

2017



NATURAL GAS  
PIPELINE  
INFRASTRUCTURE

The **INSTITUTE** for  
Public Policy & Economic Development  
at Wilkes University

*A partnership among Geisinger Commonwealth School of Medicine  
Keystone College, King's College, Lackawanna College,  
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The Institute is a non-profit research organization dedicated to empowering business and community leaders with researched based strategies for informed decision making.

We conduct independent, empirical research to identify the opportunities, issues and challenges unique to the region and find innovative ways to solve the problems facing our communities.

The Institute offers a wide array of research, consulting and support services to help organizations boost productivity, increase profitability and be successful in their missions.

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## Introduction

Northeastern and North Central Pennsylvania has become one of the United States' most prolific natural gas producing regions as a result of the ability to tap into Marcellus Shale formation. Energy companies extract these fuels in a variety of ways. The most controversial among them is the process of slick water hydraulic fracturing, also known as "fracking." Through this process, natural gas housed within the underground shale flows up to the surface from the passages left by hydraulic drilling, which are encased in steel and cement. From the Northeastern and North Central part of the Commonwealth, the gas is "dry" which means it does not require further processing to be used as a fuel.

After the natural gas is extracted, it is transported to markets and ultimately end users such as homes, businesses, and industries via a network of interstate pipelines. Interstate pipelines carry natural gas long distances, where systems of smaller diameter pipelines distribute natural gas to customers.

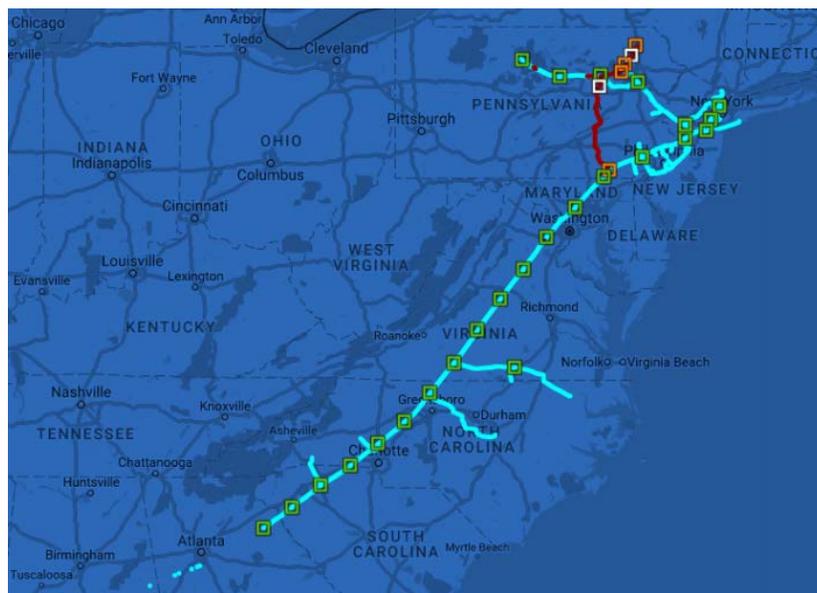
As the project descriptions below indicate, the capacity to transport natural gas from the Marcellus Shale region to markets around the United States is likely to grow in the coming years, enabling natural gas to play an even bigger role in Northeastern Pennsylvania's economy.

This report updates a previously published Institute study on pipelines completed in 2015.

## Current Pipeline Projects

### Atlantic Sunrise

The Atlantic Sunrise project is an expansion of the Williams Transcontinental (Transco) pipeline, in order to provide natural gas to an additional 7 million homes across the Southeast region of the United States. The expansion will consist of 183 additional miles of standard pipes in Pennsylvania (shown in red), two loops totaling about 12 miles, a two-mile segment replacement, and various modifications and additions to compressor facilities in Maryland, North Carolina, South Carolina, Pennsylvania, and Virginia. The filing process and field surveys were started in early spring of 2014, and by late spring Transco was holding informational meetings and open houses. Transco submitted the 7c application to the Federal Energy Regulatory Commission (FERC) in the early months of 2015. Approval is expected in early 2017. Partial service is expected to begin in the later part of 2017, and full service is expected in mid-2018.<sup>1</sup>



Atlantic Sunrise Project Map. Source: atlanticsunriseexpansion.com.

