

Estimated Economic Impact of the Leidy South Expansion Project

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Executive Summary

Williams is a natural gas infrastructure company headquartered in Tulsa, Oklahoma, with assets operating across the United States. Williams' interstate natural gas pipeline, gathering and processing operations currently touch about 30 percent of the natural gas consumed in the United States. The company currently operates approximately 3,700 miles of transmission and gathering pipelines in Pennsylvania.

The proposed Leidy South Expansion Project will connect supplies of natural gas in the Marcellus and Utica producing regions with areas of increasing demand along the Atlantic Seaboard by winter 2021-2022. The infrastructure investments, and ongoing operations associated with the project, will result in significant economic and fiscal impacts in Luzerne County, Schuylkill County, and the Commonwealth of Pennsylvania.

Construction of Compressor Stations 607 and 620 associated with the Leidy South Expansion Project will have a one-time economic impact within Luzerne County, Schuylkill County, and the Commonwealth of Pennsylvania. It is estimated that the \$59 million in total modeled construction costs will produce a total, one-time economic impact of \$47 million within Luzerne County, \$39 million in Schuylkill County, and \$100 million within the Commonwealth of Pennsylvania. In addition, capital investments will generate an estimated \$1.3 million in one-time tax revenue for the Commonwealth.

Figure ES.1: One-Time Economic Impact from Construction¹

	Luzerne County	Schuylkill County	Commonwealth of Pennsylvania
Direct Impact (\$M)	\$30	\$29	\$59
Indirect & Induced Impact (\$M)	\$17	\$10	\$41
Total Economic Impact (\$M)	\$47	\$39	\$100
Jobs Supported (FTE)	340	290	680
Total Employee Compensation (\$M)	\$13	\$10	\$28
Tax Revenue (\$M)	-	-	\$1.3

Source: The Williams Companies, Inc. (2019), IMPLAN (2015)

Following the completion of Compressor Stations 607 and 620, ongoing operations of the stations will require both direct expenditures and increased employment. These direct annual investments by

¹ The economic impact tables throughout the report are organized by the three Pennsylvania geographies where direct economic activity occurs: Luzerne County, Schuylkill County, and the Commonwealth of Pennsylvania. This direct activity generates additional indirect and induced impacts in Luzerne and Schuylkill Counties, as well as surrounding areas throughout Pennsylvania. The economic impact of the Commonwealth of Pennsylvania depicted in the tables includes the direct, indirect, and induced activity in Luzerne and Schuylkill Counties, as well as the indirect and induced impacts stimulated in the surrounding Pennsylvania areas. Consequently, the total economic impacts displayed for Pennsylvania are greater than the sum of Luzerne and Schuylkill County impacts.

Williams will generate indirect and induced impacts. Each year, ongoing operations will generate \$4.2 million in economic impact within the Commonwealth of Pennsylvania, \$2.0 million of which will occur within Luzerne County and \$2.1 million of which will occur in Schuylkill County.

Figure ES.2: Annual Economic Impact from Operations

	Luzerne County	Schuylkill County	Commonwealth of Pennsylvania
Direct Impact (\$M)	\$1.7	\$1.7	\$3.4
Indirect & Induced Impact (\$M)	\$0.3	\$0.4	\$0.8
Total Economic Impact (\$M)	\$2.0	\$2.1	\$4.2
Jobs-Years Supported (FTE)	4	4	8
Total Employee Compensation (\$M)	\$0.3	\$0.3	\$0.6

Source: The Williams Companies, Inc. (2019), IMPLAN (2015)

In addition to the significant impacts generated by capital investments and ongoing operating activity associated with the Leidy South Expansion Project, energy market participants will also potentially realize benefits as a result of a reduction in energy market volatility and decreased energy expenses. The reduction in energy market volatility and energy expenses will potentially help address household energy insecurity.

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About Econsult Solutions, Inc.

This report was produced by Econsult Solutions, Inc. (“ESI”). ESI is a Philadelphia-based economic consulting firm that provides businesses and public policy makers with economic consulting services in urban economics, real estate economics, transportation, public infrastructure, development, public policy and finance, community and neighborhood development, planning, as well as expert witness services for litigation support. Its principals are nationally recognized experts in urban development, real estate, government and public policy, planning, transportation, non-profit management, business strategy and administration, as well as litigation and commercial damages. Staff members have outstanding professional and academic credentials, including active positions at the university level, wide experience at the highest levels of the public policy process and extensive consulting experience.

