural gas has been steadily increasing as a share of the total capacity in PA, nearly overtaking coal in 2017.

Chart 1: Capacity in Pennsylvania by Fuel Type at Year End 2017 (MW)



²² Data from PJM’s 2018 PA State Report

Chart 2: Installed Generation Capacity in PA, 2010-2017



Charts 3 and 4, below, summarize the PJM queue for new electric generation capacity for Pennsylvania as of Dec. 31, 2017. The queue includes 15,199 MW of proposed new natural gas fired capacity, making up 88 percent 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 percent 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 takes up nearly the entire PJM queue for Pennsylvania, at 97 percent of the queued capacity.^{23 24} Typically, about 25 percent of the projects in PJM’s queue are actually built.²⁵

²³ PJM Pennsylvania State Report 2018

²⁴ The largest component of the “Other” fuel types based on UCAP is Nuclear (94 MW). The largest component using ICAP values is storage (141.5 MW).

²⁵ PJM, *PJM Regional Transmission Expansion Plan Report*, available at <http://www.pjm.com>.

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

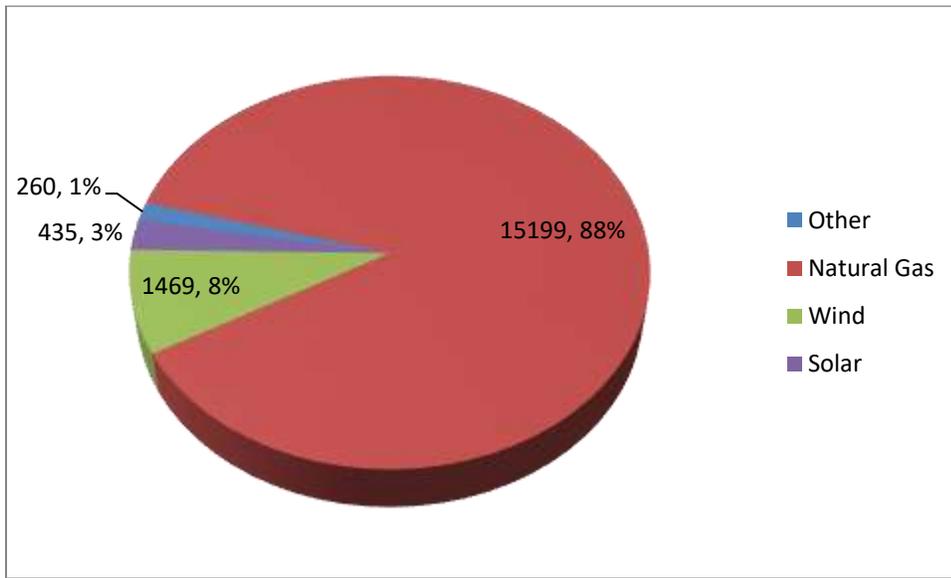
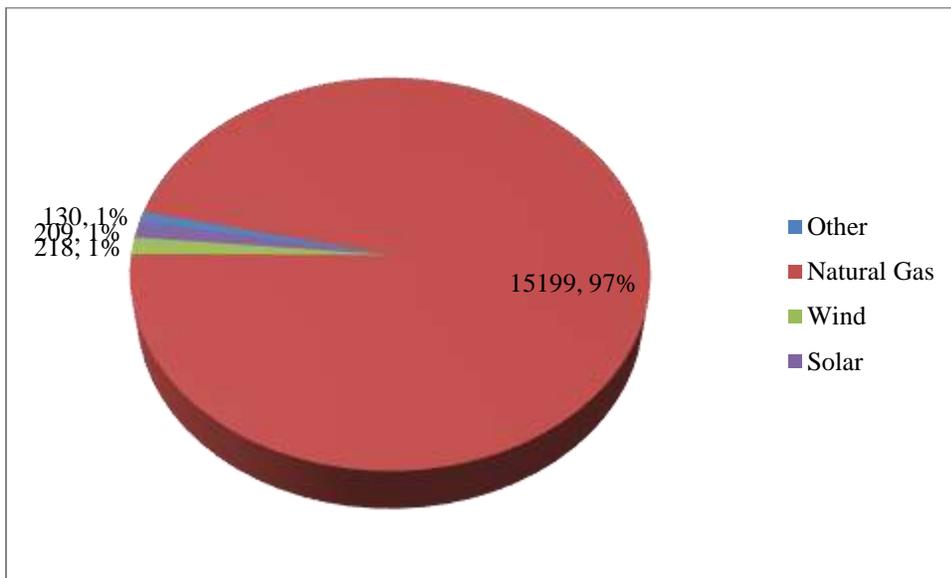


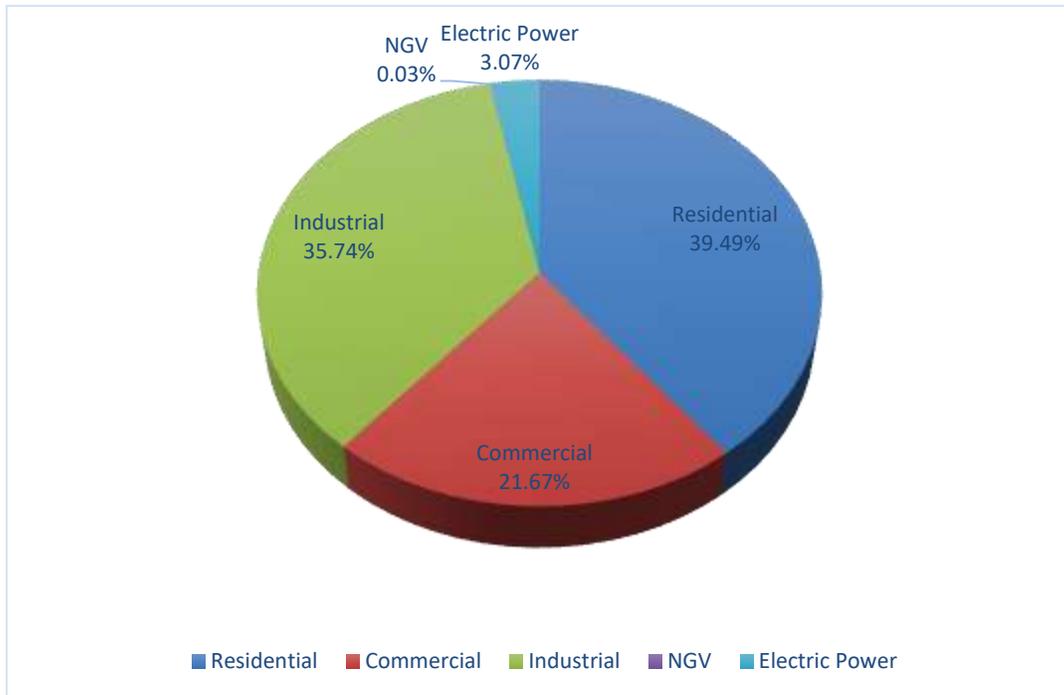
Chart 4: Queued Capacity (UCAP) in Pennsylvania by Fuel Type (MW)



Charts 5 and 6, below, compare the gas delivered in Pennsylvania for electric generation compared to other end-uses in 1997 and 2017, respectively. As depicted, the fraction of natural

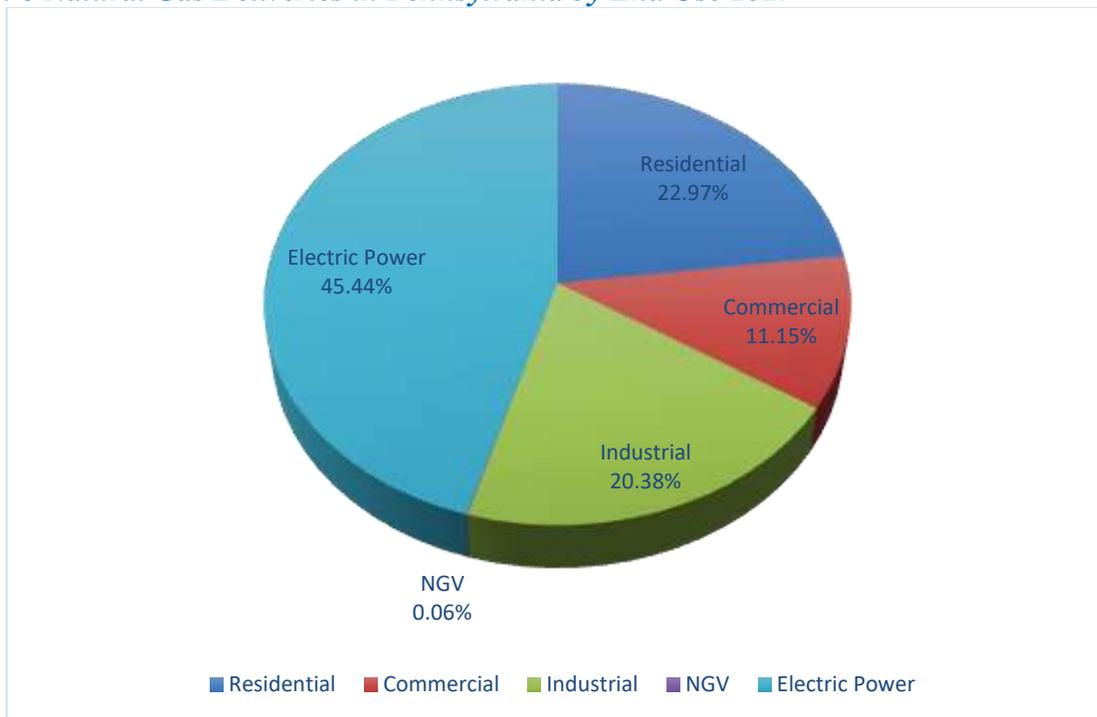
gas usage for electric generation has dramatically increased. Reasons for this increase include: greater supply of natural gas and the resultant lower cost for natural gas; the advancement of efficient natural gas fueled electric generation technology; and retirements of older coal-fired plants. As the 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 Deliveries in Pennsylvania by End Use 1997²⁶



