

**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

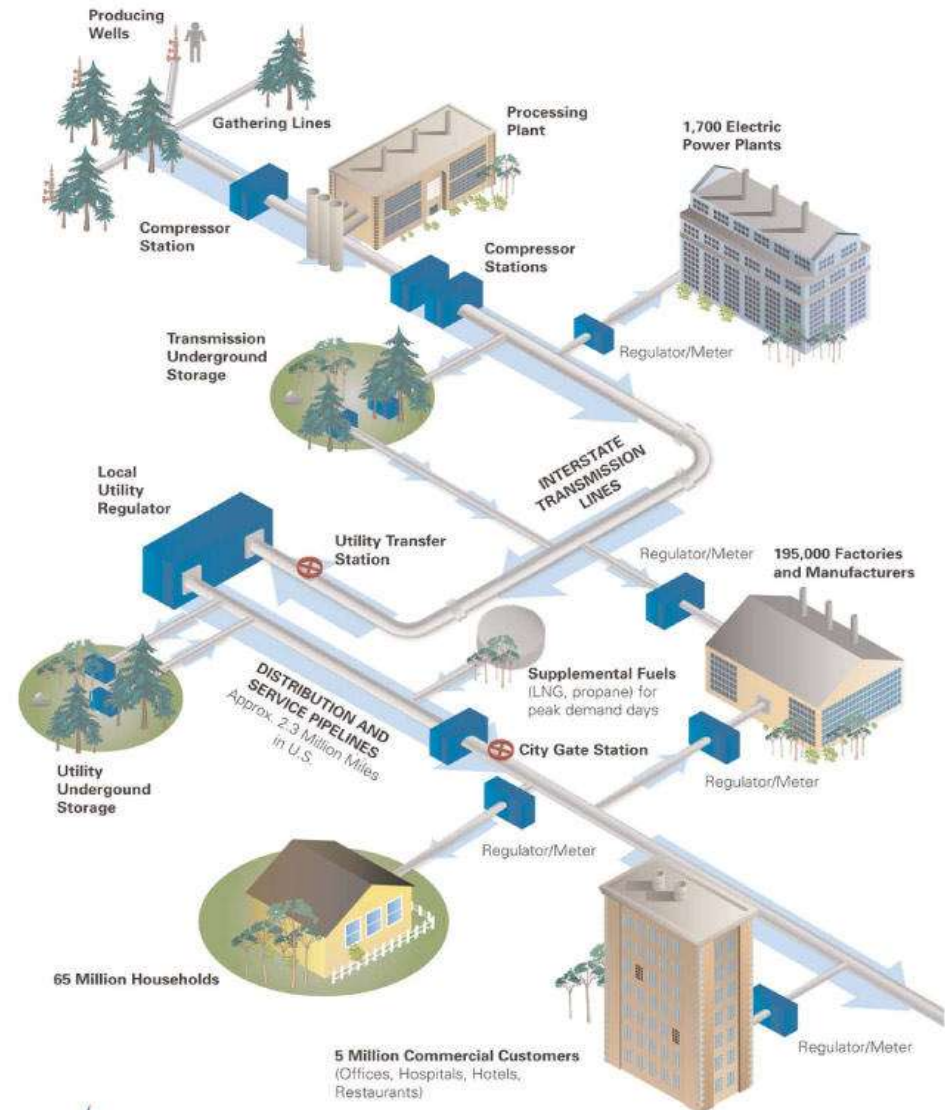
*Distributing natural gas to over three million residential, commercial and industrial customers in Pennsylvania*