1. Introduction

1.1. Background

Williams is a natural gas infrastructure company headquartered in Tulsa, Oklahoma. The company began in 1908 as a construction business before purchasing a pipeline in 1966, initiating the shift to a builder, owner, and operator of pipeline systems. Today, Williams operates across the country from Washington to Florida, with its principle operating areas in the Atlantic-Gulf, the Northeastern United States, and the Western United States. Williams' extensive interstate gas pipeline, gathering and processing operations touch approximately 30 percent of the natural gas consumed in the United States and include the following regional operations.²

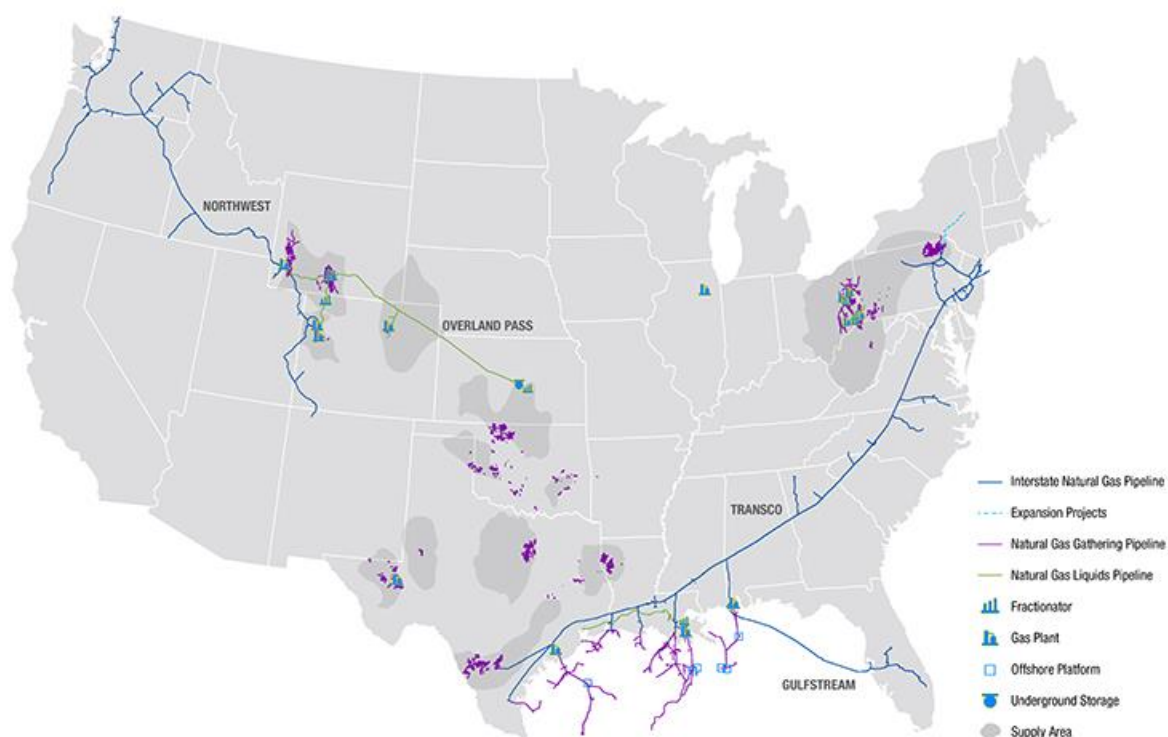
- The **Atlantic-Gulf Operating Area** includes the Transcontinental Gas Pipeline System (Transco), the largest-volume interstate natural gas pipeline system in the United States; Gulfstream, a 745-mile pipeline transporting natural gas to Florida across the Gulf of Mexico; and gathering and processing infrastructure.³ Atlantic-Gulf operations also include Gulfstar, Williams' innovative floating production system. The system is the first spar-based floating production system (FPS) with major components built in the United States.⁴
- The **Northeast Operating Area** includes the Susquehanna Supply Hub in northeast Pennsylvania, the Ohio Valley Midstream in northern West Virginia, and the Laurel Mountain Midstream joint venture in southwestern Pennsylvania. The Susquehanna Supply Hub has a gathering inlet capacity of roughly 1 Bcf/d and connects to three major interstate gas pipeline systems.
- The **West Operating Area** includes natural gas gathering and processing infrastructure and operations in Colorado, Wyoming, New Mexico, Oklahoma, Texas and Louisiana. The West Operating Area also includes the 4,000 mile Northwest Pipeline bi-directional natural gas transmission system, natural gas liquids pipelines, and a fractionation and storage facility in Kansas.