²⁶ NGV = Natural Gas Vehicles

Chart 6 Natural Gas Deliveries in Pennsylvania by End Use 2017²⁷



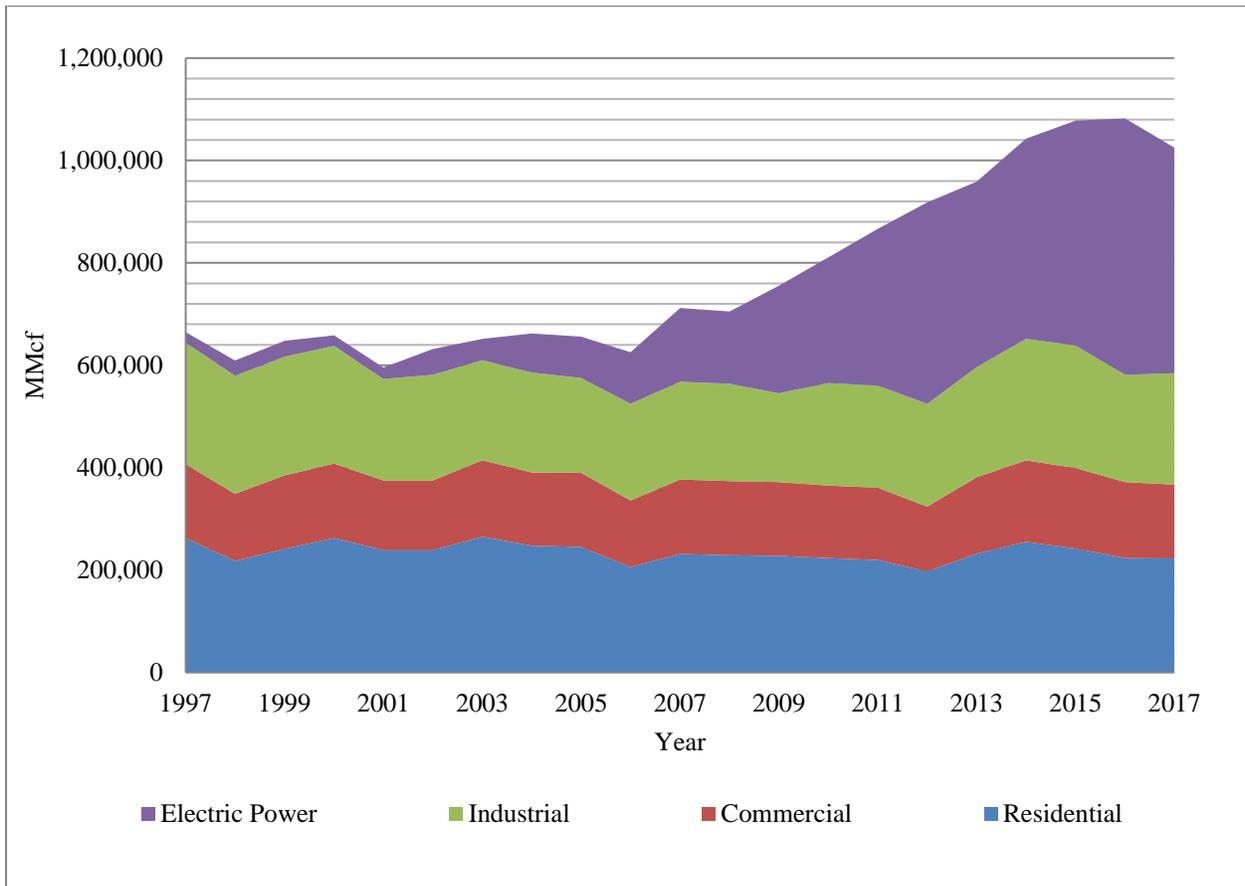
The dramatic shift in the use of natural gas from primarily residential, commercial, and industrial uses to electric power generation has been occurring steadily over the period from 1997 through 2017, with a marked acceleration beginning in 2008 as Marcellus Shale production ramped up, as seen in Figure 1, below. Notably, natural gas usage for electric generation increased about 21 percent from 2013 to 2017, rising 78 Bcf, while total usage increased only 67 Bcf over the same period.²⁸ Residential and commercial usage decreased over this period, resulting in the increased share of gas usage for electric power of 5.2 percent. There was a reduction in electric power generation in 2017 compared to 2016, but this is likely due to the below-average summer temperatures in 2017, and not a break in the trend of increasing electric generation usage. Electric consumption was also down year over year, with a 1.65 percent decline in 2017 as compared to 2016.²⁹

²⁷ EIA's data sets were incomplete for 2017, so estimates were made for the values for Commercial and Industrial deliveries.

²⁸ 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 336 MMcf to 544 MMcf, an increase of 62% from 2013-2017.

²⁹ PUC *Electric Power Outlook Report*, August 2018

Figure 1: Natural Gas Deliveries in Pennsylvania by End Use 1997-2017

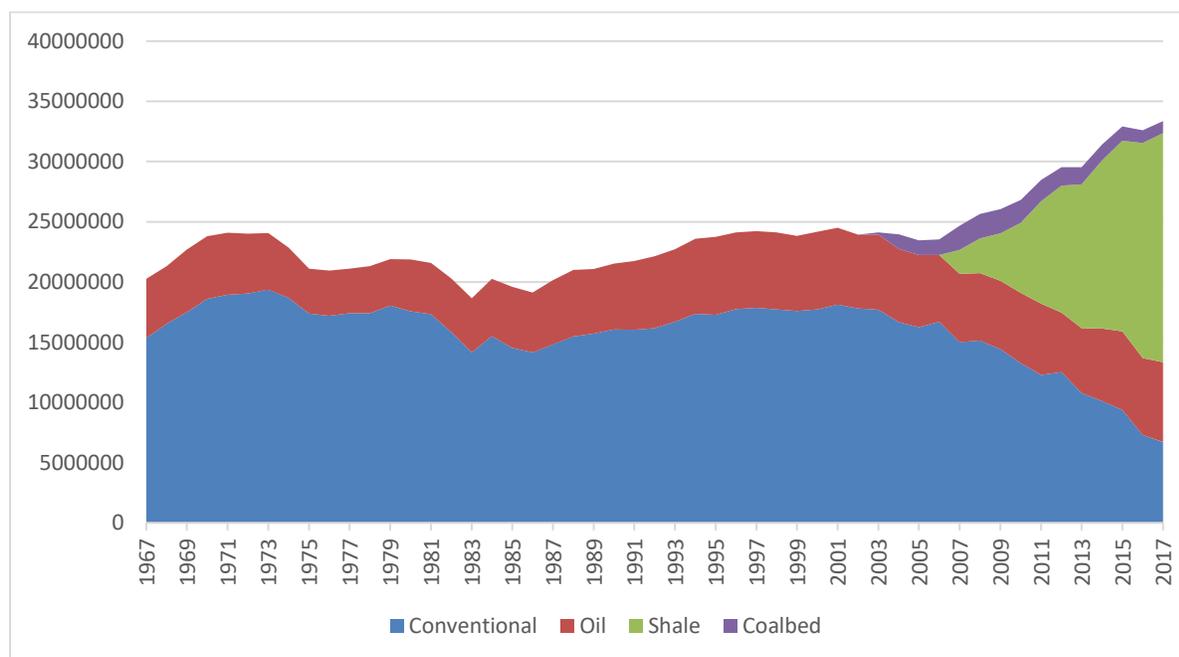


V. Natural Gas Production, Consumption, Reserves, and Prices

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.³⁰ 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.

Figure 2: US Gross Natural Gas Withdrawals (MMcf), 1967-2017



The national storage inventory peak for the prior heating season was 3.8 Tcf and was reached in November 2017. This is slightly down from the peak from the prior injection season of 4.0 Tcf in November 2016. Dry natural gas production in the U.S. averaged 73.6 Bcfd in 2017. This

³⁰ EIA, *EIA Natural Gas Summary*, available at <http://www.eia.gov>.

was an increase of 1 percent from 2016. Over the past decade, U.S. domestic dry natural gas production has increased an average of 3.4 percent per annum.³¹ Domestic natural gas consumption was 74.3 Bcfd in 2017, up 0.6 Bcfd from 2016.³² Henry Hub spot prices averaged \$2.99 in 2017, a notable increase of 18.7 percent from \$2.52/MMBtu in 2016.

An analysis of Henry Hub natural gas futures contracts in comparison to Henry Hub spot prices³³ shows an expected decline in prices over the coming two years; producing a national average projected price of \$2.83/MMBtu for 2019 and a further decline to \$2.64/MMBtu in 2020.³⁴ 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 August 2019 delivery dates. Henry Hub prices are consistently higher, with an average basis spread over the 12 months ending August 2019 of \$0.45/MMBtu.³⁵

³¹ EIA, *Natural Gas Gross Withdrawals and Production*, available at <http://www.eia.gov>.

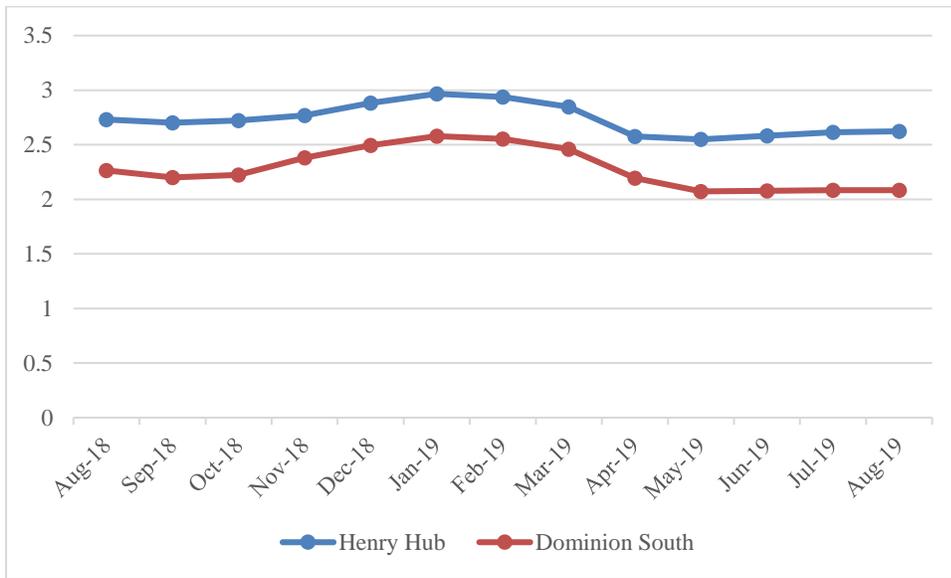
³² EIA, *Natural Gas Consumption by End Use*, available at <http://www.eia.gov>.

³³ CME Group, available at <http://www.cmegroup.com/trading/energy/natural-gas/natural-gas.html>.

³⁴ EIA, *EIA Short Term Energy Outlook*, available at <http://www.eia.gov>.

³⁵ CME Group, available at <http://www.cmegroup.com/trading/energy/natural-gas/natural-gas.html>.