# 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

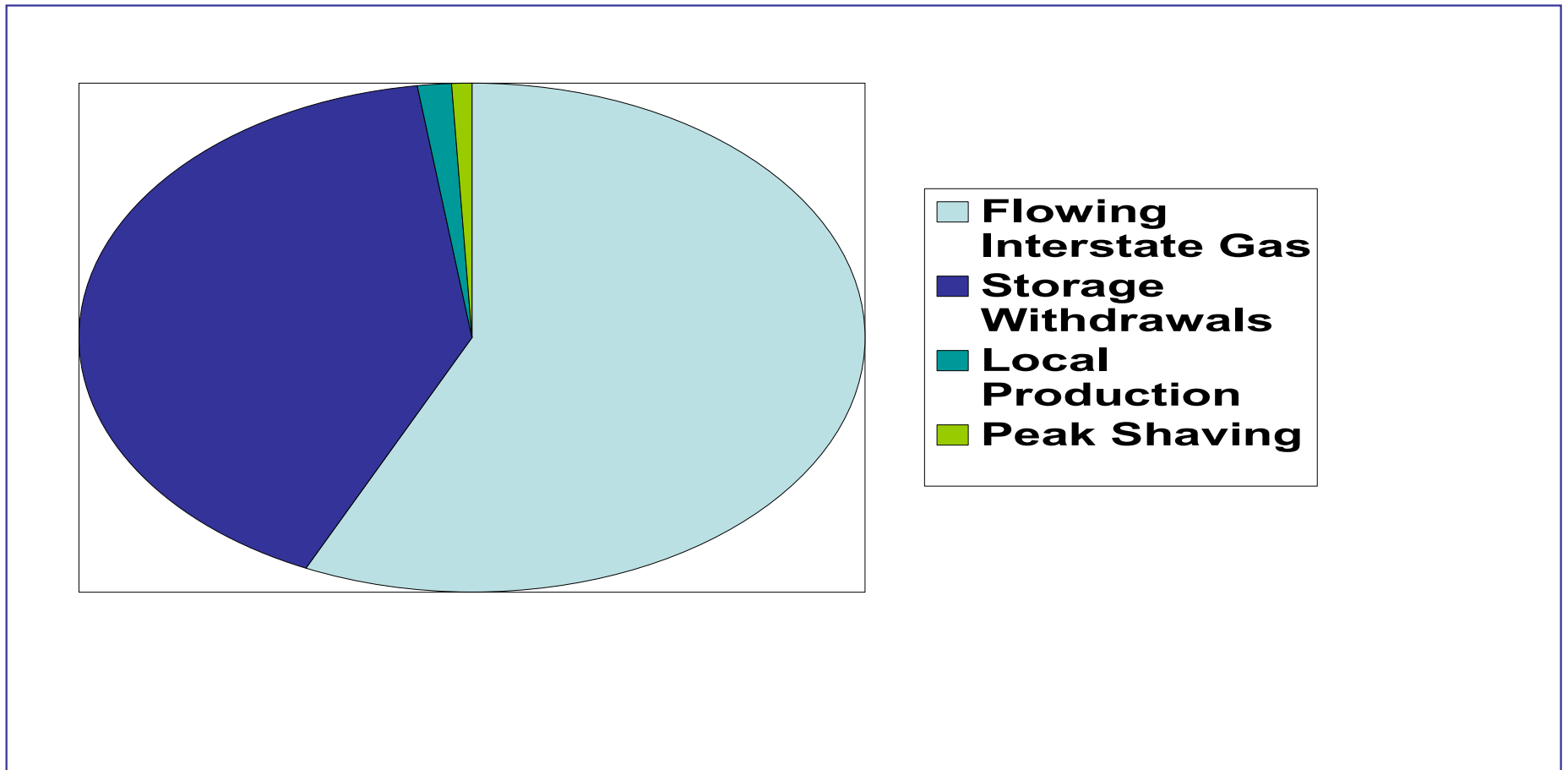
**Winter 2022-2023**

*(all natural gas volumes in billions of cubic feet)*

Expected Demand	<b>230.7 Bcf</b>
Expected Supply	
Flowing Interstate Gas	131.5
Storage Withdrawals	94.1
Local Production	2.9
Peak Shaving	2.2
<b>TOTAL</b>	<b>230.7</b>

