

Pennsylvania Public Utility Commission

Annual Winter Reliability Assessment

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Introduction

The **Energy Association of Pennsylvania** represents the interests of its

Member Natural Gas Distribution Companies:

Columbia Gas of Pennsylvania
Leatherstocking Gas Company, LLC
National Fuel Gas Distribution Corp.
PECO
Peoples Natural Gas Company LLC
Peoples Gas Company
Philadelphia Gas Works
Pike County Light & Power Company
UGI Utilities, Inc. - Gas Division
Valley Energy

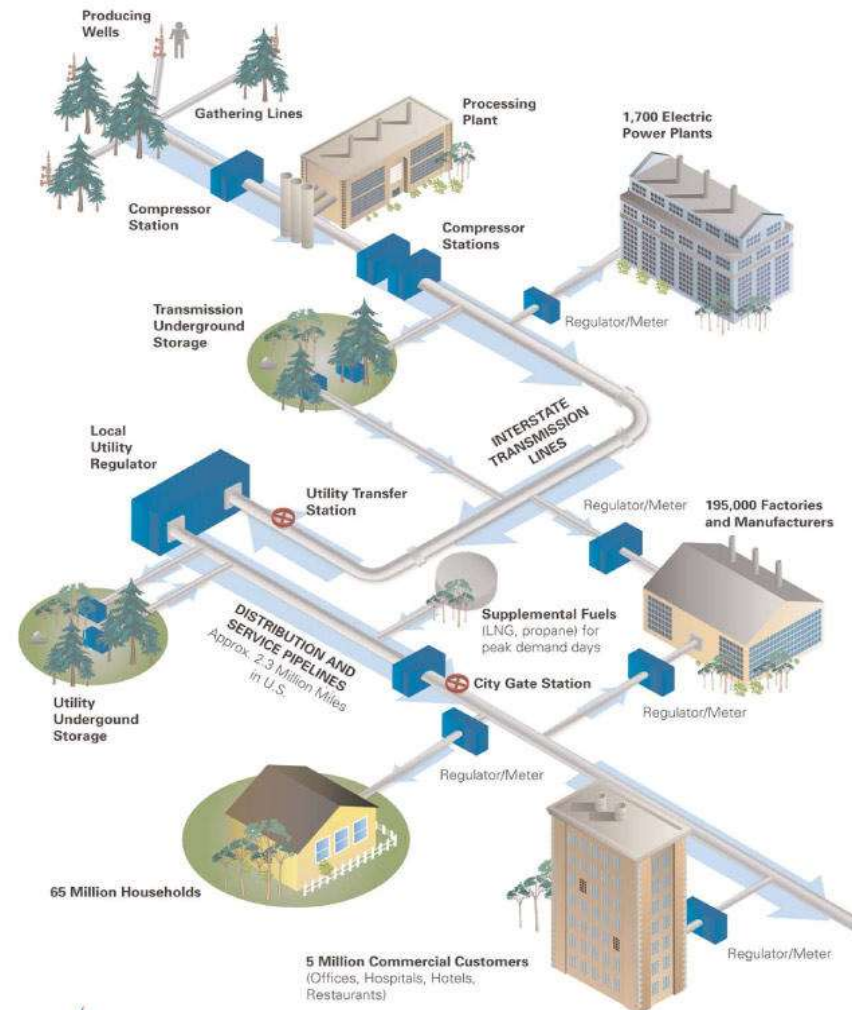
Distributing natural gas to over three million residential, commercial and industrial customers in Pennsylvania



Introduction - How Gas is Delivered

- Extracted from wells and moved from collection point into gathering system for sale into the wholesale market
 - Includes processing facility where natural gas is purified and useful by-products such as propane and butane are removed
- Moved into transmission system using compressors
 - counteracts friction that is created when gas is moved through steel pipe
- Transported by midstream companies to utility's delivery point ("city gate") or to upstream storage
 - Pressure reduced
 - Odorant added
- Moved into utility's distribution pipeline and delivered through individual service lines to customer
 - pressure further reduced for delivery