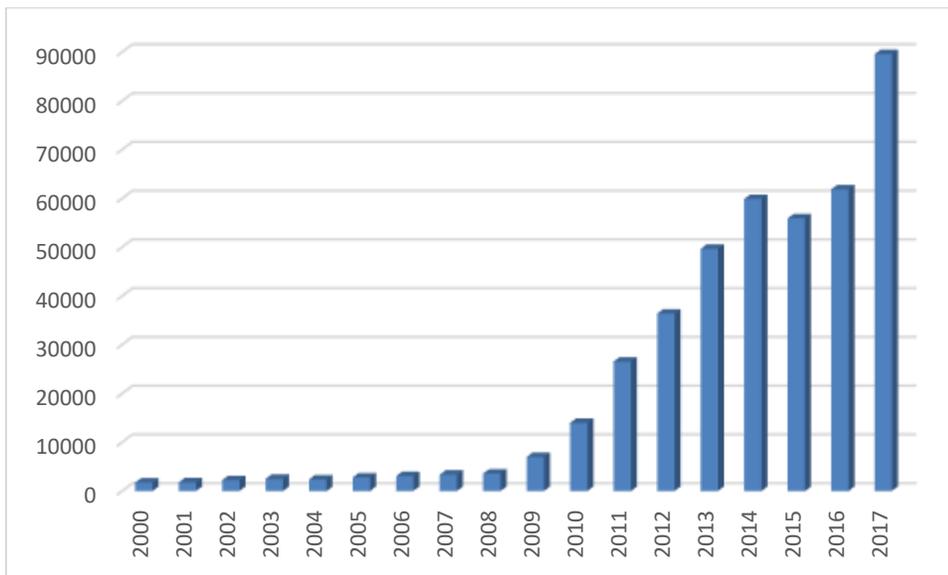
Figure 3: Henry Hub and Dominion South Hub Futures Prices (\$/MMBtu)



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 percent from 2016. Pennsylvania's dry proved reserves since 2000 can be seen in Figure 4, below.

Figure 4: Pennsylvania's Dry Proved Reserves (Bcf), 2000-2017



Total Pennsylvania storage capacity for 2016 was 761 Bcf.³⁶ Table 3, below, shows the supply and demand balance for Pennsylvania in 2016. Although Pennsylvania exported about 4.6 Tcf of natural gas in 2016, which is a 9.5 percent increase from 2015, the state still imported approximately 0.4 Tcf. This may be in part due to some of the same transportation constraints discussed earlier.

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

Table 3: 2016 Pennsylvania Natural Gas Production, Transmission and Consumption (MMcf)

Supply		Demand	
Marketed Production	5,313,258	Consumption	1,309,598
Imports	392,262	Exports	4,630,756
Withdrawal From Storage in excess of additions	68,344		
Total Supply	5,773,864	Total Consumption	5,940,354
Balancing Item*	166,490		

*Balancing item - reflects the difference between total disposition and total supply. Lost and unaccounted (L&U) for natural gas is the difference between the total gas available from all sources and the total gas accounted for from sales, net interchange and company use. Releases occur through leaks from compressor and pump seals, old leaking pipes, and vented emissions from operation practices or accidental breaks. This may also include metering error/accuracy issues.

The EIA estimates that there were 67,200 producing natural gas wells in Pennsylvania in 2017.³⁷ As of July 13, 2018, 25,757 unconventional drilling permit applications had been filed with the Pennsylvania Department of Environmental Protection. Of those applications, 11,818 unconventional wells have been drilled.³⁸ As of July 20, 2018, there were 37 rotary rigs active in Pennsylvania, a 9 percent increase 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.³⁹ Table 4, below, illustrates that Pennsylvania’s production in 2016 greatly exceeded its deliveries to consumers in the state, specifically by nearly a factor of 4 in 2016.

³⁷ EIA, *Natural Gas Annual*, available at <http://www.eia.gov>.

³⁸ 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.

³⁹ Baker Hughes, rotary rig count, available at <http://www.bakerhughes.com/rig-count>.

Table 4 Historical Pennsylvania Deliveries, Transportation and Production (Bcf)⁴⁰

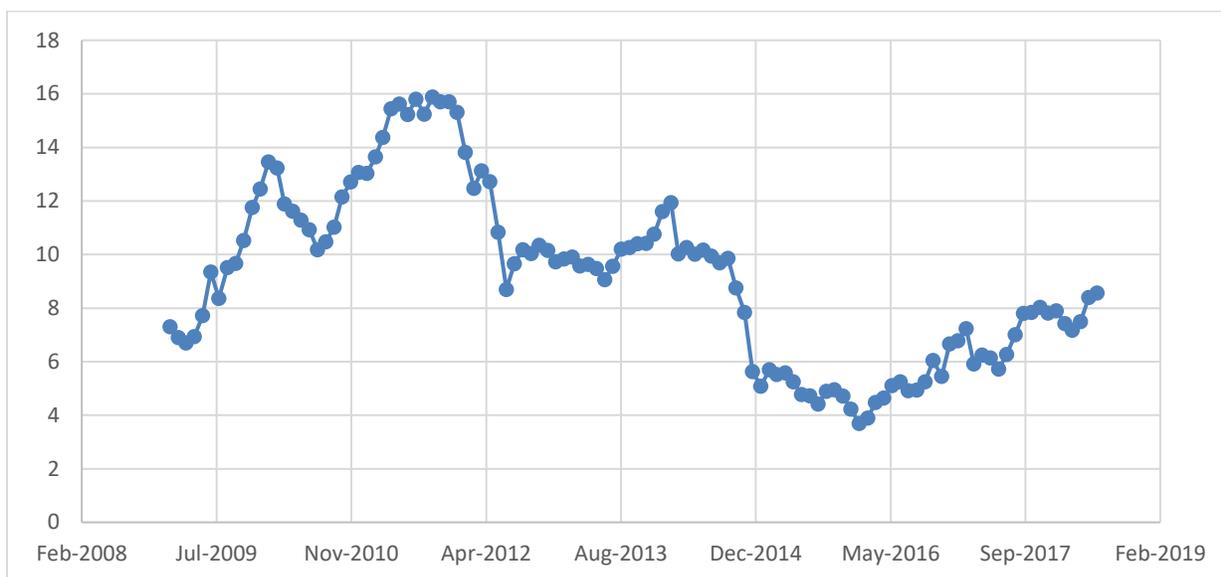
Year	Gas Delivered to Consumers	Delivered for the Account of Others (Transport)	PA Gross Gas Production
1997	664.8	261.2	79.3
1998	609.8	273.4	129.6
1999	648.2	293.5	173.8
2000	659.0	292.0	149.4
2001	596.0	254.2	130.2
2002	632.0	270.6	157.2
2003	651.9	264.3	159.2
2004	662.5	258.2	196.6
2005	656.1	246.8	167.8
2006	625.9	247.3	175.2
2007	711.9	259.1	181.4
2008	705.3	260.6	197.3
2009	755.9	253.3	272.6
2010	811.2	283.2	568.3
2011	866.8	287.6	1,301.7
2012	918.5	293.5	2,244.7
2013	959.0	331.4	3,238.1
2014	1,039.9	362.7	4,217.7
2015	1,038.3	332.5	4,759.4
2016	1,071.7	326.3	5,245.6

⁴⁰ EIA, <http://www.eia.gov>.

NGLs

Natural gas liquids (NGLs) prices had been declining through 2015 as production increased, and as more drillers had shifted to areas of higher NGL content.⁴¹ Meanwhile, pipeline capacity to move the NGLs to markets had 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 2018.⁴²

*Figure 5: NGL Composite Price (\$/MMBtu)*⁴³



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 beginning in 2014, and ethane beginning in 2016. Sunoco had planned to complete the Mariner

⁴¹ NGLs are hydrocarbons with a higher molecular weight than methane. Some examples include ethane, propane, and butane.

⁴² 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.

⁴³ EIA, Natural Gas Futures Prices (NYMEX), available at <http://www.eia.gov>.

East II project in the third quarter of 2017, bringing a total capacity of approximately 350,000 barrels per day of NGLs online.⁴⁴ However, the Mariner East II project is currently being delayed due to regulatory and safety issues identified by the PUC, Pennsylvania Department of Environmental Protection, and the Federal Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA), and it is not clear at this time when the pipeline will finish construction.⁴⁵ When it is completed, this pipeline will transport 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.

⁴⁴ Sunoco Logistics, information available at <http://www.sunocologistics.com/Customers/Business-Lines/Natural-Gas-Liquids-NGLs-Segment/257/>.

⁴⁵ <https://whyy.org/articles/regulatory-issues-delay-opening-of-sunocos-mariner-east-2-pipeline/>

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.⁴⁶ 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/ft³.⁴⁷ 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.⁴⁸

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:

⁴⁶ <https://www.reuters.com/article/us-range-resources-npls-mariner-east/range-finds-alternatives-to-ship-npls-due-penn-mariner-east-shutdown-idUSKCN1J42EK>

⁴⁷ In the natural gas industry, the heat content of natural gas is often approximated to be 1,000 Btu/ft³.

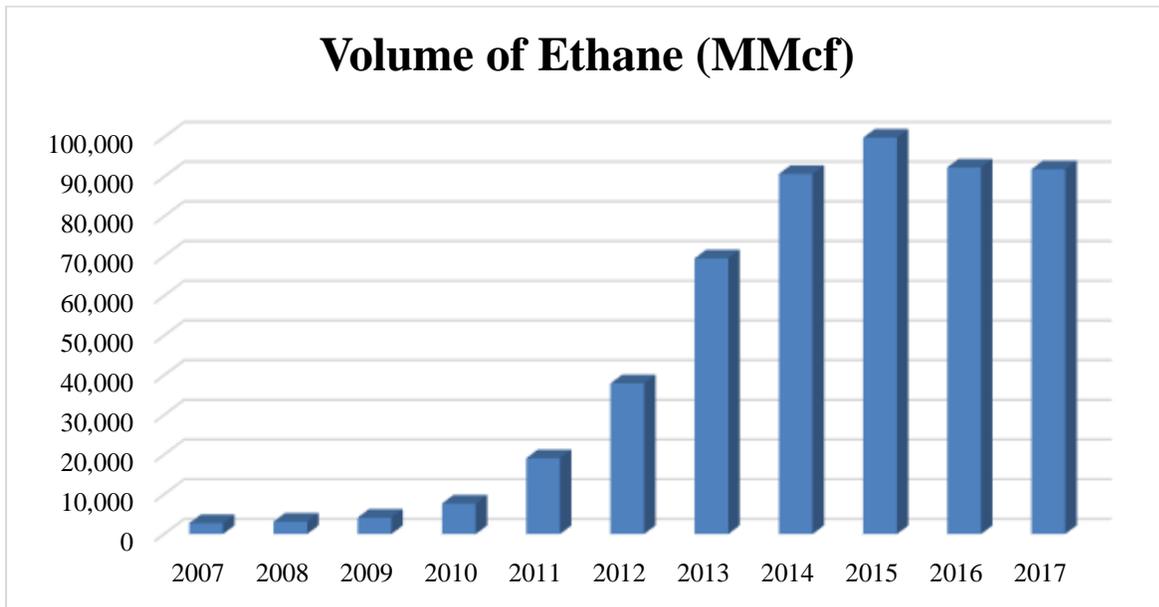
⁴⁸ Carbon monoxide has a heat content of 323 Btu/ft³.