² "Our Company." Williams, The Williams Companies, Inc., <https://co.williams.com/our-company/>

³ "Operations." Williams. <https://co.williams.com/operations/>

⁴ "Gulf of Mexico Gathering & Processing." Williams, The Williams Companies, Inc., <https://co.williams.com/operations/atlantic-gulf-operating-area/gulf-coast/>

Figure 1.1: Map of Williams' Operations



Source: The Williams Companies, Inc. (2019)

In addition to the company's significant economic contributions to the local and regional economy as an energy infrastructure company, Williams is also a responsible corporate citizen. The company is committed to promoting safe and responsible development practices, has been named a top employer in the community, focuses on buying local products and services, and maintains an active role in local education and non-profits. In fact, in 2018 Williams and its employees contributed \$9.4 million to nearly 2,000 organizations through its various community giving channels. This included more than \$5 million for United Way campaigns across the United States.

1.2. The Leidy South Expansion Project

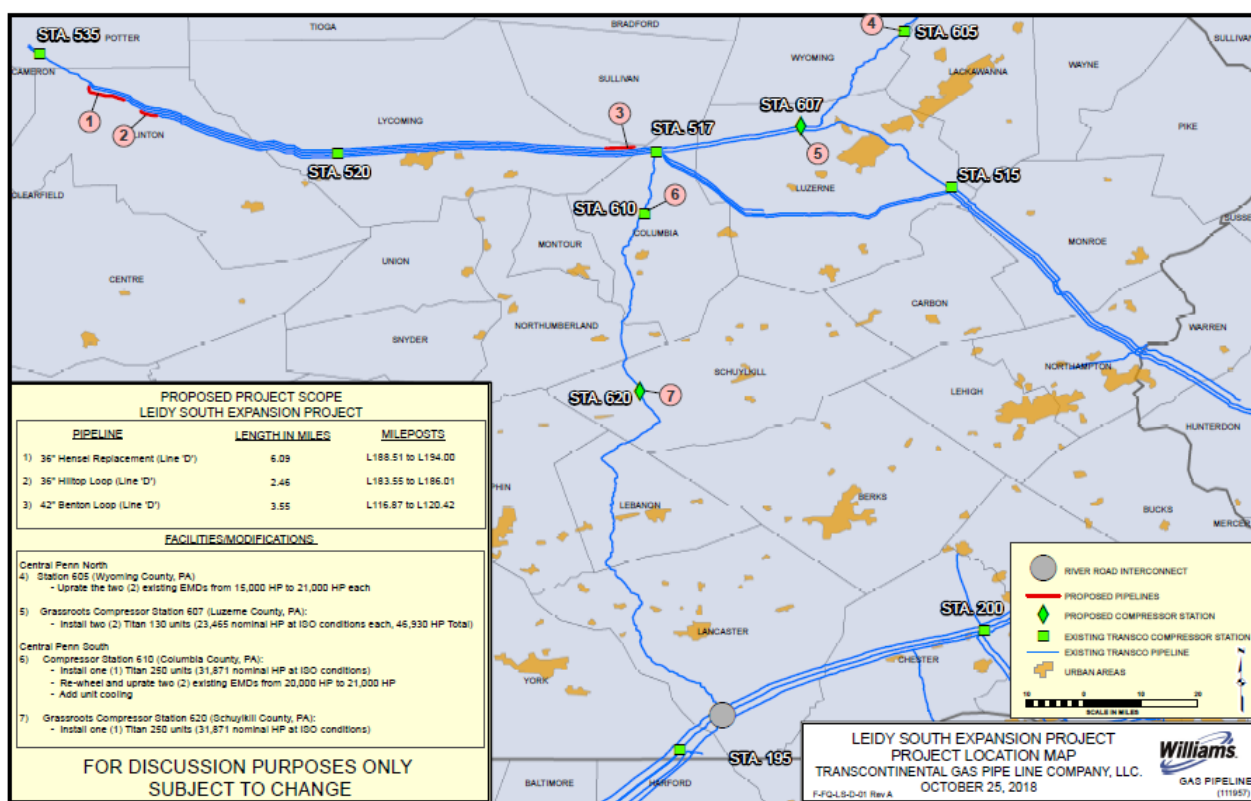
The Leidy South Expansion Project will connect supplies of natural gas in the Marcellus and Utica producing regions with areas of increasing demand along the Atlantic Seaboard by winter 2021-2022. The project will occur in northern and western Pennsylvania along the Transco pipeline, involving the Leidy Line facilities, the Central Penn Line North facilities, and the Central Penn Line South facilities. The following infrastructure investments will increase Transco pipeline capacity by 582,400 dekatherms per day, equivalent to enough natural gas to meet the needs of 2.5 million homes.

