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
National Fuel Gas Distribution Corp.
PECO Energy Company
Peoples Natural Gas Co.
Peoples TWP
Peoples Natural Gas - Equitable Gas Division
Philadelphia Gas Works
Pike County Light & Power
UGI Central Penn Gas, Inc.
UGI Penn Natural Gas, Inc.
UGI Utilities, Inc. - Gas Division
Valley Energy

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

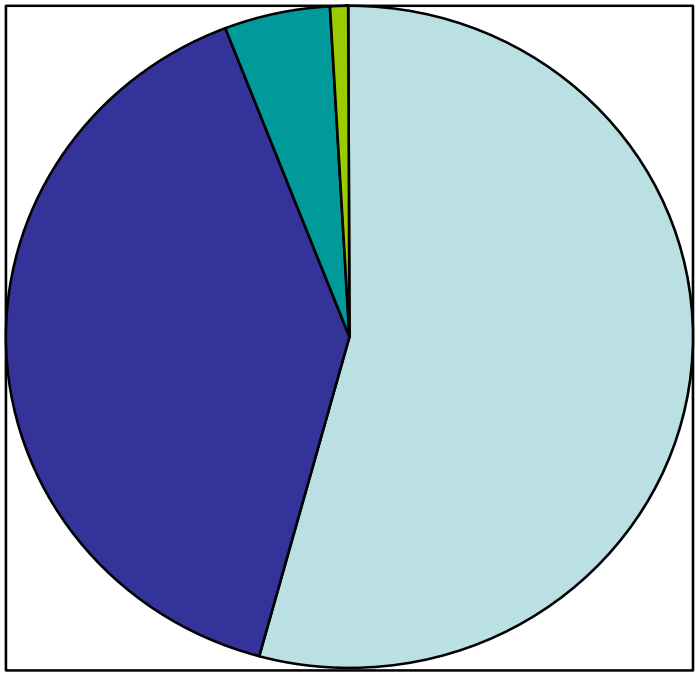
Supply and Demand

Winter 2015-2016

(all natural gas volumes in billions of cubic feet)

Expected Demand	**219.0** Bcf
Expected Supply	
Flowing Interstate Gas	118.9
Storage Withdrawals	87.1
Local Production	11.3
Peak Shaving	1.7
TOTAL	**219.0**

Winter 2015-2016: Supply Sources

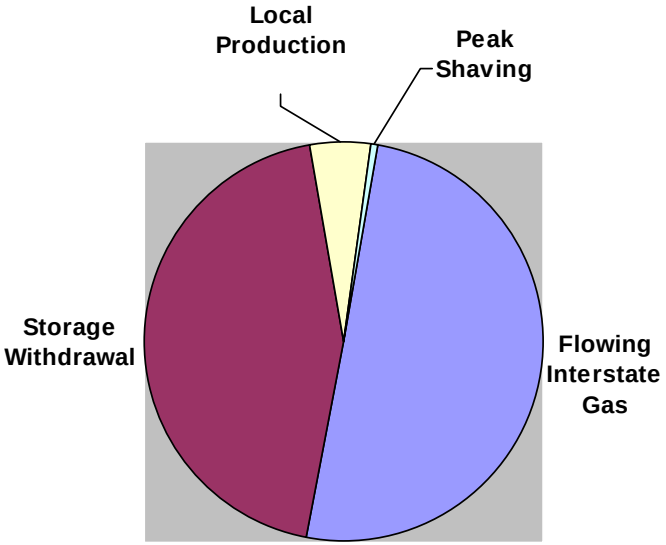


- Flowing Interstate Gas
- Storage Withdrawals
- Local Production
- Peak Shaving

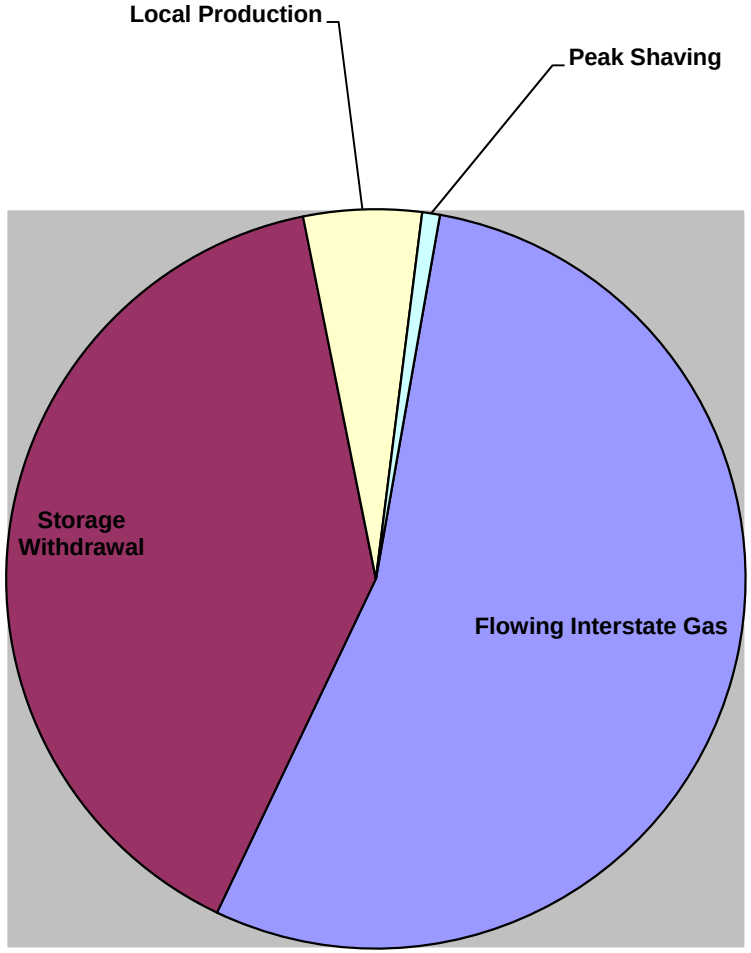
* Note: gas flowing on interstate pipelines can be sourced from Pennsylvania production connected to those interstate pipelines.