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.⁴⁹ 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.

⁴⁹ EIA, *Heat Content of Natural Gas Delivered to Consumers*, and *Natural Gas Gross Withdrawals*, both available at <http://www.eia.gov>.

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



Projects such as the Mariner East II may relieve this oversupply of NGLs. This should stabilize or raise the prices for these commodities. In 2018, this would mean that an estimated 91 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.

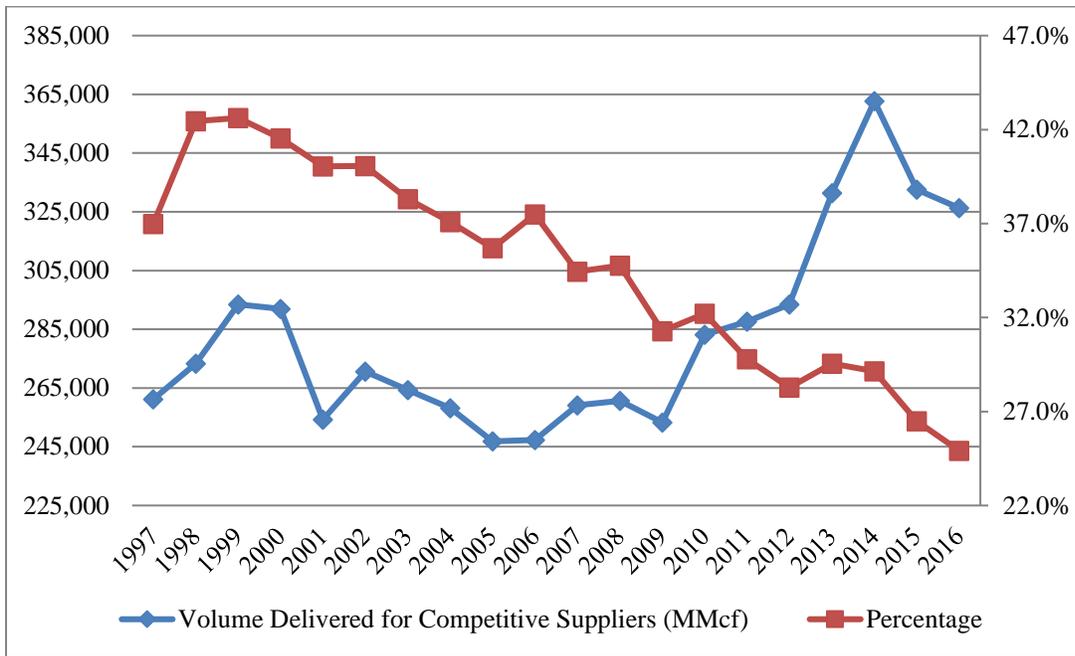
Figure 7, below, shows Pennsylvania deliveries of natural gas for competitive suppliers, often called transportation gas, as a percentage of total gas delivered. In 2016, 24.9 percent of the total natural gas delivered was for competitive suppliers in Pennsylvania. In 2017, the percentages of gas delivered for competitive suppliers by customer class were as follows:⁵⁰

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

⁵⁰ Natural Gas Delivered on Account of Others,

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

Figure 7: Natural Gas Delivered for Competitive Suppliers by Pennsylvania NGDCs ^{51 52}



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. Meanwhile, total consumption is continuing to trend upward, meaning that it is likely that the percentage of competitive supplier deliveries will continue to decline.

⁵¹ Natural Gas Delivered on Account of Others,

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

⁵² 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: 2017 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	320,081	78	26,477	319	56	2,464	83,233	528
Peoples	479,576	85	34,761	247	85	2,941	115,500	524
Peoples Gas	57,241	82	4,293	360	2	0	333	45,937
NFG	171,726	91	11,134	263	159	1,119	30,602	548
PECO	477,213	79	43,873	468	19	316	771	34,239
PGW	475,343	69	21,768	330	507	746	4,915	5,955
UGI CPG	68,582	85	8,975	301	131	1,519	5,247	2,978
UGI PNG	147,134	101	12,622	337	58	1,500	10,980	6,829
UGI Utilities	291,758	71	26,650	295	509	947	74,051	1,322

*Table 6: 2016 Customer Statistical Data*⁵³

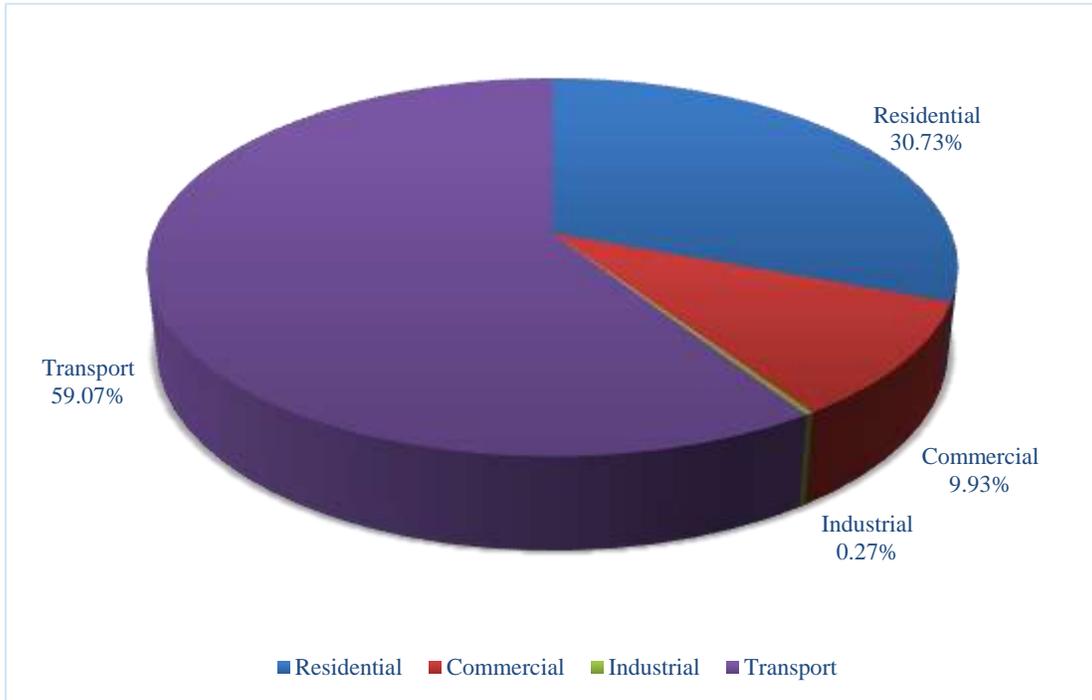
<i>Company</i>	<i>Number of Residential Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Commercial Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Industrial Customers</i>	<i>Average per customer usage (MCF)</i>	<i>Number of Transportation Customers</i>	<i>Average per customer usage (MCF)</i>
Columbia	312,033	78	26,063	312	65	2,800	88,087	455
Peoples	478,287	85	36,153	233	91	2,000	114,104	1
Peoples Gas	56,882	81	4,338	351	0	0	306	52
NFG	172,382	90	10,988	255	164	756	30,071	823
PECO	469,813	75	43,164	435	18	1,056	808	34,189
PGW	473,798	65	21,912	308	527	630	4,603	6,211
UGI CPG	70,533	82	9,121	305	132	1,864	2,815	5,448
UGI PNG	149,281	102	12,509	322	61	1,426	8,074	7,022
UGI Utilities	297,149	68	26,833	292	536	856	61,839	1,609

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

⁵³ 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.

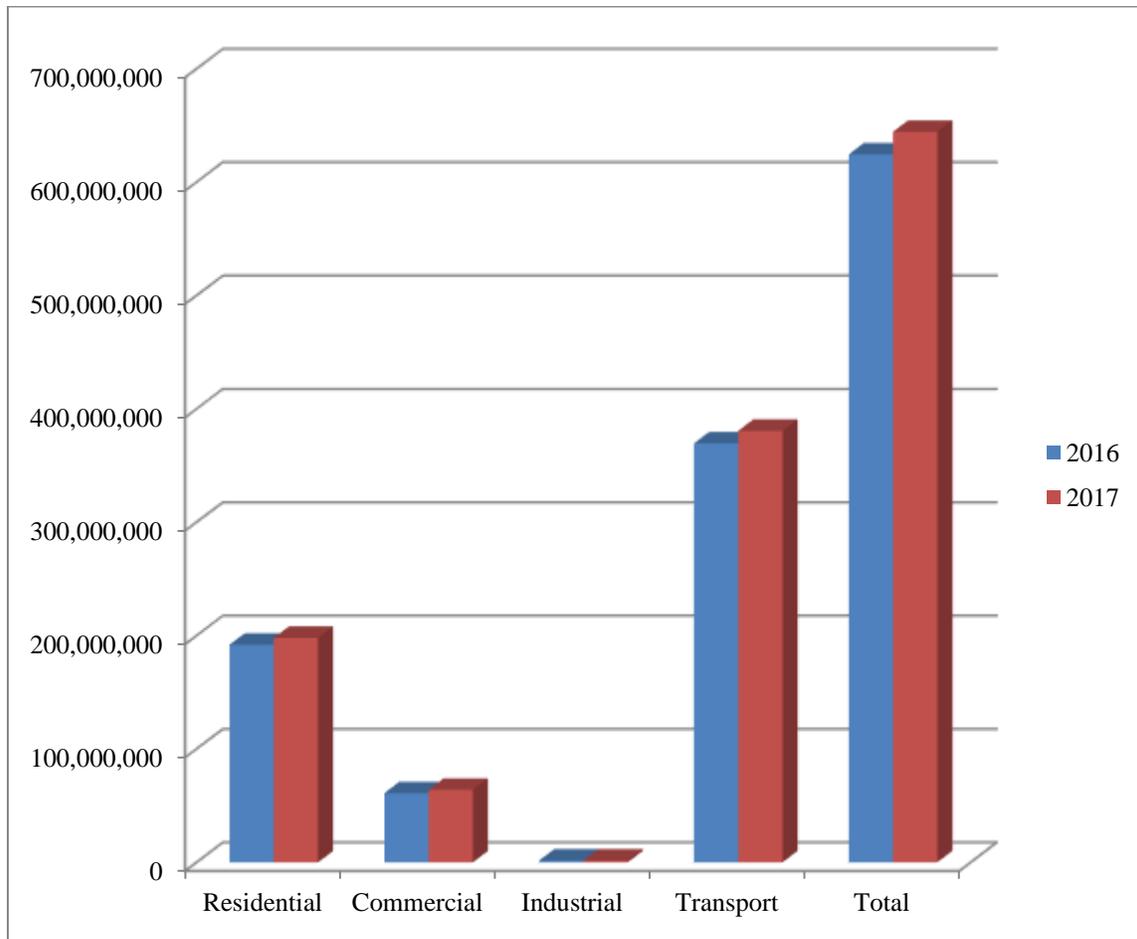
natural gas supply, and the utility delivers the natural gas to them. Transportation also includes residential and commercial customers that utilize an alternate natural gas supplier (NGS).