- The replacement of 6.3 miles of 24 inch pipe along the Transco Leidy Line with 36 inch pipe in Clinton County, Pennsylvania

Economic Impact of the Leidy South Expansion Project

- An additional 2.4 miles of 36 inch pipeline loop in Clinton County, Pennsylvania
- An additional 3.5 miles of 42 inch pipeline loop in Lycoming County, Pennsylvania
- An upgrade of two electric motor driven compressors from 15,000 horsepower to 21,000 horsepower at Transco Compressor Station 605 in Wyoming County, Pennsylvania
- The installation of two turbine driven compressors at Transco Compressor Station 607 in Luzerne County, Pennsylvania
- The addition of one turbine driven compressor at Transco Compressor Station 610 in Columbia County, Pennsylvania
- The installation of one turbine driven compressor at Transco Compressor Station 620 in Schuylkill County, Pennsylvania
- The inclusion of appurtenant underground and aboveground facilities

Figure 1.1: Leidy South Expansion Project Map



Source: The Williams Companies, Inc. (2019)

Significant infrastructure investments will occur in Clinton, Lycoming, Wyoming, Luzerne, Columbia, and Schuylkill Counties. However, the largest investments include the installation of two turbine driven compressors at Transco Compressor Station 607 in Luzerne County, Pennsylvania and the installation of

one turbine driven compressor at Transco Station 620 in Schuylkill County, Pennsylvania. These investments alone are estimated to total \$82 million.

ESI has been engaged to estimate the economic and fiscal impact of construction (Section 3) and ongoing operations (Section 4) of investments in Compressor Station 607 in Luzerne County and Compressor Station 620 in Schuylkill County. Section 4 also includes a discussion of broad regional economic benefits resulting from energy market savings. It is important to note that the overall Leidy South Expansion Project includes infrastructure investments in addition to the installation of compressor stations 607 and 620. Therefore, the economic and fiscal impact estimates presented in this report are conservative.

2. Scope and Methodology

ESI employs industry-standard economic modeling techniques to estimate direct economic activity generated by Williams in two impact categories and to translate that activity into total economic output, employment and associated earnings, as well as tax revenue impact. Economic impact estimates for each category are derived by estimating the amount of direct activity attributable to Williams by geography and then using input-output models to translate this direct economic activity into the total amount of economic activity that it supports.

In an inter-connected economy, every dollar spent generates two spillover impacts:

- First, some amount of the proportion of that expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is called the “**indirect effect**,” and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, some amount of the proportion of that expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the “**induced effect**,” and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating a local economy.

The role of input-output models is to determine the linkages across industries in order to model the magnitude and composition of the spillover impacts across the economy. ESI has developed customized economic impact models of the Luzerne County, Schuylkill County, and Pennsylvania economies using the IMPLAN input/output modeling system. The total impact of Williams’ capital investments and ongoing operations is calculated as the sum of direct, indirect and induced impacts within a given geography. This additional economic activity also translates into additional employment and associated earnings and additional tax revenues for state and local governments.

2.1. Geography of Model

As stated previously, although significant infrastructure investments will occur in Clinton, Lycoming, Wyoming, Luzerne, Columbia, and Schuylkill Counties, the largest investments include the installation of two turbine driven compressors at Transco Compressor Station 607 in Luzerne County and the installation of one turbine driven compressor at Transco Compressor Station 620 in Schuylkill County. Consequently, the economic and fiscal impact models focus on the following geographies.

1. This analysis estimates the economic impact of the installation and ongoing operation of Compressor Station 607 in **Luzerne County**;
2. This analysis estimates the economic impact of the installation and ongoing operation of Compressor Station 620 in **Schuylkill County**;

3. This analysis estimates the combined economic and fiscal impact of the installation and ongoing operation of Compressor Station 607 in Luzerne County and Compressor Station 620 in Schuylkill County within the **Commonwealth of Pennsylvania**.

3. Economic Impacts from Construction of Compressor Stations 607 and 620

3.1. Direct capital investment

Significant infrastructure investments will occur in Clinton, Lycoming, Wyoming, Luzerne, Columbia, and Schuylkill Counties. However, the largest investments include the installation of two turbine driven compressors at Transco Compressor Station 607 in Luzerne County and the installation of one turbine driven compressor at Compressor Station 620 in Schuylkill County.

Capital investments made by Williams for the construction of the compressor stations will stimulate one-time economic activity. In total, the combined construction cost of the 607 and 620 compressor stations is estimated at \$82 million. As outlined in Figure 3.1, construction costs associated with the compressor stations include labor and general construction expenditures, construction inspectors, land rights, permit fees, external consultants, and travel expenditures. Because the scope of this analysis is limited to Luzerne County, Schuylkill County, and Pennsylvania, the economic impact model is limited to construction costs incurred within Pennsylvania. In total, of the \$82 million in total construction costs, an estimated \$59 million will generate economic impact within Pennsylvania (see Figure 3.1).⁵

⁵ It is important to note that there will be additional construction costs associated with the other components of the Leidy South expansion project.

