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Center for Energy Commerce

Rawls College of Business

**Update to the Economic Impacts of the Texas
Oil and Gas Pipeline Industry**

Report Prepared For:

Texas Pipeline Association
Austin, Texas

September 2020

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Executive Summary

This study is conducted by the Center for Energy Commerce at Texas Tech University and provides estimates of the 2019 economic impact of the Texas oil and gas pipeline industry. The study also provides insights into the long-lasting benefits of the pipeline industry over the next 40 years. The study is an update to the 2014 economic impact analysis prepared by Texas Tech University that provided estimates of the industry for the years 2013 and 2024.

The focus of this study is on the value creation and the economic sustainability that lies in the economic contributions of Texas pipelines. For purposes of this study, economic output refers to the value of all industrial production in a region (i.e., gross revenues), following the convention used by the U.S. Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA); jobs are defined as the average annual number of jobs in a sector, industry, or region, while labor income consists of all forms of employment income, including employee compensation (wages and benefits) and proprietor income; and value added indicates the addition to gross state product.

The oil and gas pipeline industry expenditures related to ongoing operations and construction are an important driver of economic activities in the state of Texas and beyond. The industry's activities generate and sustain jobs, income and output, and contribute to state and local government revenues. The industry also provides substantially to the gross state product of Texas.

In the year 2019, the total economic impact from Texas pipeline operations and construction include:

- Over \$48.6 billion in economic output
- More than 238,000 jobs
- Over \$29.3 billion in additional gross state product
- Over \$2.7 billion in state and local government revenues

Of those state and local revenues, a typical Texas county receives an estimated \$12,350 in property taxes per year for each mile of pipeline located in their county.

Over the next 40 years, the Texas pipeline industry is conservatively expected to generate cumulative economic impacts (in today's dollars) of \$1.49 trillion in economic output, \$903 billion in additional gross state product, and contribute \$84 billion in state and local government revenues. Of those state and local government revenues, the cumulative property tax revenues generated per mile of pipeline for a typical Texas county is \$380,000 (in today's dollars).

Additionally, the industry will continue to sustain jobs each and every year in the state of Texas and the employment impacts will grow over time. The projected state-wide jobs impact from the operations and construction of pipelines will grow from 238,000 in 2019 to well over 492,000 workers in 40 years.

Since the original economic impact study which focused on year ended 2013, the Texas pipeline industry's total output impact from operations and construction has increased by 47% while the total employment impact has increased by 40%. Over the same time period, the amount of state and local

government revenues attributable to the existence of the Texas pipeline industry's impact increased by 68%.

The activities of the Texas pipeline industry, which include the transportation of hydrocarbons from sources of exploration and production to refineries and end-users, are one component of the substantial job creation, investment, and overall economic growth of the state's economy.

Introduction

This report was prepared by the Center for Energy Commerce at Texas Tech University and provides estimates of the positive economic impact of the oil and gas pipeline industry on the state of Texas. The oil and gas industry in Texas is characterized by a highly integrated supply chain centered on pipeline transportation and supporting infrastructure. By connecting upstream to downstream oil and gas activities, pipelines play a significant role in value creation and economic sustainability in the state.

The economic benefits of the pipeline industry result in substantial highly compensated employment, investment and economic growth. The economic impact of the pipeline industry is derived from the transportation of hydrocarbons from sources of exploration and production to refineries and end-users. This core activity, in turn, leads to a number of non-core but very critical supply chain activities such as the construction of pipelines, processing plants, meter stations, compressors, fractionators and equipment manufacturing. The secondary effects of the pipeline industry include the numerous expansions and continuing operations of suppliers to the industry as well as wholesale, retail, real estate and housing, and financial services, etc., which benefit from the increased dollars generated.

The current study is an update to the 2014 economic impact analysis prepared by Texas Tech University for the Texas Pipeline Association that provided estimates of the industry for the years 2013 and 2024. The update provides estimates of the 2019 economic impact of the Texas oil and gas pipeline industry as well as conservative insights into the long-lasting benefits of the pipeline industry over the next 40 years. A number of changes have occurred in the oil and gas industry since the time the original report was issued. A few of these changes are highlighted below:

- Pipeline mileage in Texas increased 13.16% from 2013 to 2019
- Texas pipeline mileage increased at an average annual rate of 2.08% from 2013-2019
- The number of employees in Texas whose employment is directly related to pipeline transportation increased by 2.68% per year from 2013 to 2019
- The price of WTI in 2013 was \$98.97/bbl and \$57/bbl in 2019
- The price of natural gas (Henry Hub) was \$3.73 in 2013 and \$2.56 in 2019 per million BTU
- Texas Rig Count was 843 at end of year 2013 and 406 at end of year 2019
- Texas Real Gross Domestic Product grew at an annual rate of 3.35% from 2013-2019
- The value added to Texas Real Gross Domestic Product accounted for by the economic impact generated from the Texas Pipeline industry was 1.2% in 2013 and over 1.6% in 2019

The oil and gas industry has continued to see increases in well productivity and efficiency gains due to a number of improvements including drilling technology, completions, and other processes. The various petroleum engineering and geophysical factors that characterize Texas are the basis for many economic

benefits to the state. However, the realization of these benefits depends critically on a pipeline transportation system that will also play a vital role in the future development of the Texas economy. The economic benefits arising from the existence and continuing operations of the oil and gas pipeline industry are quantified in terms of employment, labor income (including proprietor's income), value added (or additions to gross state product), and output (i.e., gross revenues). Additionally, this study provides a comprehensive analysis of the tax base associated with the industry. Specifically, this study estimates economic impact for the year ending 2019 and quantifies the benefits that Texans may expect to see over the next 40 years.