Chart 7: 2017 Pennsylvania Gas Usage by Customer Class within Major NGDCs



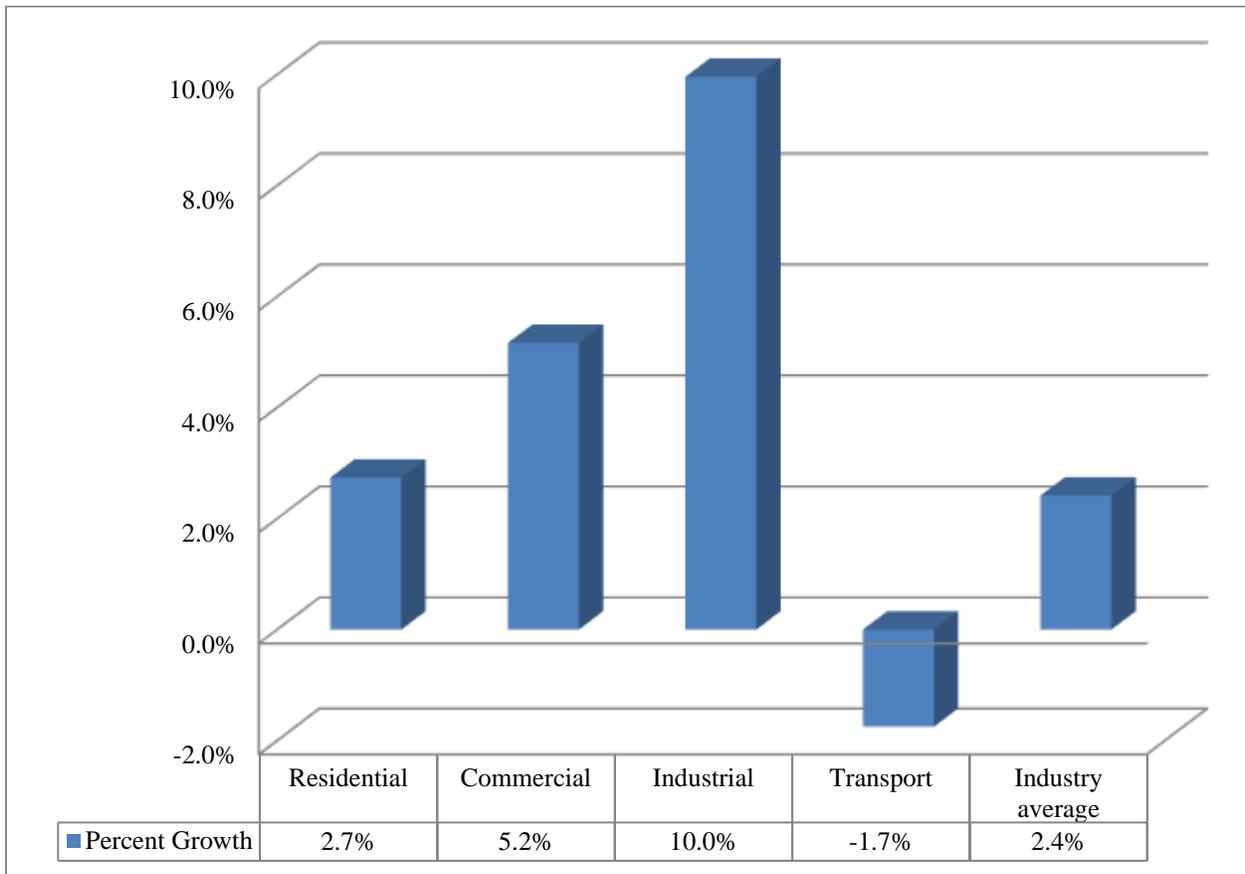
As seen in Figure 8, below, natural gas usage in 2017 was higher for each NGDC customer class as compared to 2016.

Figure 8: Pennsylvania Gas Usage by Customer Class within Major NGDCs: 2016-2017



In total, gas usage rose by 3.2 percent between 2016 and 2017, while the number of customers rose by 0.8 percent. This modest rise in usage was generally distributed across customer classes, with residential, commercial, and industrial usage all increasing in 2017 over 2016, with a slight drop in per customer usage in transportation. 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: 2016-2017



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 2017 delivery year. The data is presented for 2017 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.⁵⁴

⁵⁴ 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: 2017 Annual Gas Supply and Demand for Major Gas Utilities (MMcf)

	UGI PNG	UGI CPG	UGI Util.	PGW	Columbia	NFG	PECO	Peoples	Peoples TWP
Gas Supply:									
Supply Contracts	22,604	10,922	45,890	44,389	24,292	14,864	58,372	35,955	5,977
Spot Purchases	4,387	2,914	12,111	0	9,831	4,115	2,274	21,383	1,957
Storage Withdrawal	0	0	0	10,269	0	0	0	0	0
LNG	0	0	0	1,357	0	0	0	0	0
Subtotal Gas Supply	26,991	13,836	58,001	56,015	34,123	18,979	60,646	57,338	7,934
<hr/>									
Transportation	88,431	15,625	97,873	29,269	43,929	16,775	26,398	59,275	15,116
<hr/>									
TOTAL GAS SUPPLY	115,422	29,461	155,874	85,284	78,052	35,754	87,044	116,613	23,050
<hr/>									
Requirements:									
Firm Requirements	21,278	9,251	29,270	42,194	34,123	18,978	60,628	56,081	7,752
Liquefaction Interruptible Requirements	0	0	0	2,428	0	0	0	0	0
Storage Injections	0	0	0	11,314	0	0	0	0	0
Subtotal Firm & Interruptible	21,278	9,251	29,270	56,015	34,123	18,978	60,646	56,081	7,752
<hr/>									
Transportation	88,431	15,625	97,873	29,269	43,929	16,775	26,398	60,532	15,297
<hr/>									
Load Deductions	(5,713)	(4,585)	(28,731)	0	0	0	0	0	0
<hr/>									
TOTAL GAS REQUIREMENTS	115,422	29,461	155,874	85,284	78,052	35,753	87,044	116,613	23,049
<hr/>									
Surplus(Deficiency)	0	0	0	0	0	1	0	0	1