Figure 3.1: Construction Costs

Station 607, Luzerne County	Project Costs	Costs within PA
Labor and General Construction Expenditures	\$30.1	\$17.9
Construction Inspectors	\$3.4	\$3.4
Land Rights	\$1.6	\$1.6
Permits	\$0.1	\$0.1
External Consultants	\$6.9	\$6.9
Travel Expenditures	\$0.2	\$0.2
Total	\$42.3	\$30.1

Station 620, Schuylkill County	Project Costs	Costs within PA
Labor and General Construction Expenditures	\$26.8	\$15.9
Construction Inspectors	\$3.1	\$3.1
Land Rights	\$1.6	\$1.6
Permits	\$0.1	\$0.1
External Consultants	\$7.8	\$7.8
Travel Expenditures	\$0.2	\$0.2
Total	\$39.6	\$28.7
Grand Total	\$81.9	\$58.8

Source: The Williams Companies, Inc. (2019)

3.2. Economic Impact from Construction

The installation of compressor stations 607 and 620 will occur in Luzerne and Schuylkill Counties, respectively, while also generating spillover effects throughout Pennsylvania. Direct capital investments will employ construction workers and professional service providers, who will in turn spend a portion of their salaries and wages within the local and state economy. Construction activity will also catalyze the procurement of a wide range of goods and services, which will translate into new economic opportunities for local and state vendors.

It is estimated that construction will generate a one-time economic impact of \$47 million in direct, indirect, and induced effects within Luzerne County, supporting 340 jobs worth a combined \$13 million in employee compensation.⁶ Schuylkill County will experience a \$39 million economic impact as a result of construction, supporting 290 jobs worth \$10 million in employee compensation. The Commonwealth

⁶ Throughout the report, jobs refer to the number of full-time equivalent jobs created or supported by the project. One FTE job is equivalent to one employee working full time, but could be filled by multiple employees working part-time.

of Pennsylvania will experience a one-time economic impact of \$100 million, with 680 supported jobs worth \$28 million in employee compensation (see Figure 3.2).⁷

Figure 3.2: One-Time Economic Impact from Construction ⁸

	Luzerne County	Schuylkill County	Commonwealth of Pennsylvania
Direct Impact (\$M)	\$30	\$29	\$59
Indirect & Induced Impact (\$M)	\$17	\$10	\$41
Total Economic Impact (\$M)	\$47	\$39	\$100
Total Jobs Supported (FTE)	340	290	680
Total Employee Compensation (\$M)	\$13	\$10	\$28

Source: The Williams Companies, Inc. (2019), IMPLAN (2015)

3.3. Industry Distribution of One-Time Employment Impact

The majority (67 percent) of jobs supported by construction of the compressor stations will occur in the construction industry. However, a significant portion of employment will be generated in a range of industries, with direct, indirect, and induced jobs supported in health care and social assistance, retail trade, and professional, scientific, and technical services, along with numerous other industries across the Commonwealth of Pennsylvania (see Figure 3.3).

⁷ Earnings (Employee Compensation) include salaries and benefits of all direct, indirect, and induced employees.

⁸ It is important to note that these economic impact estimates are only associated with the construction of the two compressor stations and do not include the additional components of the Leidy South Expansion Project. As such, the economic impact of the full project will be larger.

Figure 3.3: One-Time Construction Employment Impact Detailed by Industry

Industry	Direct, Indirect, and Induced FTEs	% of Total Employment Impact
Construction	455	67%
Health Care and Social Assistance	32	5%
Retail Trade	40	6%
Professional, Scientific, and Technical Services	25	4%
Administrative/Support; Waste Management/Remediation Services	20	3%
Retail Trade	16	2%
Accommodation and Food Services	16	2%
Wholesale Trade	16	2%
Other Services (except Public Administration)	15	2%
Real Estate and Rental and Leasing	12	2%
All Other	33	5%
Total	680	100%

Source: IMPLAN (2015)

3.4. One-Time State Tax Revenue Impact

The construction of the compressor stations will generate one-time tax revenues for Pennsylvania. Modeled tax revenues include income tax, sales tax, and business tax, which in total will produce an estimated \$1.3 million in one-time total tax revenues from the direct, indirect, and induced economic activity of construction (see Figure 3.4)

Figure 3.4: One-Time Tax Revenue Impact from Construction of the Compressor Stations

	Commonwealth of Pennsylvania (\$M)
Income Tax	\$0.5
Sales Tax	\$0.6
Business Tax	\$0.2
Total	\$1.3

Source: IMPLAN (2015), Econsult Solutions (2019)

4. Economic Impacts from Ongoing Operations of Compressor Station 607 and 620

4.1. Annual Operations

After construction is completed, the project will continue to generate important economic benefits at the county and state level from ongoing operations. The project will add new jobs to the local economy; those workers will in turn spend a portion of their salaries and wages within the local and state economy. Ongoing operations will also require the procurement of various goods and services, which will translate into new economic opportunities for local and state vendors representing a wide range of industries. Direct expenditures associated with the ongoing operations of the new compressor stations will stimulate recurring economic activity, while also generating recurring, annual tax revenues.