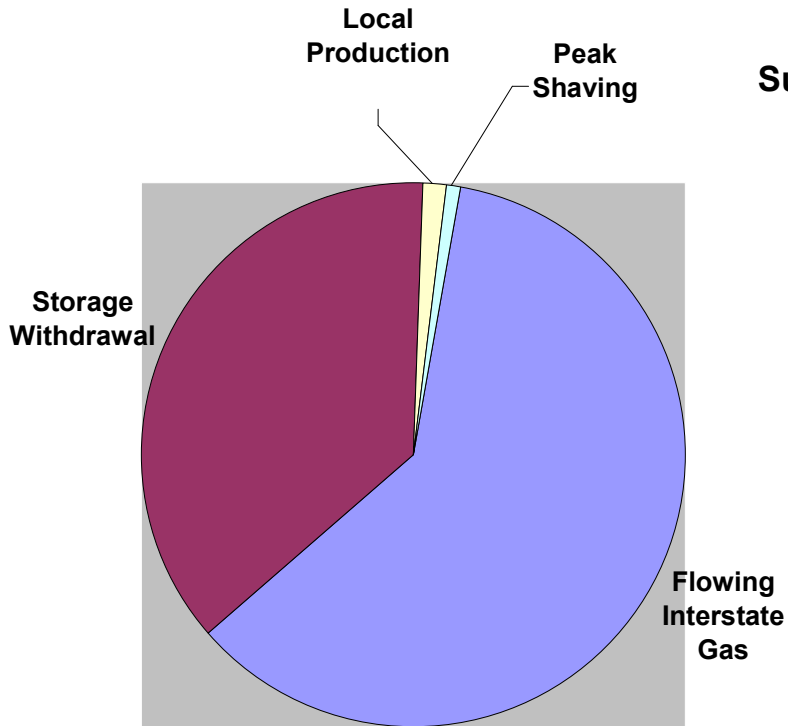


# Winter 2022-2023: Supply Sources



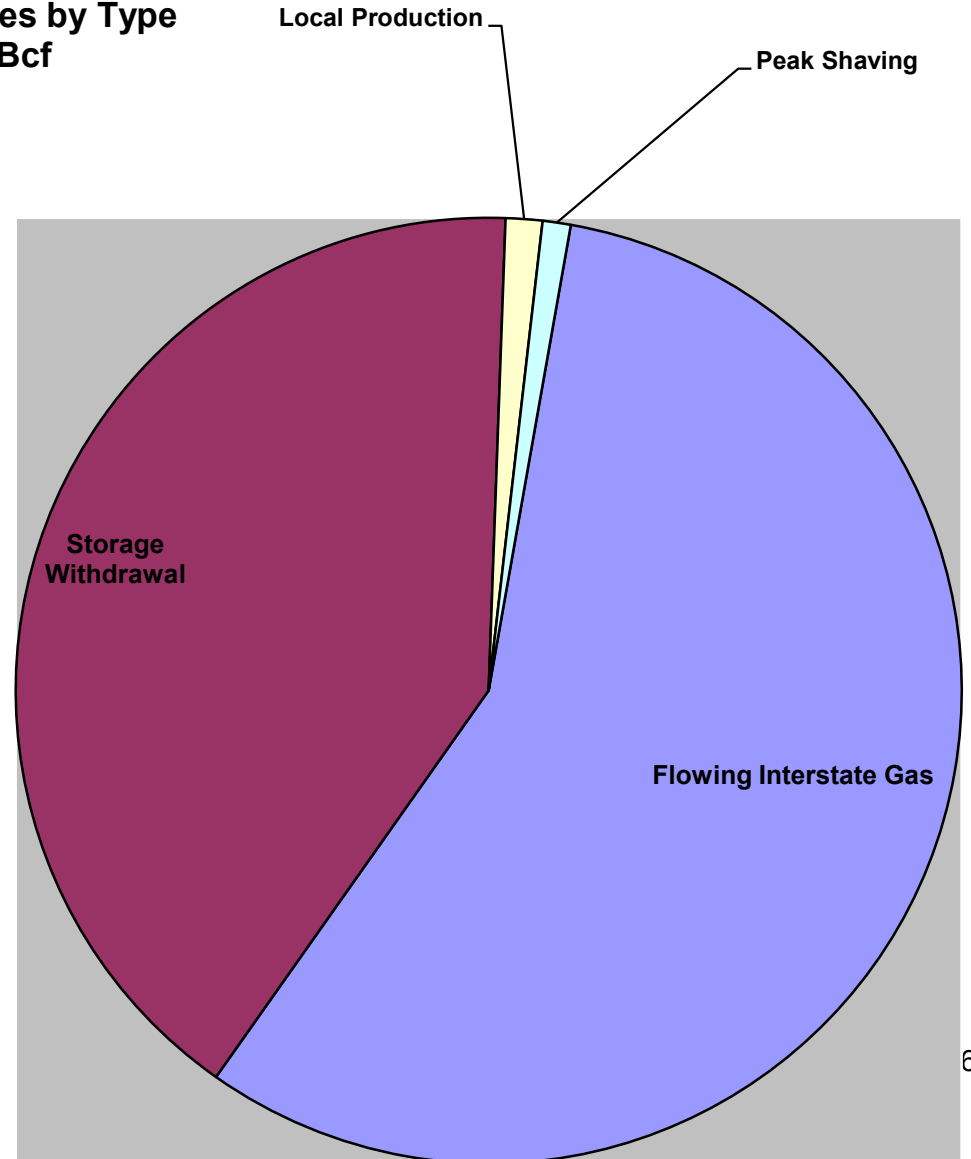
\* Note: gas flowing on interstate pipelines can be sourced from Pennsylvania production connected to those interstate pipelines.