Comparison of Forecasts
Last Winter and This Winter

Winter 2014-2015:
Supply Sources by Type
212.8 Bcf



Winter 2015-2016:
Supply Sources by Type
219.0 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 production (where available)
- Peak shaving facilities

System Planning Strategies - Production

- Record high natural gas production is helping to ensure that adequate supplies of natural gas are available. In August, for the second consecutive month, dry natural gas (consumer-grade natural gas) production was the highest for any month since the Energy Information Administration (EIA) began reporting dry natural gas production data. Year-to-date dry natural gas production at 72.0 billion cubic feet (Bcf) per day, on average, exceeds last year's comparable volume by 3.6 Bcf, even with the drilling slowdown in 2015.

- EIA expects that marketed natural gas production will increase by 4.2 Bcf/d (5.6%) and 1.5 Bcf/d (1.9%) in 2015 and 2016, respectively, with increases in the Lower 48 states expected to more than offset continuing production declines in the Gulf of Mexico.

- The productivity of natural gas wells is steadily increasing in many basins across the United States because of the increasing precision and efficiency being realized in oil and natural gas extraction. Increases in drilling efficiency will continue to support growing natural gas production in the forecast despite relatively low natural gas prices.

- The combination of two technologies —horizontal drilling and hydraulic fracturing — has made it possible to produce shale gas economically. The United States has experienced a rapid increase in natural gas production from shale resources. Most analysts believe that the shale portion of total production will continue to grow with time. Current accounting for production from shale plays in the US places the daily natural gas production volume at more than 40 Bcf per day, according to the EIA. By all counts that is more than 50 percent of all natural gas being produced in the United States today.

(US Energy Information Administration (EIA) Natural Gas Monthly, 10/30/15; American Gas Association (AGA), Natural Gas Market Indicators, 10/15/15, and 10/30/15; US EIA, Short Term Energy and Winter Fuels Outlook, released 10/6/15; US EIA, Growth in U.S. Hydrocarbon Production from Shale Resources by Drilling Efficiency, 3/11/14, http://www.eia.gov/todayinenergy/detail.cfm?id=15351)

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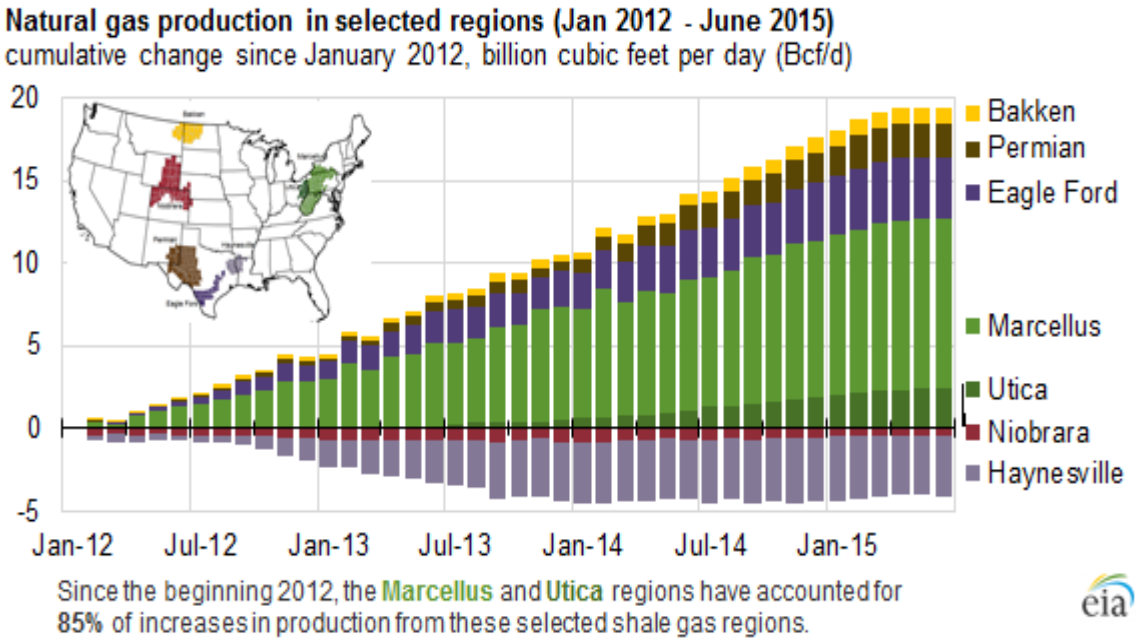
System Planning Strategies - Production