Installation of Compressor Station 607 will create 2 new jobs and the installation of Compressor Station 620 will create 3 new jobs. In total, including employee costs and operating expenses, ongoing annual expenditures associated with both compressor stations will total \$3.4 million (see Figure 4.1).

Figure 4.1: Annual Operating Expenditures

Station 607		Total
Direct Full Time Employees	2	
Compensation per employee per year	\$60,000	\$120,000
Benefits per employee per year (20-30%)	\$15,000	\$30,000
Annual Operating Costs	\$1,500,000	\$1,500,000
Total		\$1,650,000
Station 620		Total
Direct Full Time Employees	3	
Compensation per employee per year	\$60,000	\$180,000
Benefits per employee per year (20-30%)	\$15,000	\$45,000
Annual Operating Costs	\$1,500,000	\$1,500,000
Total		\$1,725,000
Grand Total		\$3,375,000

Source: The Williams Companies, Inc. (2019)

4.2. Economic Impact from Operating Compressor Stations 607 and 620

The direct expenditures and associated employee compensation required to maintain operations of the compressor stations will generate an annual economic impact in Luzerne County, Schuylkill County, and Pennsylvania. Within Luzerne County, compressor station operations will produce \$2.0 million in total

economic impact, supporting 4 total jobs, and \$0.3 million in employee compensation annually. Within Schuylkill County, compressor station operations will produce \$2.1 million in total economic impact, supporting 4 total jobs, and \$0.3 million in employee compensation. Within Pennsylvania, compressor operations will produce \$4.2 million in total economic impact, supporting 8 total jobs, and \$0.6 million in employee compensation (see Figure 4.2).

Figure 4.2: Annual Economic Impact from Operations

	Luzerne County	Schuylkill County	Commonwealth of Pennsylvania
Direct Impact (\$M)	\$1.7	\$1.7	\$3.4
Indirect & Induced Impact (\$M)	\$0.3	\$0.4	\$0.8
Total Economic Impact (\$M)	\$2.0	\$2.1	\$4.2
Total Jobs Supported (FTE)	4⁹	4¹⁰	8
Total Employee Compensation (\$M)	\$0.3	\$0.3	\$0.6

Source: The Williams Companies, Inc. (2019), IMPLAN (2015)

4.3. Annual State Tax Revenue Impact

Operation of compressor stations 607 and 620 will also stimulate an increase in annual tax revenue within Pennsylvania. Tax revenue results from direct operation and employment, along with indirect and induced economic impacts created by operations and employment. Income tax, sales tax, and business tax impacts resulting from operations of compressor stations 607 and 620 are estimated to total a combined \$62,800 in annual tax revenue (see Figure 4.4). In addition to income, sales, and business taxes paid to the Commonwealth, Williams anticipates incurring a \$100,000 increase in property taxes for the compressor stations.

Figure 4.4: Estimated Tax Revenues from Operating the Pipeline

	Commonwealth of Pennsylvania
Income Tax	\$11,000
Sales Tax	\$39,300
Business Tax	\$12,500
Total	\$62,800

Source: IMPLAN (2015), Econsult Solutions (2019)

⁹ Total jobs supported include the 2 direct employees hired by Williams as well as 2 combined indirect and induced jobs.

¹⁰ Total jobs supported include the 3 direct employees hired by Williams as well as 1 combined indirect and induced job.

4.4. Additional Benefits to Energy Market Participants

In addition to the significant impacts generated by capital investments and ongoing operating activity associated with the Leidy South Expansion Project, energy market participants will also potentially accrue substantial benefits as a result of a reduction in energy market volatility and decreased energy expenses.

In 2018, Pennsylvania produced approximately 6 trillion cubic feet of gas, designating the Commonwealth as the second-largest natural gas producing state. Despite substantial natural gas production throughout the Commonwealth, inadequate pipeline infrastructure restricts access to natural gas, creating production curtailments and shut-in production. The Leidy South Expansion Project will enable the existing Transco pipeline system to transport an additional 582,400 dekatherms of natural gas supply per day, equivalent to the amount of natural gas required to meet the daily needs of approximately 2.5 million homes. The Williams' Transco pipeline has executed commitments with Seneca Resources Company, LLC, Cabot Oil & Gas Corporation and UGI Utilities for 100 percent of the firm transportation capacity resulting from the Leidy South Expansion Project.