# Comparison of Forecasts Last Winter and This Winter



Winter 2021-2022:  
Supply Sources by Type  
230.6 Bcf

Winter 2022-2023:  
Supply Sources by Type  
230.7 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

- The US Energy Information Administration (EIA) reports that 2022 U.S. dry natural gas (consumer-grade natural gas) production was the highest on record for any injection season and 3.9 billion cubic feet (Bcf) per day higher than the 2021 injection season average. Last year, both U.S. natural gas production and exports had set records.
- It is anticipated that dry natural gas production will increase to an average of 99.1 Bcf per day in the fourth quarter of 2022 and increase further still to 99.6 Bcf per day in 2023. U.S. natural gas producers are operating more drilling rigs now than at the beginning of the COVID-19 pandemic in early 2020.
- Dry natural gas production from shale formations in the Appalachian Basin that spans Pennsylvania, West Virginia, and Ohio has been growing since 2008, and monthly production has set record highs. In 2021, natural gas from shale formations accounted for 79% of all U.S. natural gas production. The Appalachian Basin contains two shale formations, Marcellus and Utica. In the first half of 2021, on its own, the Appalachian Basin would have been the third-largest natural gas producer in the world, behind Russia and the rest of the United States.
- Production has increased in part because of widespread adoption of two technologies —horizontal drilling and hydraulic fracturing that allow operators 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.
- 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. Note that the PGC makes a report every two years and its 2020 report shows 3.368 Tcf, or almost no change from the 2018 amount. The record gas resources assessed by the PGC, in addition to record reserves and record production reported by the EIA, display a picture of strong supply of natural gas in the U.S. for many years to come.

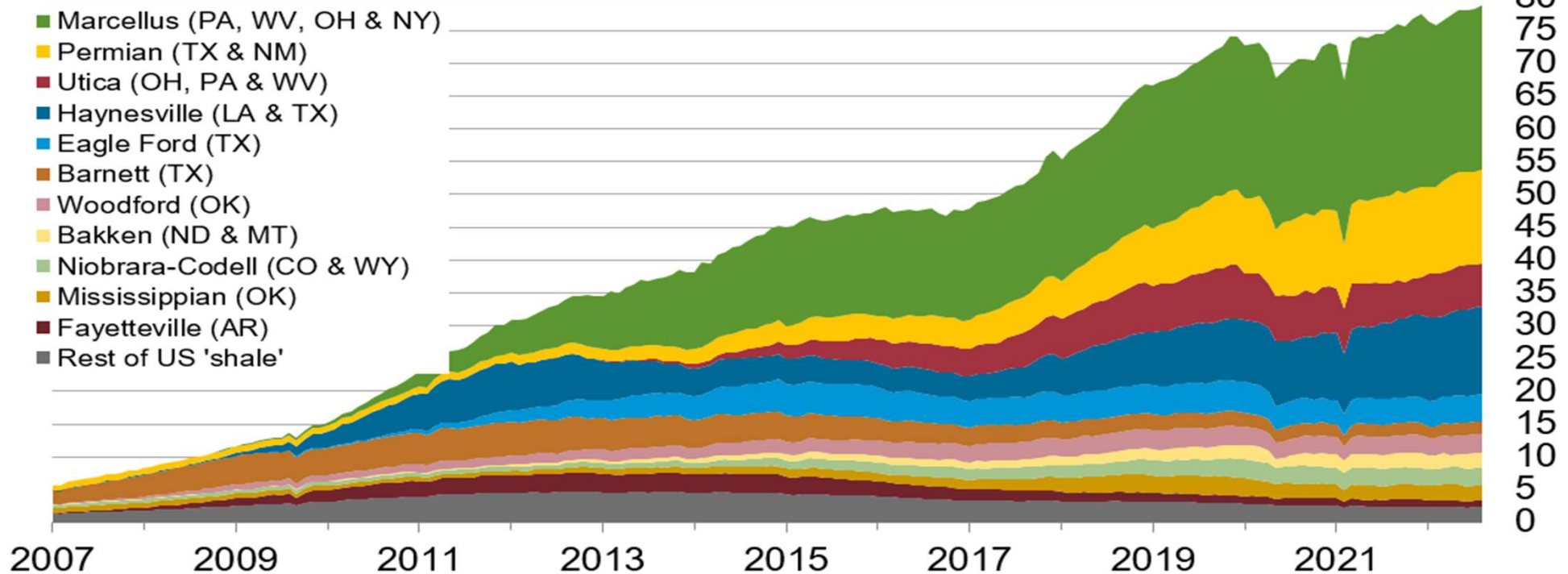
(<https://www.iea.org/reports/world-energy-outlook-2020#>; US Energy Information Administration (EIA) Today in Energy, release date 9/15/22, 10/21/22; US EIA Short-Term Energy Outlook, release date 10/13/21; American Gas Association (AGA) Energy Insights, 10/14/22; Potential Supply of Natural Gas in the United States, Report of the Potential Gas Committee, released 12/31/18, 12/31/20, [www.potentialgas.org](http://www.potentialgas.org))