NATURAL GAS DELIVERY SYSTEM



Supply and Demand

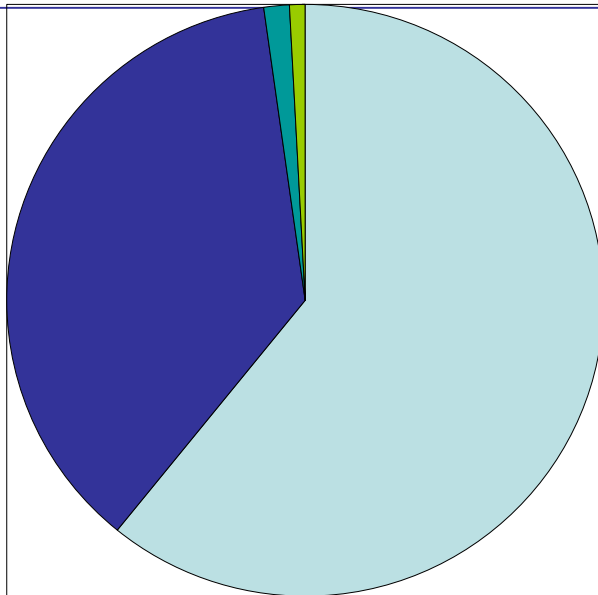
Winter 2020-2021

(all natural gas volumes in billions of cubic feet)

Expected Demand	224.7 Bcf
Expected Supply	
Flowing Interstate Gas	136.8
Storage Withdrawals	82.9
Local Production	3.1
Peak Shaving	1.9
TOTAL	224.7