A 2018 study conducted by Concentric Energy Advisors for the PennEast Pipeline Company, LLC asserts that it is widely understood that markets with constrained natural gas supply have higher and more volatile natural gas prices.¹¹ The study outlines the following potential benefits of increased natural gas pipeline capacity to users in restricted markets.

- Development in the Marcellus and Utica basins has increased natural gas supply in the Northeast region resulting in lower prices for residential and smaller commercial natural gas users that access gas through local distribution companies.
- Industrial natural gas users that often purchase gas from third-parties would directly benefit from a reduction in natural gas market area price resulting from increased supply.
- Additional natural gas resources may reduce prices for electric consumers in markets where producers set the electric energy price based on cheaper natural gas prices.
- The introduction of additional natural gas capacity may limit short-term reliance on more expensive oil-based resources, resulting in a price reduction for consumers, and may incentivize the permanent replacement of less efficient and more costly oil-powered generation resources in the long run.

Utility costs are a significant expense for households, and represent a particularly substantial burden for low-income households and those living on fixed incomes. In fact, according to a U.S. Energy Information Administration (EIA) analysis, one-third of households struggled to pay energy bills or maintain a sufficient level of heating and cooling in their homes in 2015.¹² The EIA's Residential Energy

¹¹ Estimated Energy Market Savings from Additional Pipeline Infrastructure Serving Eastern Pennsylvania and New Jersey. Concentric Energy Advisors. April 2018. https://penneastpipeline.com/wp-content/uploads/2018/05/PennEast_Concentric_Update_FINAL_4-24-2018.pdf

¹² U.S. Energy Information Administration. One in Three U.S. Households Faces a Challenge in Meeting Energy Needs. September 2018. <https://www.eia.gov/todayinenergy/detail.php?id=37072>

Consumption Survey indicated that 20 percent of households “reported reducing or forgoing necessities such as food and medicine to pay an energy bill.”¹³ In addition, 11 percent of survey respondents were forced to keep homes at an unsafe temperature. The reduction in energy market volatility and energy expenses resulting from the Leidy South Expansion Project has the potential to offer critical community benefits by helping to address household energy insecurity.

¹³ Ibid

Appendix A – Input Output Methodology

OVERVIEW

Economic impact estimates are generated by utilizing input-output models to translate an initial amount of direct economic activity into the total amount of economic activity that it supports, which includes multiple waves of spillover impacts generated by spending on goods and services and by spending of labor income by employees. This section summarizes the methodologies and tools used to construct, use, and interpret the input-output models needed to estimate this project's economic impact.

INPUT-OUTPUT MODEL THEORY

In an inter-connected economy, every dollar spent generates two spillover impacts:

- First, some amount of the proportion of that expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is called the “indirect effect,” and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, some amount of the proportion of that expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the “induced effect,” and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating a local economy.

The role of input-output models is to determine the linkages across industries in order to model out the magnitude and composition of spillover impact to all industries of a dollar spent in any one industry. Thus, the total economic impact is the sum of its own direct economic footprint plus the indirect and induced effects generated by that direct footprint.