# System Planning Strategies - Production

## Monthly dry shale gas production

billion cubic feet per day



Data source: Enverus state administrative data. Data are through August 2022 and represent EIA's official tight gas estimates but are not survey data. State abbreviations indicate primary state(s).

Note: Improvements to play identification methods have altered production volumes of various plays.



( US Energy Information Administration (EIA) [eia.gov/naturalgas/weekly/](https://eia.gov/naturalgas/weekly/)- 10/20/22 )

# System Planning Strategies - Price

- Serving as a national benchmark, the Henry Hub in southern Louisiana is the best known spot market for natural gas. As of October 19, 2022, the Henry Hub spot price was \$5.50 per MMBtu.
- With regard to natural gas spot prices at Northeast regional trading hubs, the price on 10/19/22 was \$5.13/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 increase 54% from last winter to average \$7.26 MMBtu, then fall in 2023 as production rises. Changes in natural gas spot prices are typically reflected in the retail price over a period of months because of the way these costs are handled in regulated rates.
- The National Oceanic and Atmospheric Administration (NOAA) expects the United States to experience a slightly colder winter compared to last winter. EIA expects colder temperatures and slightly more household consumption to contribute to higher natural gas bills compared to the 2021/2022 winter. The agency forecasts U.S. residential natural gas prices to be 28% higher than last winter's heating costs. For households that use natural gas as their primary space heating fuel, EIA expects average consumption this winter to increase by 5% from last winter.
- The price of natural gas is determined by numerous market factors such as supply and demand, weather, imports and exports, underground storage levels, and natural gas production. Record high liquefied natural gas (LNG) exports have been a growing source of natural gas demand.

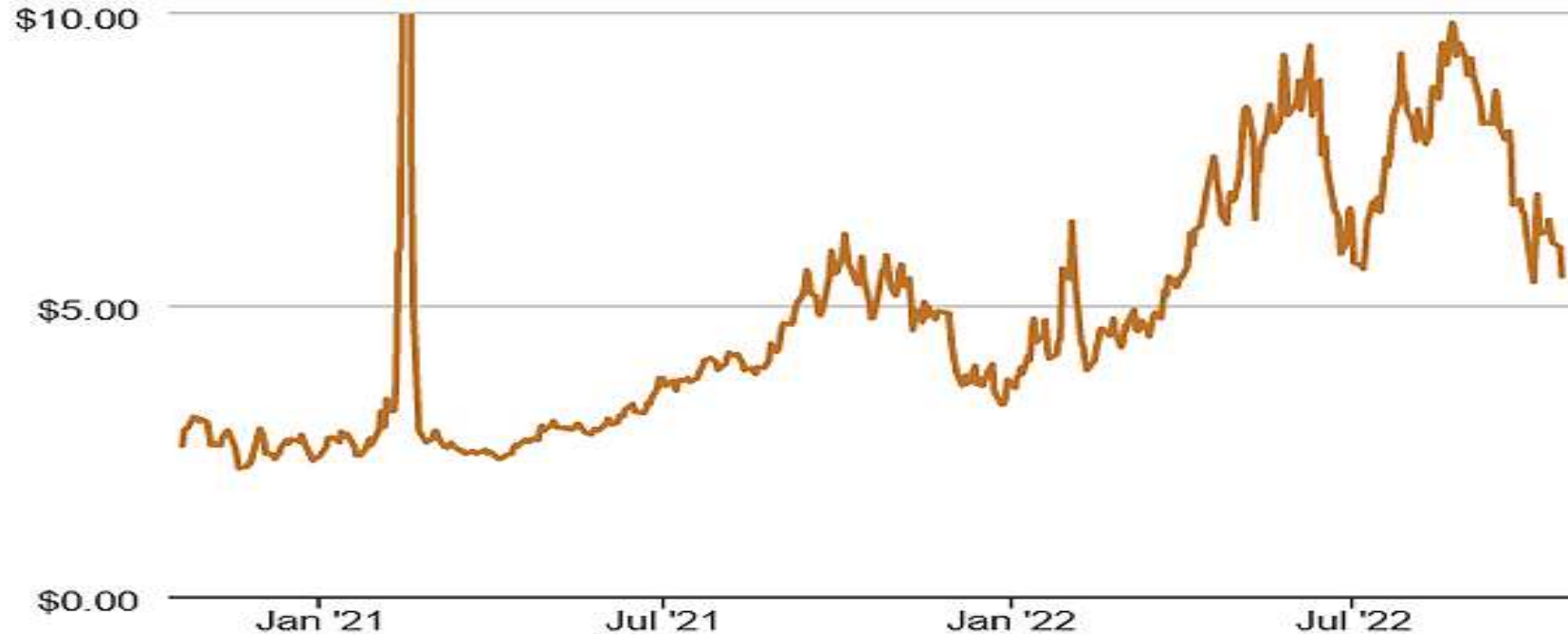
(US Energy Information Administration (EIA) 2022 Winter Fuels Outlook, released October 12, 2022; <https://www.eia.gov/todayinenergy/detail.php?id=54259> 10/17/22; Short-Term Energy Outlook, released October 13, 2021; US EIA Natural Gas Weekly Update, released 10/20/22 and 10/21/21; TODAY IN ENERGY -10/4/22, 10/14/21; US EIA Winter Fuels Outlook – October 2021; AGA Natural Gas Market Indicators -10/14/22)