Winter 2020-2021: Supply Sources

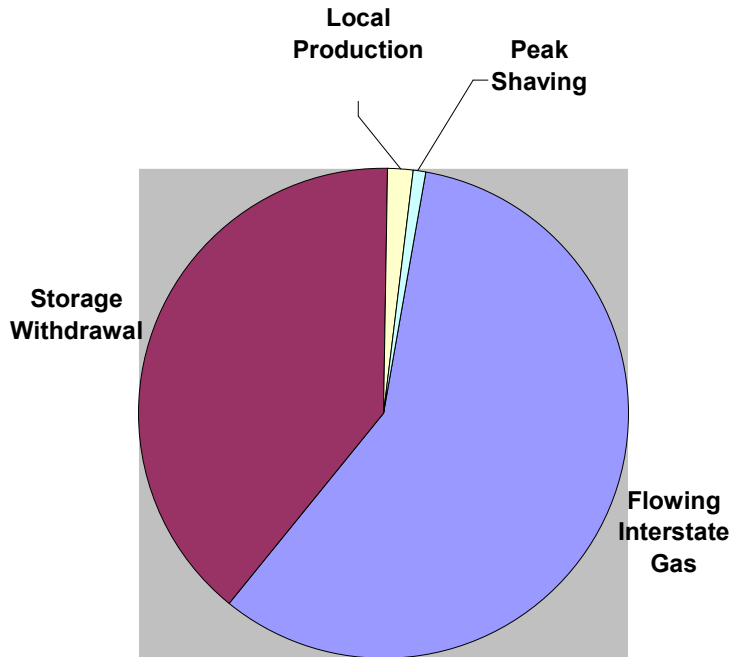


- Flowing Interstate Gas
- Storage Withdrawals
- Local Production
- Peak Shaving



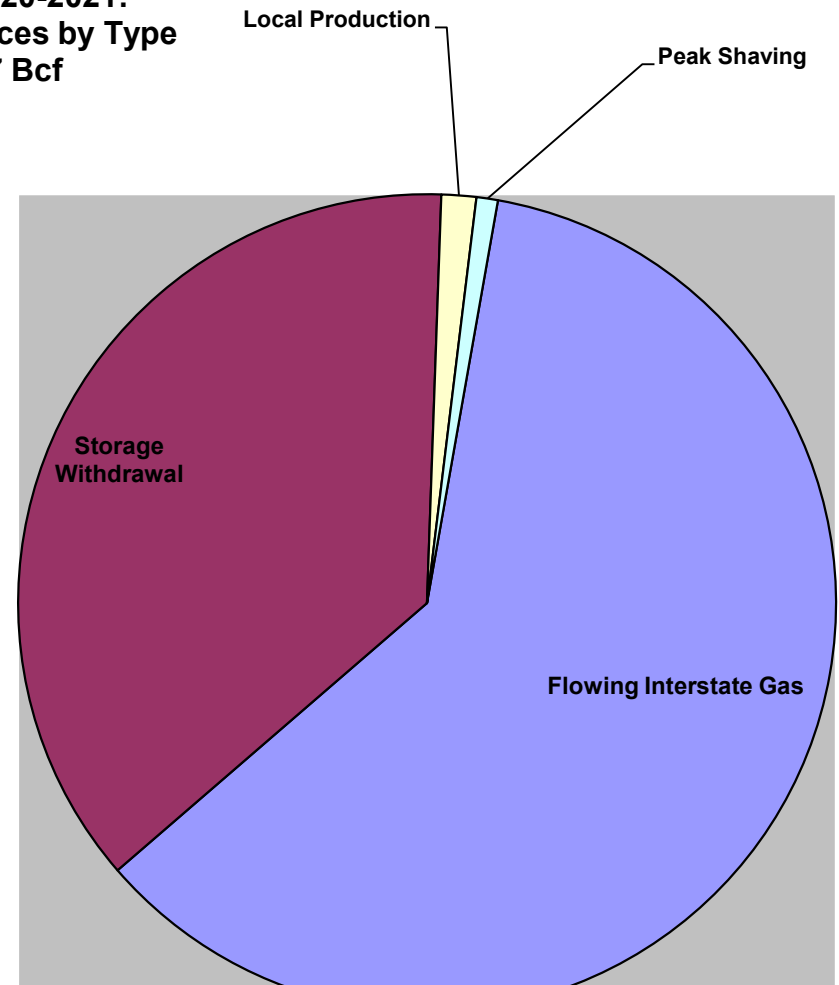
* Note: gas flowing on interstate pipelines can be sourced from Pennsylvania production connected to those interstate pipelines.

Comparison of Forecasts Last Winter and This Winter



Winter 2019-2020:
Supply Sources by Type
223.8 Bcf

Winter 2020-2021:
Supply Sources by Type
224.7 Bcf



System Planning Strategies

Objective: To identify supply resources (including upstream transportation and storage capacity) that will be necessary to preserve service reliability at anticipated levels of firm demand



System Planning Strategies

Capacity and Supply Assets: NGDCs commit to capacity and supply assets as necessary to meet firm customer needs, including operational swings. Commitments may include a reserve, but do not include service to interruptible customers. These assets include:

- Pipeline deliveries per firm transportation agreements
- Underground storage withdrawals (on-system, off-system)
- Pennsylvania local production (where available)
- Peak shaving facilities