Chart 8: Pennsylvania Gas Utility Annual Supply 2017

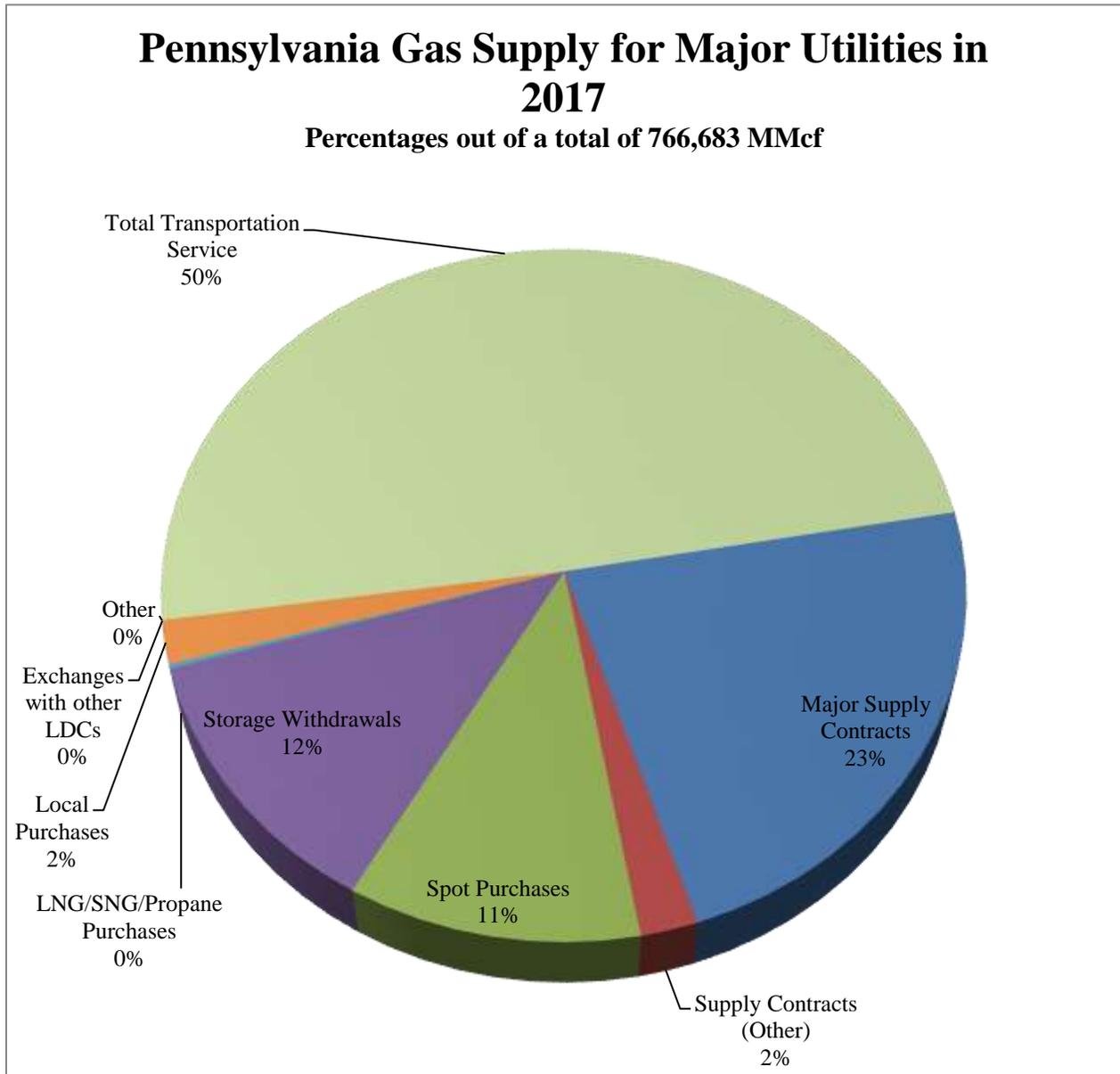
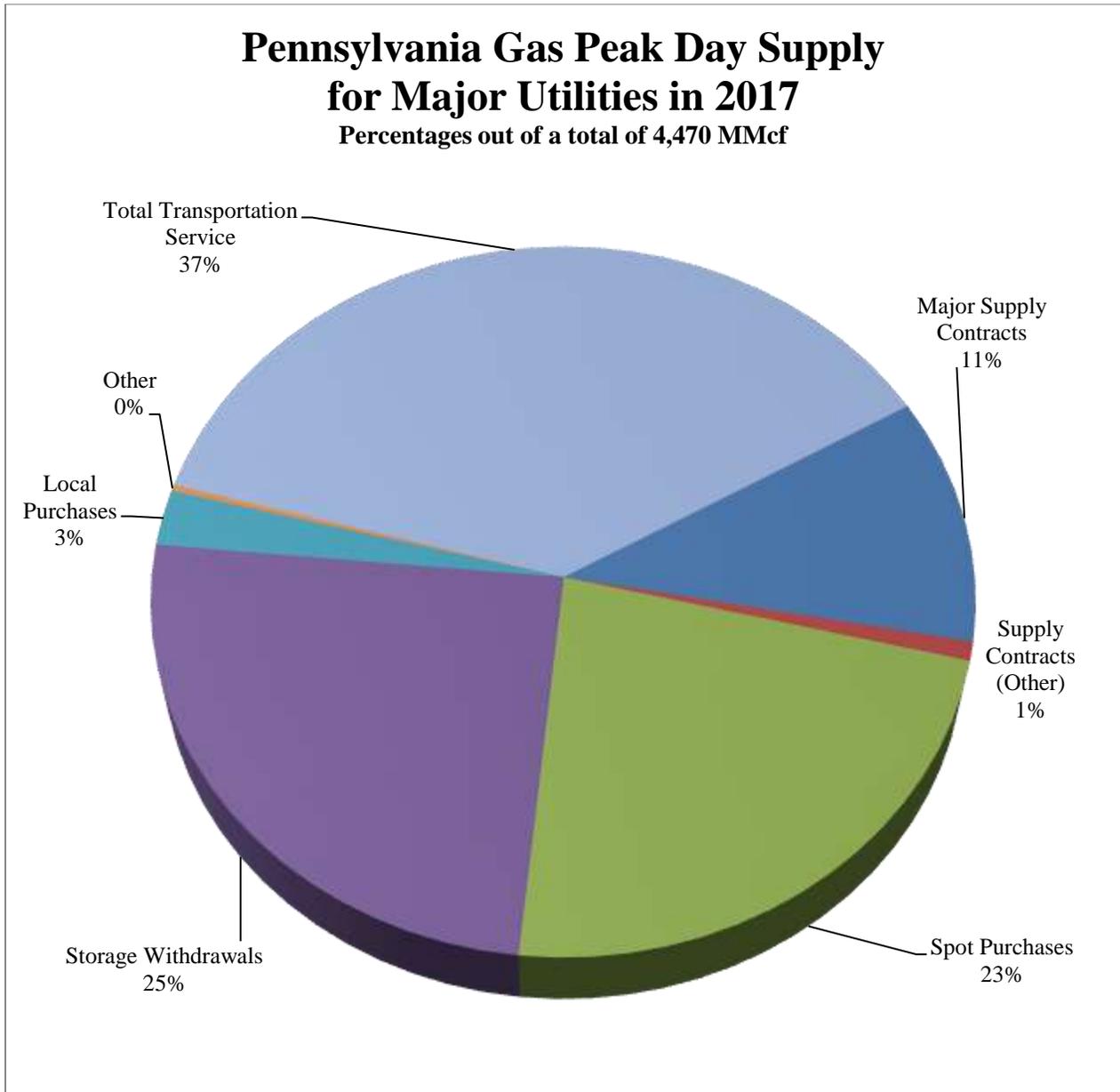


Table 8: 2017 Peak Day Gas Supply and Demand Balance for Major Gas Utilities (MMcf)

	UGI PNG	UGI CPG	UGI Util.	PGW	Columbia	NFG	PECO	Peoples	Peoples TWP
Gas Supply:									
Supply Contracts	102	17	47	178	342	195	506	383	36
Spot Purchases	106	78	424	0	0	0	115	301	65
Storage Withdrawal	0	0	0	169	0	0	0	0	0
LNG	0	0	0	77	0	0	0	0	0
Subtotal Gas Supply	208	95	471	424	342	195	621	684	101
<hr/>									
Transportation	270	66	358	150	273	116	155	251	32
<hr/>									
TOTAL GAS SUPPLY	478	161	829	574	615	311	776	935	133
<hr/>									
Requirements:									
Firm Requirements	161	83	341	426	342	195	708	576	78
Liquefaction Interruptible Requirements	0	0	0	0	0	0	0	0	0
Storage Injections	0	0	0	0	0	0	0	0	0
Subtotal Firm & Interruptible	161	83	341	426	342	195	708	576	78
<hr/>									
Transportation	307	75	383	150	273	116	68	359	54
<hr/>									
Load Deductions	(10)	(3)	(106)	0	0	0	0	0	0
<hr/>									
TOTAL GAS REQUIREMENTS	478	161	830	576	615	311	776	935	132
<hr/>									
Surplus(Deficiency)	0	0	(1)	(2)	0	0	0	0	1

Chart 9: Pennsylvania Peak Day Supply 2017



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 2007 through 2017.⁵⁵

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.

⁵⁵ 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.

Table 9: Operating Revenue and Operating Expense

OPERATING REVENUE (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	650.5	351.8	838.8	928.8	326.6	871.9	187.0	134.6	618.4		4,908.4
2008	781.9	388.8	821.7	1,163.7	348.4	886.0	193.0	151.9	626.3		5,361.7
2009	544.9	325.1	759.6	939.8	337.0	823.1	169.0	109.2	556.1		4,563.8
2010	559.2	255.5	686.8	736.1	328.5	749.2	156.2	100.2	573.3		4,145.0
2011	504.8	248.1	613.0	715.3	306.9	705.1	148.2	53.2	534.1		3,828.6
2012	406.3	215.9	545.4	634.2	243.5	642.6	128.4	47.4	412.7		3,276.4
2013	512.3	235.5	600.8	738.5	276.9	688.2	128.4	89.2	450.5		3,720.3
2014	563.3	248.3	646.8	835.5	308.6	746.6	154.0	110.6	511.4		4,125.0
2015	536.2	196.9	546.5	716.1	265.1	621.5	131.1	85.8	457.4		3,556.7
2016	493.9	175.0	463.4	588.3	205.9	629.0	124.0	78.7	409.9		3,168.1
2017	552.6	204.6	495.3	675.5	231.3	635.0	136.4	91.3	500.5		3,522.3
OPERATING EXPENSE (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	619.0	324.4	782.2	855.5	299.1	823.5	175.6	123.2	552.5		4,555.0
2008	741.7	359.8	779.5	1,025.5	327.8	824.2	178.3	142.3	566.0		4,945.1
2009	492.8	294.5	671.6	749.6	312.9	748.6	154.3	101.5	492.7		4,018.5
2010	495.7	220.4	599.8	613.6	297.5	655.3	135.8	93.5	506.0		3,617.6
2011	444.6	200.8	406.7	558.2	237.0	523.6	109.3	37.4	409.7		2,927.2
2012	337.6	176.9	350.2	452.3	177.0	473.3	81.2	33.6	291.0		2,373.1
2013	416.1	187.9	484.8	499.1	204.1	491.2	81.2	71.7	307.2		2,743.3
2014	478.5	209.0	525.7	707.3	279.2	627.3	129.9	89.7	432.7		3,479.3
2015	445.2	165.0	430.5	590.5	239.7	564.9	109.3	69.5	382.3		2,996.8
2016	400.2	143.3	340.1	476.5	186.5	520.7	103.7	62.1	319.3		2,552.3
2017	467.1	177.0	367.7	569.1	187.0	540.0	109.4	74.2	417.1		2,908.4

Table 10: Net Operating Income and Administration & General Expense

NET OPERATING INCOME (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	31.5	27.4	56.6	73.3	27.5	-6.9	11.4	11.4	65.9		298.1
2008	40.2	29.0	42.2	90.3	20.6	9.0	14.7	9.6	60.3		315.9
2009	52.1	30.5	88.0	141.3	24.1	4.1	14.7	7.7	63.4		425.9
2010	63.5	35.1	87.0	91.6	31.0	26.5	20.4	6.7	67.3		429.1
2011	35.9	35.5	115.7	72.9	52.0	30.8	28.2	11.1	59.0		440.9
2012	45.2	27.9	106.3	101.4	33.8	32.7	28.8	9.3	72.7		458.3
2013	70.3	37.6	116.1	78.9	41.8	56.5	28.8	11.3	93.8		535.2
2014	97.0	45.8	121.0	138.9	44.9	67.7	39.3	26.4	98.8		679.8
2015	100.4	35.8	115.9	120.3	37.5	5.8	38.2	20.0	85.4		559.5
2016	66.8	24.0	123.2	72.2	14.2	63.3	17.5	12.0	78.1		471.3
2017	85.8	20.2	127.6	73.7	37.7	56.1	23.7	12.5	74.6		511.8

ADMINISTRATION & GENERAL EXPENSE (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	49.6	26.3	33.0	70.7	16.8	101.6	23.4	9.6	36.6		367.6
2008	39.9	26.7	30.4	52.0	20.1	101.9	16.7	9.9	35.6		333.2
2009	45.3	26.5	31.9	41.8	21.8	103.4	15.0	10.2	37.4		333.3
2010	53.4	27.1	29.4	60.9	21.2	120.3	17.6	12.3	36.5		378.7
2011	56.2	29.4	29.0	78.4	19.8	108.5	14.8	11.7	35.1		383.0
2012	47.4	28.9	32.7	70.9	15.1	124.1	11.2	9.6	35.1		375.0
2013	53.0	31.2	28.0	82.7	21.8	107.9	15.2	11.0	38.6		389.4
2014	58.9	27.7	27.4	66.0	20.7	110.9	14.8	9.3	44.3		380.0
2015	62.3	27.9	30.2	69.1	24.2	152.9	15.2	10.5	46.5		438.8
2016	70.5	24.5	31.3	55.3	21.7	168.3	14.7	8.0	36.4		430.7
2017	91.5	28.2	33.2	52.3	25.4	148.5	16.0	7.6	44.0		446.7