### Mariner 2

Sunoco Logistics' Mariner 1, as described under Completed Pipeline Projects below, was fully functional in the first quarter of 2016. A second phase of this pipeline project is currently in the making, Mariner 2. The plan consists of building a 20-inch diameter pipeline through the states of Delaware, Pennsylvania, Ohio, and West Virginia (shown in red on the map below). When finished, it will run parallel to the Mariner 1 and serve essentially the same purpose: to transport Liquid Petroleum Gases (LPG) to Marcus Hook Facility near the Delaware. This facility will process the gases and make them available for purchase. Land acquisition for the project is ongoing. As of September 2016, Sunoco's timeline for construction has run in to some delays

due to public protest and “significant technical deficiencies” in their application, including permit review and negotiations with landowners.<sup>23</sup> As of November 2016, completion and start-up is expected in the third quarter of 2017.<sup>4</sup>



For additional information visit [SXPipelineProjects.com](http://SXPipelineProjects.com) and follow @SXLUpdates on Twitter

Mariner 1 and Mariner 2 Map. Source: [sxpipelineprojects.com](http://sxpipelineprojects.com).

### Constitution Pipeline

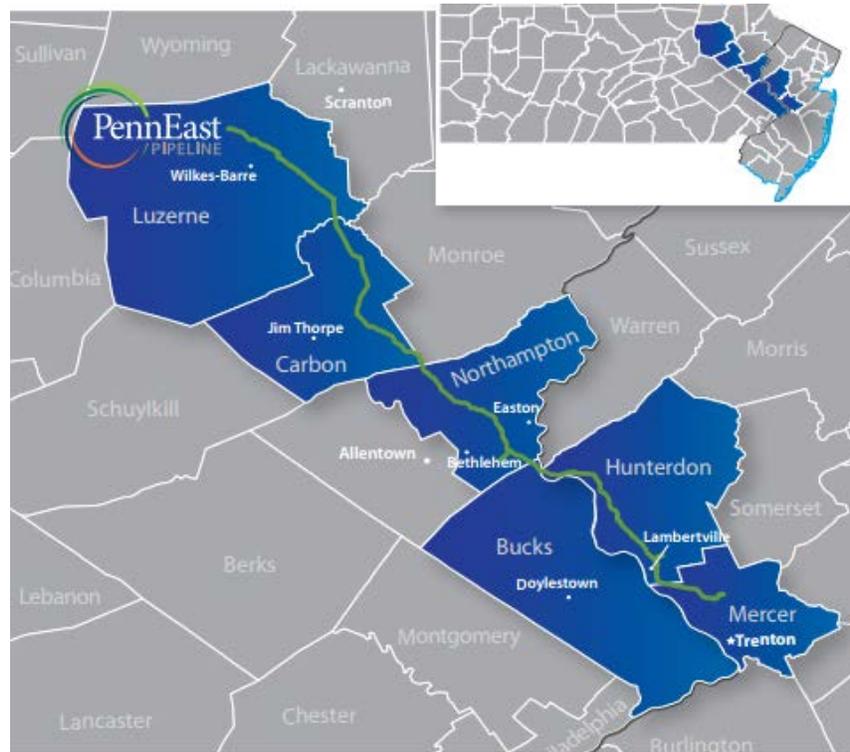
Williams Companies is also the developer behind the Constitution Pipeline. The 30 inch pipeline will be buried underground and will extend 124 miles from Susquehanna County, Pennsylvania to the Iroquois Gas Transmission and Tennessee Gas Pipeline systems in Schoharie County, N.Y., passing through Broome County, Chenango County, and Delaware County, N.Y. on the way.<sup>5</sup> Williams completed pre-filings and project outlines in the summer of 2013. An exact timeline is not given for completion, since recent legal disputes over land have caused construction delays, but an approximate date of mid-2017 was recently announced.<sup>6</sup>



Source: Constitution Pipeline

## PennEast

The PennEast Pipeline Project is a planned 36 inch pipeline that will span 118 miles through Pennsylvania and New Jersey to bring natural gas resources into millions of homes in both states. The pipeline will join Transco's pipeline interconnection near Trenton, New Jersey.