System Planning Strategies - Production

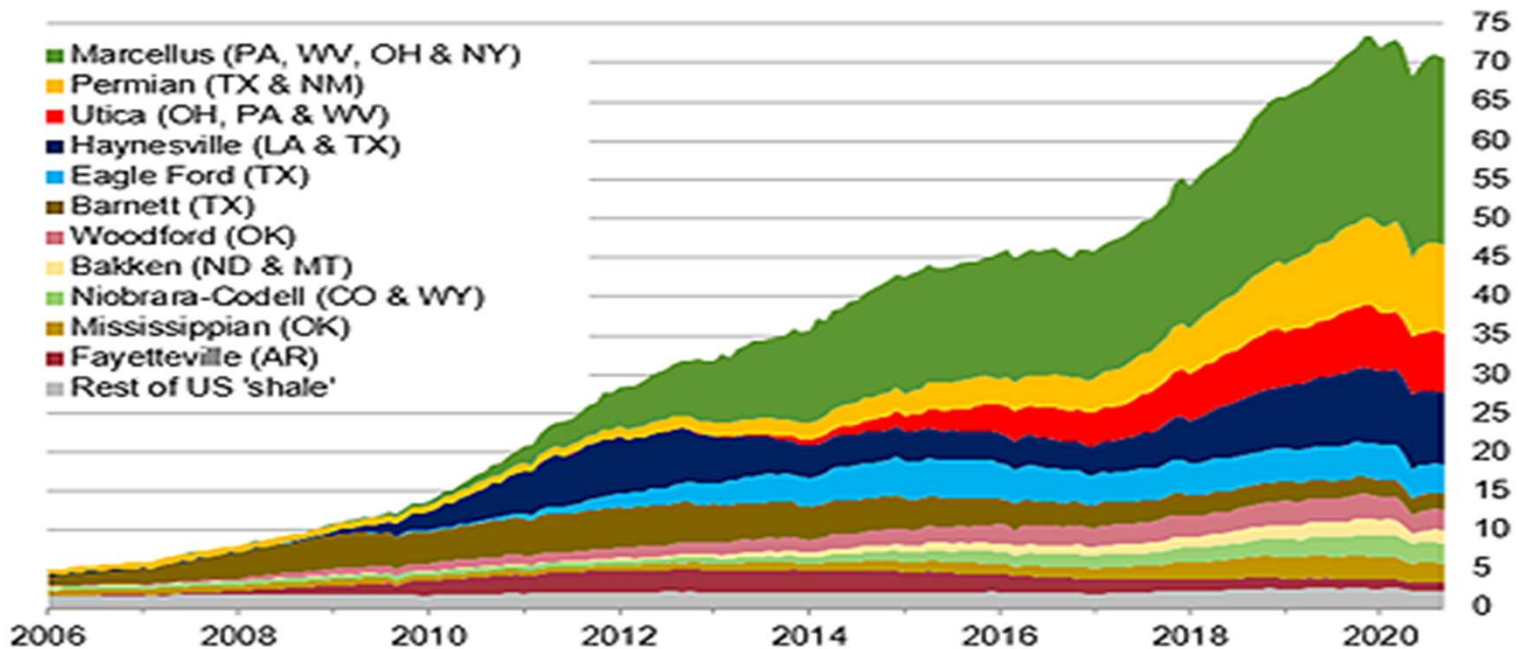
- According to the year end 2018 Potential Gas Committee's (PGC) natural gas resources assessment, the U.S. possesses a total mean technically recoverable resource base of 3,374 trillion cubic feet (Tcf) which is the highest resource evaluation in the Committee's 54 year history. The increase resulted, in part, from reassessments of shale gas resources in the Atlantic and Mid-Continent areas. The record gas resources assessed by the PGC, in addition to record reserves and record production reported by the US Energy Information Administration (EIA), display a picture of strong supply of natural gas in the U.S. for many years to come.
- EIA expects that natural gas production will be lower this winter than last winter. The EIA forecasts that U.S. dry natural gas (consumer-grade natural gas) production will average 90.6 billion cubic feet (Bcf) per day in 2020, down from an average of 93.1 Bcf/d in 2019.
- Domestic dry natural gas production slipped to below 85 Bcf per day several times during the first two weeks of October, just as overall demand picked up due to falling temperatures. The 2020 World Energy Outlook from the International Energy Agency (IEA), released on October 13, projects natural gas production to rebound relatively quickly as dry gas basins respond to the lost output in associated gas. As a result, the IEA envisions that total gas production will surpass its 2019 peak by 2022.
- Gross production of natural gas has generally been increasing for more than a decade. The United States has experienced a rapid increase in natural gas production from the robust influx of Marcellus and Utica shale resources. States driving this increase are Pennsylvania and Ohio. The EIA expects that production will begin to rise in the second quarter of 2021 in response to higher natural gas and crude oil prices.
- Production has increased in part because of new drilling techniques. The combination of two technologies —horizontal drilling and hydraulic fracturing — has made it possible to produce shale gas economically. Improvements in drilling technology and more efficient hydraulic fracturing techniques have allowed, and are likely to continue to allow, the expansion of shale gas production. Advances, such as longer well laterals, allow producers to recover greater volumes from a single well.