Pennsylvania is Driving Northeast Natural Gas Production

"In the Northeastern United States, natural gas production has grown rapidly since early 2009 as a result of increased drilling activity in the Marcellus Shale. The largest production gains have occurred in Northeastern Pennsylvania, with noticeable increases also in Southwestern Pennsylvania and West Virginia."



Source: Energy Information Administration at http://www.eia.gov/todayinenergy/detail.cfm?id=22252

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System Planning Strategies - Price

- The Henry Hub in southern Louisiana is the best known spot market for natural gas. Under $3.00 per million British thermal units (MMBtu) prices for November Henry Hub natural gas has been par for the course most of this year and certainly headed into this winter.

- The EIA expects the Henry Hub natural gas price to average $2.81/MMBtu in 2015 and $3.05/MMBtu in 2016.

- The Henry Hub spot price is currently about $2.02 per MMBtu.

- Prices in the Northeast trading hub have been below prices at the Henry Hub. The price is currently about $1.36/MMBtu at the Transcontinental Pipeline Zone 6 (New York).

(American Gas Association (AGA) Natural Gas Market Indicators – 10/30/15; US Energy Information Administration (EIA) Short-Term Energy and Winter Fuels Outlook, released October 6, 2015; US EIA, Natural Gas Weekly Update, for week ending 11/4/15, released 11/5/15)

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System Planning Strategies - Pipeline Capacity Reliability

- The national pipeline network is comprised of 305,000 miles of interstate and intrastate transmission pipelines and 400 underground natural gas storage facilities. Development of this infrastructure helps meet the needs of the market.

- More than one-third of the pipeline projects since 2008 addressed 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, 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

- About 27,800 miles of new natural gas transmission pipeline were placed in service in the U.S. from 1998 to 2011. At least 25 major pipeline projects were completed in the U.S. in 2011, adding a total of about 2,400 miles of pipeline and 13.7 billion cubic feet (Bcf) per day of capacity. In addition to bidirectional pipeline projects, the industry is planning to build 35 Bcf/d of transportation capacity to support the growth of natural gas production in the Northeast. As of November 7, 2014, the industry added more than 2 Bcf/d of additional transportation capacity in the Northeast, following 1.6 Bcf/d of additional capacity coming online a week earlier.

- Even though the Northeast has seen increased natural gas production and new infrastructure, consumers in New England continue to pay high natural gas prices during peak demand days. Algonquin Gas Transmission and Tennessee Gas Pipeline, which supply most of the natural gas to New England, plan to increase their capacities into New England by 4.1 Bcf/d by the end of 2018.

(US EIA, Today in Energy, 12/2/14, 3/25/13, and 2/17/12; US EIA Natural Gas Year-In-Review 2011, released July 2012 and Year-In-Review 2009, released July 2010; US EIA, Major Changes in Natural Gas Transportation Capacity 1998-2008, J. Tobin, Office of Oil & Gas; FERC Summer 2012 Energy Market & Reliability Assessment, 5/17/12; www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/index.html)

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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**

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Storage Management

- Inventories must be maintained at the levels necessary to fulfill obligations per planning criteria. Aggregate projected storage levels on Nov. 1, 2015 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 unserved for some part of the remainder of the season

- Working natural gas is the volume of gas in a reservoir that is available for withdrawal. Nationally, natural gas working inventories are well above average. Stockpiles are nearly 16% above their levels of a year ago and about 4.5% above the five-year average.

- As of October 30, 2015, working natural gas in underground storage totaled 3,929 billion cubic feet (Bcf), according to EIA estimates. Injections of natural gas into underground storage have been at a record pace and above the five year average.

(American Gas Association (AGA) Natural Gas Market Indicators –10/15/15; US Energy Information Administration (EIA) Weekly Natural Gas Storage Report, released November 5, 2015; US EIA Natural Gas Weekly Update, for week ending November 4, 2015, released 11/5/15, and for week ending September 23, 2015, released 9/24/15)

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Injections into Liquified Natural Gas (LNG) Facilities

- Two Association members inject into member-owned facilities
- Total volume injected: 3.2 Bcf
- PECO Energy anticipates using LNG to meet 1% of winter day requirements, PGW anticipates using LNG to meet 2% 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, 44.5% 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.