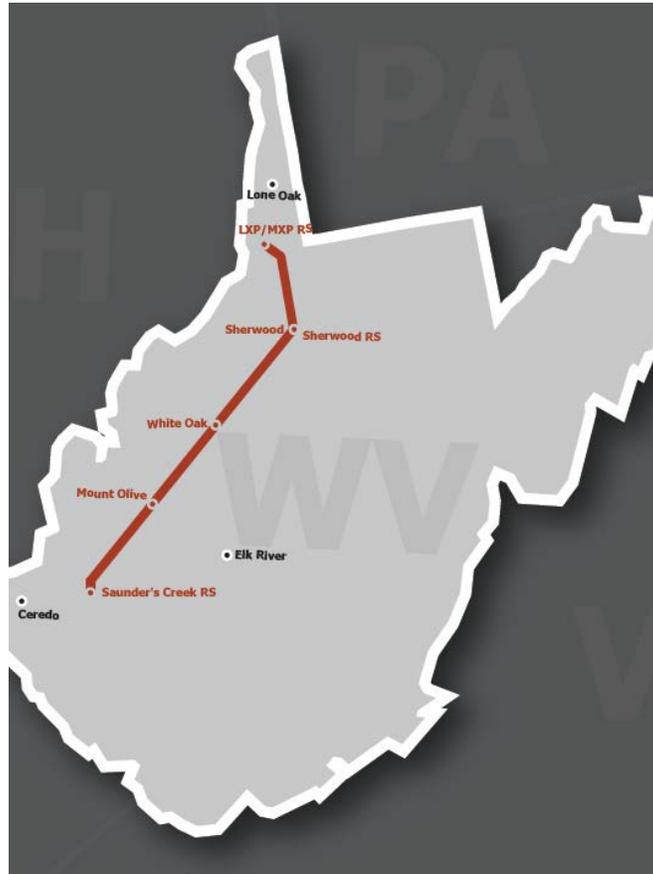
Source: PennEast Pipeline

In 2014, the developer contacted landowners, submitted the pre-filing application to the FERC, and held open houses. Scoping meetings were held in 2015, and the official application for the project was submitted. The FERC published the proposal draft for EIS approval in 2016. A final decision from the FERC is expected in 2017. Pending approval, construction is expected to begin in 2018, and the pipeline is planned to be in-service late-2018 or early-2019.<sup>7</sup>

## Mountaineer Xpress

The Columbia Pipeline Group (CPG) is in charge of the Mountaineer Xpress pipeline project (as seen in the graphic below), which consists of 165 miles of 36 inch pipeline in West Virginia, adding to the 2,500 miles of pipeline that the company currently has running through state. Also included in this project are new Compressor Stations in Doddridge, Calhoun, and Jackson Counties; each county will have three gas-fire compressor units installed. Modifications are also necessary to existing Compressor Stations in Marshall (Lone Oak Station), Wayne (Ceredo Station), and Kanawha (Elk River Station) Counties. These modifications include updates to

machinery, compression systems, and existing pipelines. CPG submitted their filing request to the FERC in August of 2015. In October of the same year, open houses for the pipelines were held. The official application for the project was submitted to the FERC in 2016, and a decision is expected sometime in 2017. Columbia plans to have the pipeline and stations in service by the year 2018.<sup>8</sup>



Source: Columbia Pipeline Group

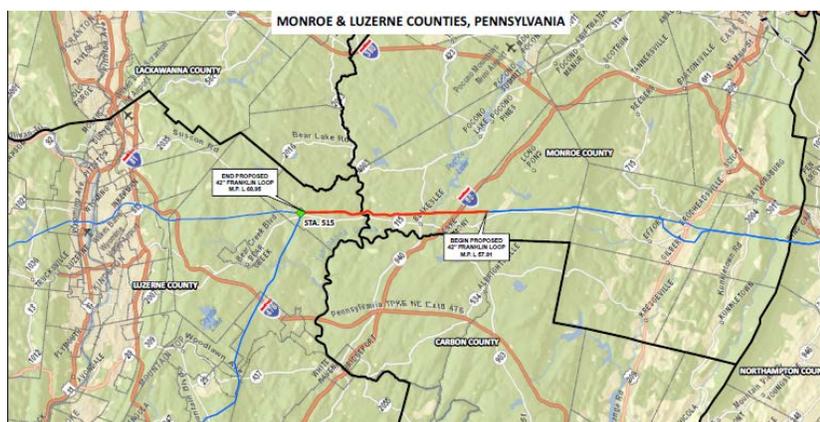
## Completed Pipeline Projects

### Mariner 1

Sunoco Logistics' Mariner 1 was designed to repurpose existing natural gas lines into transportation lines for petroleum products. Approximately 50 miles of existing lines were modified to connect fracking operations in the Western counties of Pennsylvania to the Marcus Hook Facility near the Delaware Water Gap, where the gases can be processed into propane and ethane, and sold to other facilities. Successful propane delivery was accomplished in December of 2014, and ethane delivery was accomplished in the first quarter of 2016.