(<https://www.iea.org/reports/world-energy-outlook-2020#>; US Energy Information Administration (EIA) *Today in Energy*, release date 9/12/19; US EIA *Short-Term Energy Outlook*, release date 10/6/20; American Gas Association (AGA) *Natural Gas Market Indicators*, 10/15/20; *Potential Supply of Natural Gas in the United States, Report of the Potential Gas Committee*, released 12/31/18, www.potentialgas.org)



System Planning Strategies - Production

Monthly dry shale gas production billion cubic feet per day



Sources: EIA derived from state administrative data collected by Enverus Drillinginfo Inc. Data are through September 2020 and represent EIA's official tight gas estimates, but are not survey data. State abbreviations indicate primary state(s)



(US Energy Information Administration (EIA) - https://www.eia.gov/naturalgas/weekly/img/202009_monthly_dry_shale.png)

System Planning Strategies - Price

- Serving as a national benchmark, the Henry Hub in southern Louisiana is the best known spot market for natural gas. In September, this spot price averaged \$1.92 per MMBtu (million British thermal units). As of October 14, 2020, the Henry Hub spot price was \$2.03 per MMBtu. With regard to natural gas spot prices at Northeast regional trading hubs, the price on 10/14/20 was \$1.27/MMBtu at the Transcontinental Pipeline Zone 6 (New York).
- According to the US Energy Information Administration (EIA), Henry Hub natural gas spot prices are forecast to average \$3.00 MMBtu this winter, which is a 39% increase from last winter, which had historically low natural gas prices.
- Significant regional variation exists in residential natural gas price changes compared with last winter. EIA forecasts residential natural gas prices in the Northeast to be 8% lower than last winter.
- EIA forecasts that average household expenditures for most major home heating fuels will increase this winter because of higher expected energy consumption. EIA expects that ongoing COVID-19 mitigation efforts and more people working and attending school at home will contribute to higher levels of home heating use this winter than in previous years. In addition, based on forecasts from the National Oceanic and Atmospheric Administration (NOAA), EIA's forecast assumes a colder winter than last year in much of the United States.
- U.S. industrial sector consumption of natural gas has declined compared to the previous year amid responses to the coronavirus disease that resulted in a global economic shutdown. The EIA expects annual consumption of natural gas by U.S. industries to decline by 4.4% in 2020 and then grow 1.1% in 2021.

(US Energy Information Administration (EIA) Short-Term Energy Outlook, released October 6, 2020; <https://www.eia.gov/outlooks/steo/archives/sep20.pdf>; US EIA Natural Gas Weekly Update, released 9/24/20 and 10/14/20; US EIA Winter Fuels Outlook – October 2020)



System Planning Strategies - Pipeline Capacity Reliability

- Development of the national pipeline network infrastructure, comprised of interstate and intrastate transmission pipelines and underground natural gas storage facilities, helps meet the needs of the market and reach new customers within the U.S. and abroad.
- Pipeline projects address a growing need for additional natural gas pipeline capacity to support transportation of new natural gas production to regional markets. According to the Federal Energy Regulatory Commission (FERC), access to new production and added natural gas transportation capacity has contributed to breaking down long standing price differences between market hubs and has helped to reduce bottlenecks significantly.
- The pipeline infrastructure in the Northeastern US has not kept pace with soaring natural gas production. In addition to bidirectional pipeline projects, the industry is working to build transportation capacity to support this production growth.
- Pipeline expansion projects are helping to alleviate a supply glut in the region. Additional pipeline capacity brought into service since June 2017 has enabled production increases, including the Leach XPress, the Rover Pipeline, and Phase 1 of Atlantic Sunrise, all of which transport natural gas out of the Northeast region. EIA expects construction of new natural gas pipeline capacity to continue, in particular in the northeastern United States. As new pipeline projects come online, they create an outlet for increased production, providing natural gas to demand markets in the Midwest, the Southeast, eastern Canada, and the Gulf Coast.