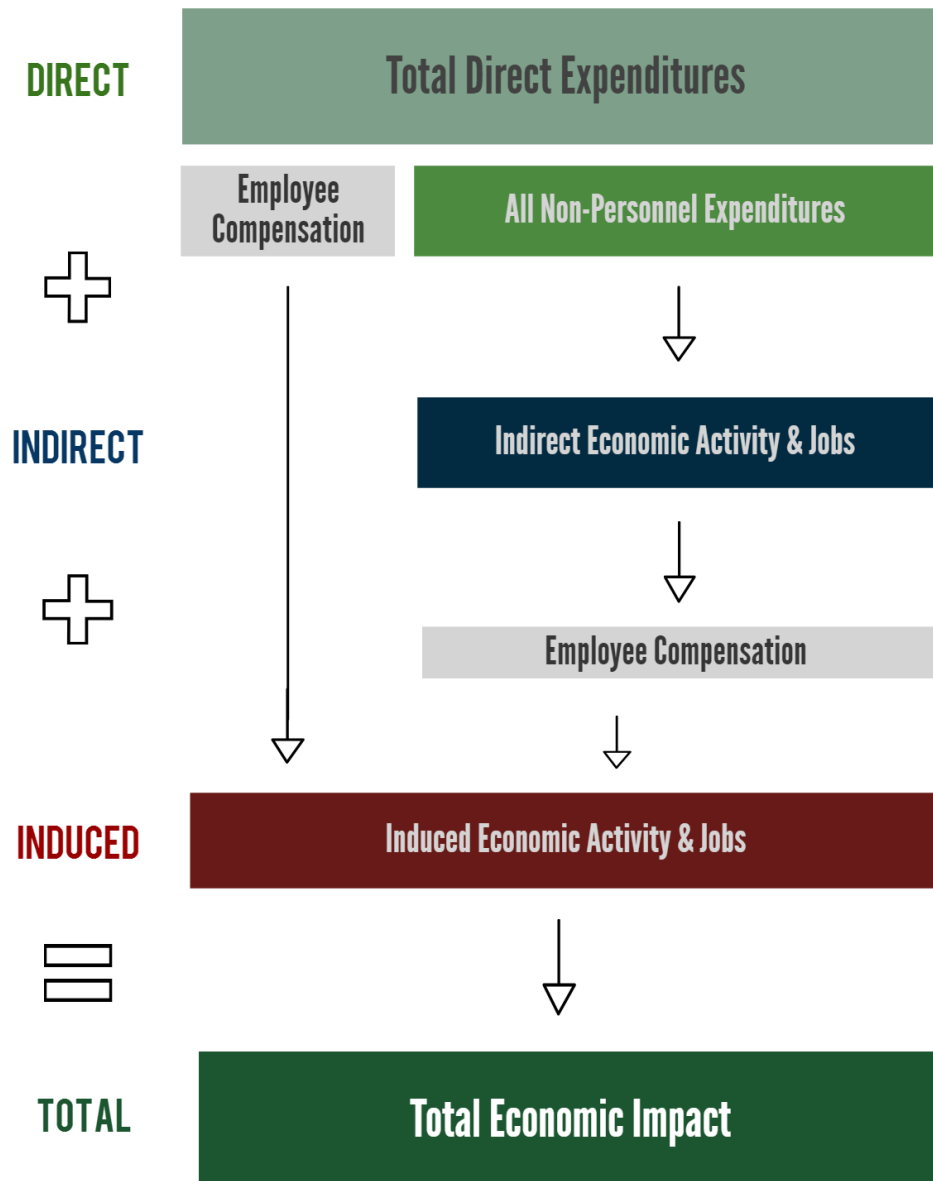
INPUT-OUTPUT MODEL MECHANICS

To model the impacts resulting from the direct expenditures, Econsult Solutions, Inc. developed a customized economic impact model using the IMPLAN input/output modeling system. IMPLAN represents an industry standard approach to assess the economic and job creation impacts of economic development projects, the creation of new businesses, and public policy changes within a county its surrounding area.

IMPLAN has developed a social accounting matrix (SAM) that accounts for the flow of commodities through economics. From this matrix, IMPLAN also determines the regional purchase coefficient (RPC), the proportion of local supply that satisfies local demand. These values not only establish the types of goods and services supported by an industry or institution, but also the level in which they are acquired locally. This assessment determines the multiplier basis for the local and regional models created in the IMPLAN modeling system. IMPLAN takes the multipliers and divides them into 536 industry categories in accordance to the North American Industrial Classification System (NAICS) codes.

The IMPLAN modeling system also allows for customization of its inputs, which alters multiplier outputs. Where necessary, certain institutions may have different levels of demand for commodities. When this occurs, an “analysis-by-parts” (ABP) approach is taken. This allows the user to model the impacts of direct economic activity related to an institution or industry with greater accuracy. Where inputs are unknown, IMPLAN is able to estimate other inputs based on the level of employment, earnings, or output by an industry or institution.

Figure A.1 – Economic Impact Methodology



EMPLOYMENT AND WAGES SUPPORTED

IMPLAN generates job estimates based on the term “job-years”, or how many jobs will be supported each year. For instance, if a construction project takes two years, and IMPLAN estimates there are 100 employees, or more correctly “job-years” supported, over two years, that represents 50 annual jobs. Additionally, these can be a mix of a full and part-time employment. Consequently, job creation could feature more part-time jobs than fulltime jobs. To account for this, IMPLAN has a multiplier to convert annual jobs to full-time equivalent jobs.

Income to direct, indirect, and induced jobs is calculated as employee compensation. This includes wage and salary, all benefits (e.g., health, retirement) and payroll taxes (both sides of social security, unemployment taxes, etc.). Therefore, IMPLAN’s measure of income estimates gross pay opposed to just strictly wages.

TAX REVENUES

The economic impacts in turn produce one-time or ongoing increases in various tax bases, which yield temporary or permanent increases in various tax revenues. To estimate these increases, Econsult Solutions, Inc. created a tax revenue impact model to translate total economic impacts into their commensurate tax revenue gains. These tax revenue gains only account for a subset of the total tax revenue generation that an institution or industry may have on the economy. Furthermore, where institutions are tax exempt, only the tax revenue generation from supported indirect and induced industries is accounted for