### Leidy Southeast Expansion Project

The Leidy Southeast Expansion Project, designed by Transco, was a 30 mile expansion to an existing pipeline in Pennsylvania and New Jersey. The expansion was mainly composed of 42 inch pipeline loops that run parallel to the existing lines. Compressor maintenance and valve functionality were also addressed and repaired, and the existing transmission corridor was expanded and maximized. When completed, the purpose of these modifications were to lessen the impacts of fracking on surrounding property owners and the environment. The pre-filing process was completed in January 2013, followed by the open houses in April of that year. That summer, FERC scoping hearings were carried out and environmental reports were submitted. In September of 2013, Transco submitted their 7c application, and construction for the compression station was started approximately one year later. In December 2014, the FERC gave approval for pipeline construction, which began in the spring of 2015. The full project was completed and in-service by December of that year.<sup>9</sup> The sections of the pipeline that run through Monroe and Luzerne Counties can be seen in the map below.



Source: Leidy Southeast

## Virtual Pipelines

Natural gas can be distributed in several ways. Another mode of transportation of fuels is the use of virtual pipelines. According to GE Oil and Gas, “virtual pipelines are substitute to physical pipelines that distribute gas via land or sea transport. They replicate the continuous flow of energy via transportation logistics using trucks or ships<sup>10</sup>.” These virtual pipelines are an alternative measure taken when the ability to build a physical pipeline is either impossible because of land, or is too expensive. One of the main receivers of these virtual pipelines are the New England States. Most of New England has no natural gas pipelines, which causes the residents to have higher heating costs and industrial processing fees<sup>11</sup>.

The companies that provide these virtual pipelines are located throughout the United States and Canada. Among the major firms of the industry are: Compass Natural Gas in Mechanicsburg, PA; NG Advantage in Colchester, VT; OsComp Systems in Houston, TX; Xpress XNG Boston, MA; Global Partners, LP in Waltham, MA; Irving oil in New Brunswick, Canada; Innovative Natural Gas in Concord, NH; REV LNG in Ulysses, PA; and UGI Energy Services in Wyomissing, PA<sup>12</sup>.

Compass Natural Gas, the first virtual pipeline company in the state of Pennsylvania, opened a site in December 2016 in Lycoming County. At this facility, gas extracted from the Marcellus Shale will be cleaned, compressed to 3600 psi, and shipped to customers who may not have access to natural gas via traditional pipelines<sup>13</sup>.

Virtual pipelines are composed of containers called MAT transport modules. These modules are resistant to impact, fire, and explosions. The gas within the MATs are monitored by telecontrol systems to assure that the system is functioning properly. These pipelines function through a three-step process First, the MATs are loaded onto a Microskid, which connects to an existing pipeline, compresses the natural gas, and fills the module to capacity. Empty MAT containers brought from various consumption points are unloaded and exchanged. Filled modules are then placed on to trailers through the use of ST machines, which are operated by the driver. ST machines minimize loading and unloading times while maintaining high safety standards. MAT modules are linked to the trailer by an anchoring system and transported to their consumption points at the speed of typical freight transport. Upon arrival, the modules are unloaded to PA-D platforms, regulated, and finally connected to the household supply network, in the case of residential consumption. In cases of industrial use, the PA-Ds are connected to regulating plants. A catalytic heater system is fitted onto the platform and the energy is transferred to the energy system within the factory or building<sup>14</sup>.

Some executives in these natural gas firms are optimistic in regards to the future success of these virtual pipelines. Pedro Santos, CEO of OsComp Inc., offered his opinion on what the

largest areas of growth for the industry are: “the first is propane replacement. There’s a heck of a lot of propane demand in the U.S. market right now that could be replaced by natural gas, but the economics for a pipeline for natural gas don't make any sense.”<sup>15</sup> The portability that virtual pipelines provide make it possible to supply the necessary fuels to any place that these resources are needed, such as rural settings where traditional means of natural gas distribution are not feasible.