# System Planning Strategies - Price

## Natural gas spot prices (Henry Hub)

dollars per million British thermal units



Data source: Natural Gas Intelligence

Note: Henry Hub prices reported for February 16 and 17, 2021, exceeded the published range, averaging \$16.96/MMBtu and \$23.61/MMBtu, respectively.



(( US Energy Information Administration (EIA) [eia.gov/naturalgas/weekly/](https://eia.gov/naturalgas/weekly/)- 10/20/22))

# 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.
- Growth in pipeline takeaway capacity allows natural gas produced in the Appalachian Basin to reach other demand markets, especially in the Midwest. From 2008 to 2020, total pipeline takeaway capacity from the Northeast increased from 4.5 Bcf/d to 24.5 Bcf/d, alleviating some congestion and supporting higher wholesale natural gas prices in the region. Most of the increase in takeaway capacity happened between 2014 and 2020, when pipeline capacity increased by 16.5 Bcf/d. Pipeline takeaway capacity from Appalachia to Canada and to the Southeast has also increased. In 2022, five new natural gas pipeline capacity projects will expand capacity in Texas out of the Permian Basin.

(US EIA Today in Energy, released 8/4/22, 9/1/21; [www.stateimpact.npr.org/pennsylvania/2017/08/17/as-pipelines-alleviate-natural-gas-glut-prices-rise-for-producers-in-northeast/](http://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, 2022 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.
- The Energy Information Administration (EIA) reported 129 billion cubic feet (Bcf) injection into storage on September 30, the second highest net injection on record. Stocks are below the five year average for this time of year, but still within the five year historical range. Net injections into natural gas storage in the East region to build natural gas inventories will help supply the region with natural gas in the winter when demand exceeds supply.
- At the start of the 2022-2023 winter heating season (October-March) working natural gas inventories in underground storage facilities in the East region ended September 6% below year ago levels according to EIA. The East region consists of 18 states, stretching from Florida to Maine, with the majority of that storage in Pennsylvania, Ohio and West Virginia. This past summer was the third hottest on record in the United States, which contributed to record consumption of natural gas in the electric power sector to meet air conditioning demand. High consumption during the summer months contributed to lower than average injections during that time and storage remained below the five year average all season.

*(American Gas Association (AGA) Natural Gas Market Indicators –10/1/21; US Energy Information Administration (EIA) Short Term Energy Outlook, released 10/13/21; US EIA Weekly Natural Gas Storage Report, released 10/21/21; US EIA Natural Gas Weekly Update, released 10/20/22)*





# 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: 4.6 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, 57% 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.