(US EIA Today in Energy, released 5/18/18, 10/4/18; www.stateimpact.npr.org/pennsylvania/2017/08/17/as-pipelines-alleviate-natural-gas-glut-prices-rise-for-producers-in-northeast/; Federal Energy Regulatory Commission (FERC) State of the Markets Report, released 3/17/16; FERC Summer 2012 Energy Market & Reliability Assessment, 5/17/12)



Ability to contract for interstate pipeline capacity

- Firm capacity assets are used to transport supplies and manage storage to serve firm customers and operationally balance system requirements
- Members routinely review the interstate capacity market to try to obtain the optimum portfolio of assets to meet their needs
- The temperature sensitive loads of residential and human needs customers require dedicated, firm gas supply assets, including interstate transportation and storage services: There is no substitute
- Members do not report difficulty contracting for firm interstate capacity **when it is available**



Storage Management

- Inventories must be maintained at the levels necessary to fulfill obligations per planning criteria. Aggregate projected storage levels on Nov. 1, 2020 are sufficient to meet anticipated winter demand
- Warmer than normal weather affects storage utilization, given the need to meet minimum turnover requirements for the integrity of fields and to comply with pipeline tariff provisions



Storage Management

- Where contractually and operationally permissible, an NGDC may leave gas in storage if projected replacement costs exceed current prices, or an NGDC may use storage in lieu of firm transportation if replacement costs are favorable.
- Storage inventory is managed to prevent deliverability from being reduced before potential design day occurrence, and to prevent firm markets from going un-served for some part of the remainder of the season.
- U.S. natural gas inventories are forecasted by EIA to be at 4 trillion cubic feet (Tcf) by the end of October, which would be a record high. Not counting the final two weeks remaining in the typical underground storage injection season (April through October), national inventories are at 10% above the five year average and 11.1% above year-ago levels.
- For the week ending October 16th, working natural gas stocks totaled 3,926 billion cubic feet (Bcf), which is 327 Bcf more than the five year average. At 3,926 Bcf, total working gas is above the five year historical range.
- It appears the gas market is well-positioned in terms of supply as we head into the winter.

(American Gas Association (AGA) Natural Gas Market Indicators –10/15/20; US Energy Information Administration (EIA) Short Term Energy Outlook, September 2020 and October 2020 releases; US EIA Weekly Natural Gas Storage Report, released 10/16/20; US EIA Natural Gas Weekly Update, released 10/22/20)



Injections into Liquefied Natural Gas (LNG) Facilities

- Two Association members own on-system liquefied natural gas (LNG) facilities, which provide a source of wintertime deliverability
- These facilities are also used to mitigate exposure to price volatility, especially during peak periods
- Total volume injected: 5.0 Bcf
- PECO anticipates using LNG to meet 1% of winter day requirements, PGW anticipates using LNG to meet 3% of winter requirements
- Management of LNG facilities is primarily a matter of preparedness



Gas Price Volatility: Hedging

- Based on a weighted average of the members, 47.6% of this winter's supplies are hedged
- Supplies are considered hedged if they are
 - Already purchased and in storage
 - If they are contracted for delivery under:
 - Fixed-price contracts
 - Forward-priced contracts
 - Price caps



Conclusion: Supply

- Members are well prepared to accommodate the conditions forecasted in their winter season planning design.
- Underground storage and peak shaving inventories will be adequate to handle design conditions.

Thank you.