Table 11: Maintenance Expense and Depreciation Expense

MAINTENANCE EXPENSE (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	12.3	4.1	21.2	31.7	4.8	20.1	3.6	5.8	9.8		113.4
2008	13.8	4.2	22.5	33.0	6.4	21.0	7.7	6.5	10.6		125.7
2009	14.1	4.1	22.8	36.6	7.1	25.6	4.7	5.8	11.8		132.6
2010	14.1	4.0	23.7	35.5	6.7	25.7	4.3	6.2	11.9		132.1
2011	13.9	3.9	21.5	35.2	7.8	31.7	4.5	5.1	14.1		137.7
2012	14.4	3.3	20.8	36.6	8.8	29.8	4.5	4.8	14.1		137.2
2013	15.5	5.6	27.0	41.0	9.1	33.6	3.9	4.2	14.9		154.9
2014	18.3	6.1	26.8	43.4	10.7	40.5	4.6	4.2	16.6		171.2
2015	22.0	6.4	32.4	42.3	14.1	38.5	4.4	5.3	15.7		181.1
2016	23.6	5.9	29.5	38.1	12.6	41.0	4.5	4.4	13.8		173.4
2017	25.8	6.1	29.9	38.4	12.5	42.5	4.2	4.3	16.5		180.3

DEPRECIATION EXPENSE (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	16.9	11.6	29.0	37.2	15.0	38.1	8.3	5.8	20.8		182.7
2008	18.2	11.2	30.8	39.0	15.2	38.8	8.5	6.1	21.0		188.8
2009	21.0	11.1	31.5	39.2	16.3	37.2	7.5	6.1	22.1		192.0
2010	22.5	11.1	32.7	41.6	16.7	39.0	7.8	5.9	22.5		199.8
2011	25.0	11.3	33.5	44.9	14.4	39.6	8.1	6.5	23.3		206.7
2012	14.4	11.4	35.1	46.7	14.1	40.1	8.3	7.1	24.1		201.3
2013	33.4	11.4	36.7	48.7	14.6	41.5	8.7	6.3	25.9		227.3
2014	37.7	11.5	39.2	46.4	15.6	41.7	8.8	7.2	28.1		236.1
2015	42.1	12.0	42.0	45.9	16.6	44.6	9.1	7.4	31.0		250.8
2016	47.5	12.9	43.1	48.8	16.6	46.7	10.0	7.2	34.2		267.0
2017	52.0	14.2	47.2	52.3	17.2	48.6	10.8	7.6	39.0		288.9

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

TOTAL GAS COSTS (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	436.9	188.4	569.3	536.8	230.0	540.9	122.8	85.2	428.4		3,138.7
2008	621.4	229.1	647.5	790.9	245.9	587.2	124.8	112.2	428.1		3,787.1
2009	250.2	174.3	384.4	498.3	232.0	392.6	78.9	63.8	390.7		2,465.2
2010	328.7	95.1	381.3	390.9	198.9	321.7	83.4	52.0	340.0		2,192.0
2011	332.2	96.6	314.5	371.1	194.2	303.8	73.0	48.8	329.2		2,063.5
2012	152.8	69.4	239.1	216.9	127.3	220.8	47.2	34.2	217.0		1,324.6
2013	265.3	79.3	275.5	312.0	164.6	258.9	51.2	30.5	251.1		1,688.5
2014	259.1	91.3	320.3	356.1	195.6	295.1	59.9	41.5	290.1		1,909.0
2015	182.6	44.5	189.2	288.6	100.7	196.8	39.0	23.2	221.4		1,286.0
2016	114.7	22.5	174.1	193.9	76.9	149.8	33.1	19.8	197.1		981.8
2017	176.4	54.3	190.9	277.6	100.1	187.9	45.1	29.7	256.5		1,318.5

AVERAGE COST OF GAS PURCHASED (\$/MCF)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Ave.
2007	8.99	7.97	9.85	7.92	7.77	9.30	8.85	8.14	11.79		8.95
2008	11.32	7.97	11.04	8.65	8.44	11.00	9.64	9.41	12.01		9.94
2009	6.00	7.76	6.79	7.30	9.60	7.44	8.23	7.00	11.46		7.95
2010	7.04	5.43	6.85	5.29	6.23	6.31	5.85	5.69	7.33		6.22
2011	7.51	4.72	6.18	5.25	5.75	5.74	5.72	6.29	7.02		6.02
2012	4.79	3.37	5.47	4.20	4.41	4.98	4.28	5.14	5.52		4.68
2013	5.75	3.81	5.51	4.60	5.18	5.29	4.41	3.42	6.27		4.92
2014	6.25	4.07	6.15	5.44	6.09	5.78	5.37	4.87	7.42		5.72
2015	4.90	2.10	4.09	4.11	3.66	4.17	3.73	3.06	5.64		3.94
2016	3.56	1.21	3.97	3.06	3.23	3.33	3.37	2.38	5.47		3.29
2017	5.22	2.85	4.39	4.71	3.69	4.28	4.26	3.64	5.69		4.30

Table 13: Gross Utility Plant in Service

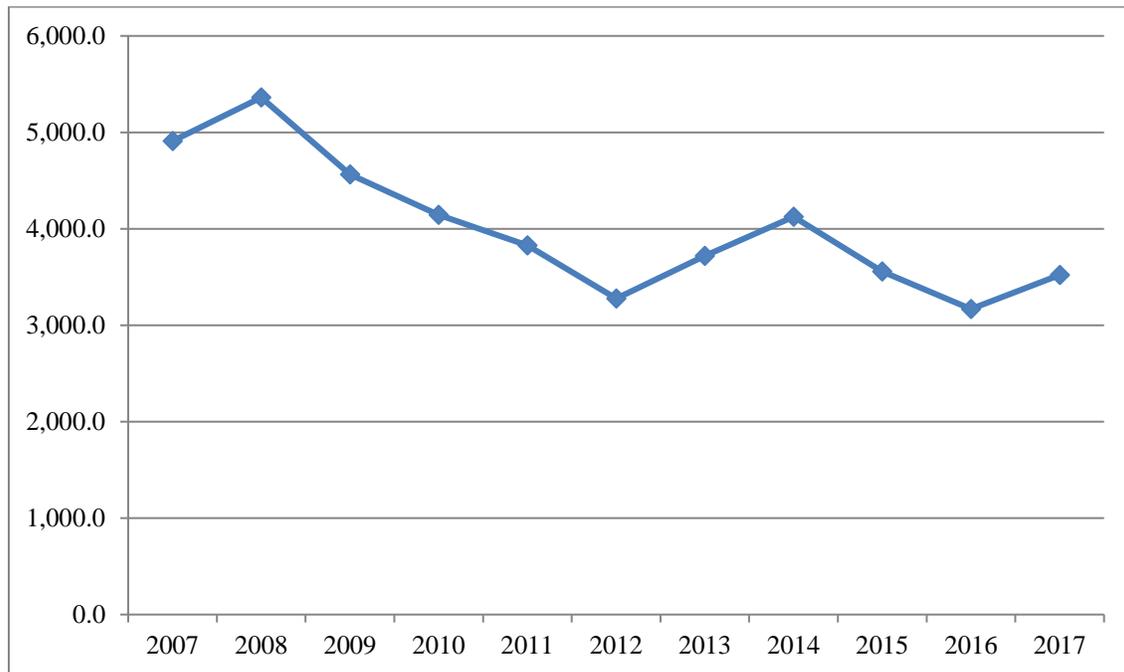
GROSS UTILITY PLANT IN SERVICE (\$ Million)											
	Columbia	NFG	PECO	Peoples	UGI - PNG	PGW	UGI - CPG	TWP	UGI		Total
2007	788.6	441.0	1,556.5	1,702.3	531.9	1,421.1	294.6	213.7	1,068.5		8,018.2
2008	851.1	454.6	1,595.5	1,791.3	552.9	1,454.9	312.6	224.4	1,113.2		8,350.5
2009	925.1	465.7	1,646.8	1,858.2	564.4	1,502.0	332.3	229.4	1,153.5		8,677.4
2010	981.9	478.9	1,698.5	1,919.3	575.2	1,531.0	347.3	237.7	1,187.7		8,957.5
2011	1,073.6	491.5	1,792.9	2,032.5	597.8	1,555.1	357.4	245.2	1,078.2		9,224.2
2012	1,198.2	501.4	1,859.5	2,143.0	618.1	1,575.8	370.6	249.6	1,148.7		9,665.0
2013	1,335.7	511.7	1,932.4	2,077.3	650.2	1,596.6	384.4	273.3	1,228.3		9,989.9
2014	1,500.5	527.2	2,071.4	2,169.9	685.6	1,646.7	395.6	299.9	1,337.7		10,634.5
2015	1,660.1	542.5	2,205.4	2,278.2	733.1	1,685.2	425.4	311.5	1,423.3		11,264.7
2016	1,860.1	577.8	2,260.4	2,367.9	780.4	1,741.5	460.1	329.6	1,704.8		12,082.6
2017	2,074.1	594.5	2,503.6	2,544.0	821.3	1,793.6	482.4	348.4	1,732.1		12,893.9

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.⁵⁶

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 2007.