Xpress Natural Gas – the Boston-based company responsible for creating the term “virtual pipeline” – recently expanded their fleet of virtual pipelines after purchasing 20 new Q-VP650 gas trailers and system upgrades from Quantum Fuel Systems Technologies. Each of these containers are equipped with the highest space capacity available in the industry. The technology allows the trailers to deliver around 650,000 standard cubic feet of storage when utilized at a level of 5000 psi.<sup>16</sup> These pressure levels increase storage capacity by about 20 percent compared to standard systems that function at 3600 psi levels<sup>17</sup>. In late January 2017, Pennsylvania Governor Tom Wolf announced the expansion of Xpress Natural Gas into Susquehanna County. The company is projected to spend over 18 million dollars to establish an 88-employee facility that will load up to 100 tanker trucks per day. This natural gas be delivered across the Northeast and the Mid-Atlantic.<sup>18</sup>

## Productive and Economic Factors of Natural Gas

The Marcellus and Utica Shales represent some of the most productive natural gas sources in the nation. As of February 2017, the Marcellus Shale was producing 18,591 million cubic feet of natural gas per day while the Utica Shale was producing 3,956 million cubic feet per day<sup>19</sup>. Since the beginning of 2012, the two regions have been responsible for 85 percent of shale gas production growth in the United States.<sup>20</sup> For the Utica Shale region alone, currently proposed pipeline construction projects may have the capability to almost double the capacity of natural gas production in the area.<sup>21</sup>

The need for more takeaway capacity out of the Marcellus and Utica shales has become a common refrain, but with a long list of projects on tap the northeast could be headed for a pipeline overbuild, according to RBN Energy LLC President Rusty Braziel.

Speaking to attendees at the 21st Annual LDC Gas Forums Northeast conference in Boston in June 2016, Braziel said an evaluation of price and production scenarios through 2021 suggests the industry is planning too many pipelines to relieve the region’s current capacity constraints.

“Is it possible that we could build too much takeaway capacity out of the Marcellus and Utica?” “It’s certainly happened in about every other segment of the energy business over the last few years,” Braziel said.

Braziel stated that his firm estimated Northeast production through 2021 by taking a range of price scenarios and determining what producers would be likely to drill and how many drilled but uncompleted (DUC) wells they would put into service. RBN’s most aggressive growth scenario would see the Marcellus and Utica increase production by 11 Bcf/d over the next five years. From 2015 to 2016, five new pipelines became key projects to extending the takeaway capacity of the Marcellus and Utica shale deposits. The key pipelines are as follows: Rockies Express Pipeline (REX) reversal project in Ohio, East Side Expansion in Pennsylvania, Broad Run Flexibility Project in Tennessee, Uniontown-to-Gas City project in Indiana, and Leidy Southeast in New York. In the last five years, the takeaway capacity in these states has increased dramatically; the EIA says “their combined growth of 12 billion cubic feet per day since 2011 accounts for 89 percent of the United States’ total growth in natural gas production.”<sup>22</sup>

Braziel’s comments partially reflect the sentiment of a recent study by the Institute for Energy Economics and Financial Analysis (IEEFA). This study concluded that the analysis of proposed interstate pipeline projects by the Federal Energy Regulatory Commission (FERC) fails to provide an inclusive process to demonstrate the need for new pipelines and related infrastructure.<sup>23</sup> The IEEFA’s recommendations stemming from this study were to hold off on projects “until a regional planning process can be developed for pipeline infrastructure.” Additionally, they suggest that FERC lower the allowed returns on equity for pipeline developers, and called for an official investigation into why the rate of failure for new pipelines is relatively high.<sup>24</sup>

However, the president of the Columbia Pipeline Group, Glen Kettering, does not believe that the Marcellus Shale region is at risk of experiencing pipeline overbuild. Rather, he thinks that eventually – by 2020 – projected production will match output.<sup>25</sup> David Messersmith of the Penn State Extension’s Marcellus Education Team believes that the truth lies between the two extremes. “There is clearly a need for additional pipeline infrastructure, although perhaps not as much as is currently proposed. This is a market-driven process, and we are perhaps beginning to see the market correct itself regarding pipeline capacity.”<sup>26</sup> Inconsistency between projected growth and actual growth can perhaps be contributed to the fact that infrastructure projects have longer lead times than production projects, according to the U.S. Energy Information Administration (EIA). The Marcellus and Utica Shales accounting for 89 percent of United States totally growth in natural gas production since 2011; pipeline production may not move as quickly.<sup>27</sup>

## Endnotes

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