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



⁵⁶ 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 \$)

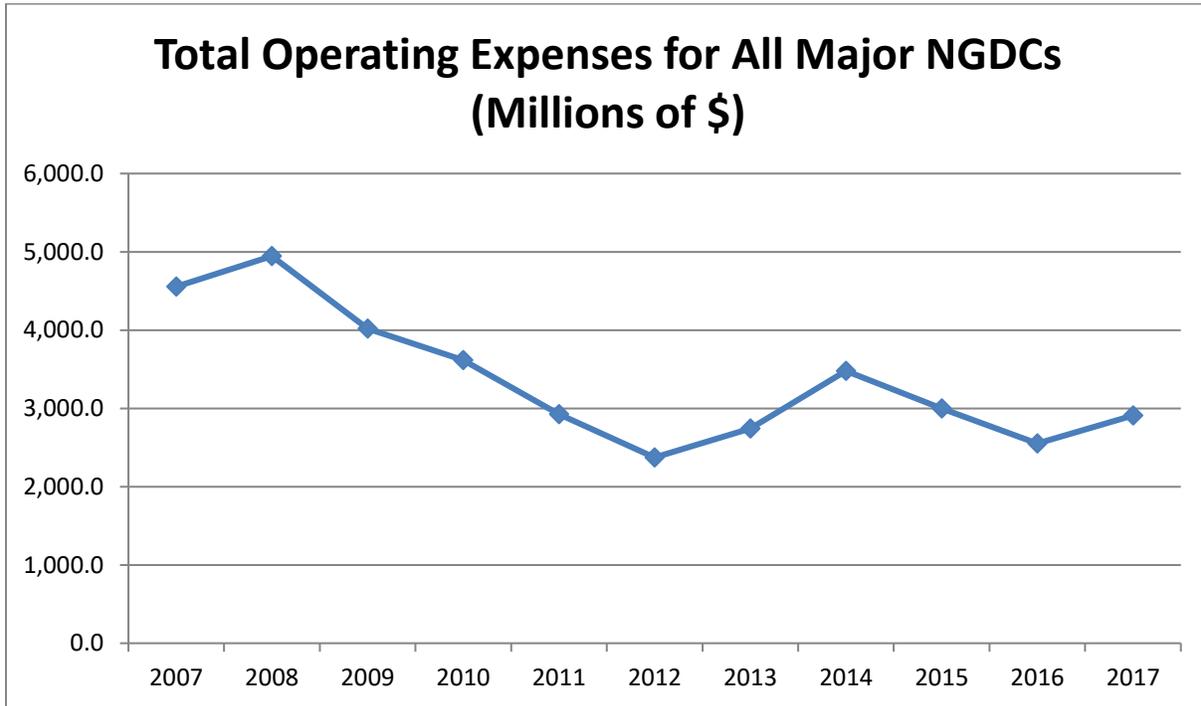
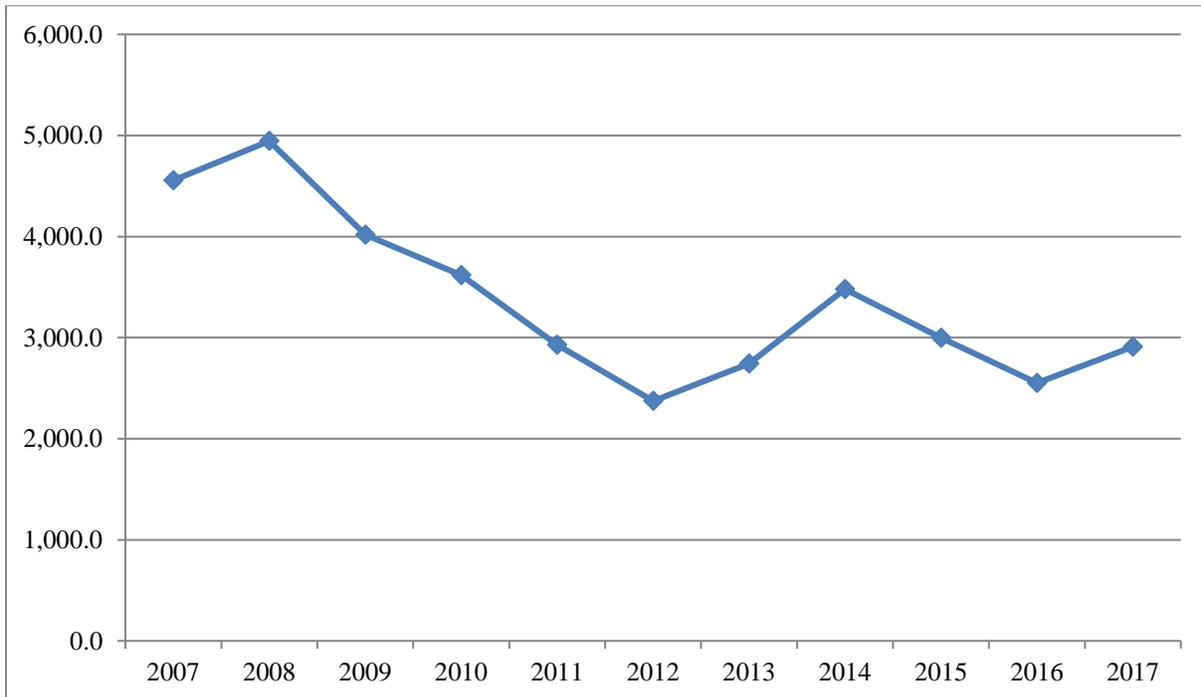
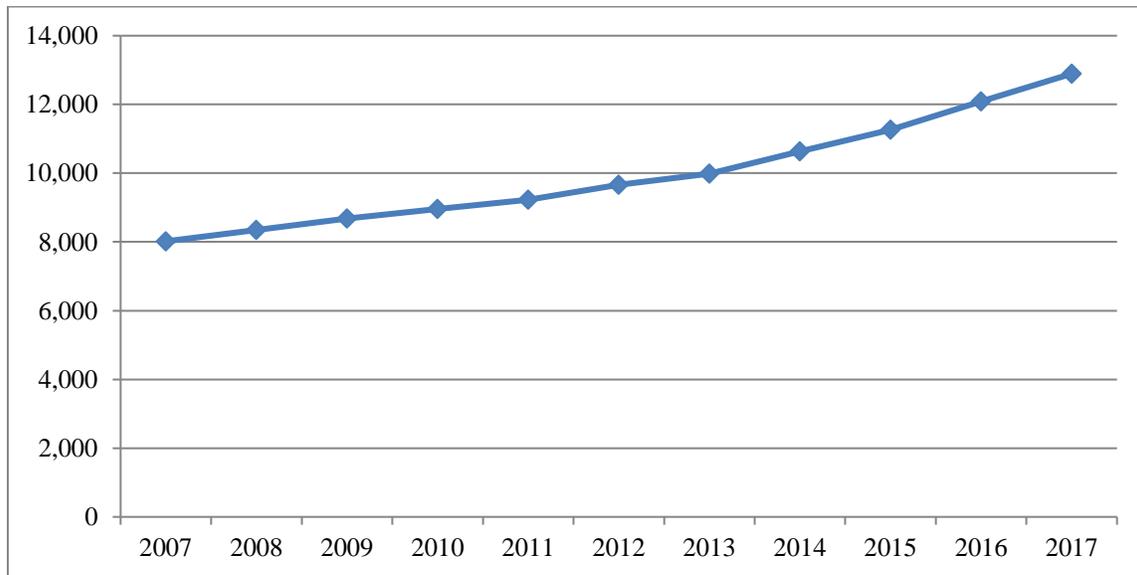


Figure 12: Average Cost of Gas Purchased for All Major NGDCs (\$/Mcf)



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.⁵⁷ Figure 13, below, shows that the major NGDCs have added approximately \$443 million per year to their total utility plant in service. This equates to a cumulative increase of 60.8 percent in plant in service for the total industry since 2007. Figure 14, below, shows that while all NGDCs have increased plant in service since 2007, Columbia has the fastest rate of increase, more than doubling its total plant in service with a 163 percent increase since 2007. PGW has the slowest rate of increase at 26.2 percent since 2007.⁵⁸

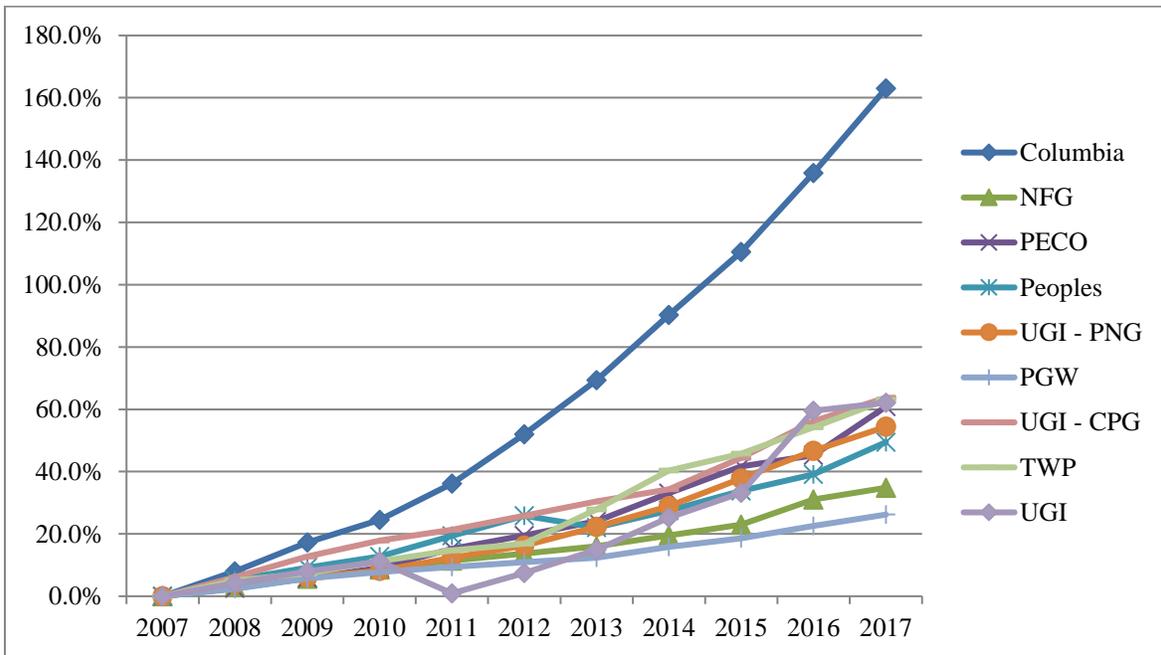
Figure 13: Total Utility Plant in Service for All Major NGDCs (Millions of \$)



⁵⁷ Final Implementation Order entered May 23, 2014 at Docket No. L-2012-2317274.

⁵⁸ All of the other major NGDCs besides PGW and Columbia have had an increase of roughly 50-60 percent since 2007. The notable exception is NFG, with an increase of only 34.8 percent. NFG is also the only major NGDC without a Commission-approved LTIIP and DSIC mechanism in Pennsylvania.

Figure 14: Cumulative Percentage Increase in Utility Plant in Service for All Major NGDCs (base year 2007)



Section 4 - Conclusion

X. Summary

Natural gas production and consumption both appear to have somewhat leveled off in Pennsylvania. While prices were relatively higher in 2017, it appears that natural gas prices will return to a decline over the next two years, through 2019. Natural gas continues to be an increasing portion of Pennsylvania's electric power generation, and this trend seems likely to continue.

Some market developments to watch for in the next couple of years will involve NGL production and transportation capacity, as well as LNG production. As additional pipeline capacity becomes available to move NGLs to market, such as the Mariner East pipelines, it is likely that prices for these products will rise. 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