Objectives and Methodological Approach

The major objective of this study is to quantify the economic impact of the Texas oil and gas pipeline industry. Specifically, these impacts are in the form of jobs created and sustained, economic output as measured by the value of all industrial production in an area or region, value added to state gross domestic product, and various forms of state and local government revenues generated from the activities associated with this industry.

The analysis utilizes the IMPLAN economic impact modeling software. The original model was calibrated to capture the underlying factors of economic activity in Texas using historical economic, geophysical, and petroleum engineering data. The updated study accounts for the underlying petroleum engineering aspects of the oil and gas supply chain, which when combined with energy economic analysis allow for the estimation of the impacts of the industry.

Economic Impacts of Texas Oil and Gas Pipeline

The transportation of oil and gas in Texas entails a number of different specialized activities. These activities generate significant economic benefits by creating and sustaining jobs, income, value added and output. In addition, the industry provides important state and local government revenues that benefit the citizens of the state.

A set of economic models, referred to as *input-output* (I-O) models by economists, was constructed to measure the economic impact of the oil and gas pipeline industry on the Texas economy. The basis of an economic impact model is the spending patterns of individuals and businesses in the region being studied. In particular, expenditures by firms engaged in the ongoing operations and construction of oil and gas pipeline on equipment and supplies occur within the state and elsewhere, while oil and gas pipeline employees tend to spend the majority of their income more locally. Economists generally categorize the economic impacts from these expenditures into two types of effects: direct and secondary. Direct effects represent those expenditures within the region of the industry being studied. Direct effects lead to secondary effects in the form of business-to-business transactions in the region (e.g., to restore inventory) referred to as indirect effects and also to new income in the form of wages and salaries, rent and interest payments, payments to proprietors and stockholders for investment, etc. also known as induced effects. For purposes of this study, economic output (i.e., gross revenues) refers to the value of all industrial production (i.e., mining, services, retail trade, manufacturing, etc.) in the state, following the convention used by the U.S. Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA), jobs are defined as the average annual number of jobs in a sector, industry, or region, while labor income consists of all forms of employment income, including employee compensation (wages and benefits) and proprietor income, and value added indicates the addition to Gross State Product.

The economic model identifies the “linkages” within the economy that exist between businesses (or enterprises) and other businesses, and businesses (or enterprises) and final consumers. From the economic model, a set of industrial sector “economic multipliers” unique to the state economy are calculated. These multipliers are used to provide a comprehensive assessment of the economic impact of the oil and gas pipeline industry. Specifically, the economic impact analysis provides information as to the number of jobs created and sustained by the ongoing operation of the industry, the income added to the state economy from the industry’s operations, which includes household income or earnings, and the total output (in dollars) that industry contributes to the economy. Similarly, economic impacts are generated from the construction of new pipeline and related infrastructure (i.e., plants, meter stations, etc.); however, unlike ongoing operations, construction related impacts are shorter-lived, typically assumed to last one year in an economic impact analysis. An interesting feature of the Texas pipeline industry is that, given the current energy outlook, it is possible that major construction projects will continue to arise throughout the foreseeable future, thus providing economic benefits over a number of years.

For purposes of this report, the economic models were constructed for 2019, the last full year for which all data are available. In order to estimate the economic impact and contribution of the Texas oil and

gas pipeline industry in 2019 we follow the convention of first estimating industry sales and using “data internal to the model to identify all backward linkages in the study area related to the subject.” (IMPLAN) Construction related impacts are derived from estimates of construction expenditures for net new pipeline mileage utilizing data from *Oil and Gas Journal* annual cost survey, the Economic Information Administration (EIA), and a proprietary data. Pipeline mileage data (historical, current and net new) come from the Railroad Commission of Texas. The analysis was conducted using the IMPLAN Version 3.0 software package. For purposes of this study, and following convention of economic impact research, the core sector was defined as pipeline transportation or new non-residential construction (pipeline other than sewer and water) where, for the latter, local purchase percentage adjustments are accounted for to accurately reflect actual expenditures.

Cumulative impacts over 40 years are expressed in today’s dollars using a proprietary algorithm that takes into account growth, inflation, and discount rates. Projected future jobs are estimated using a proprietary algorithm that takes into account industry data such as job growth, changes in pipeline mileage, and an adjustment factor for advances in technology that capture increases in economies of scale. More information as to methodology utilized may be found in the 2014 economic impact study.

The 2019 Economic Impact of the Texas Oil and Natural Gas Pipeline Industry

2019 Economic Impacts from Operations

The following table summarizes the 2019 operations-related impacts of the pipeline industry for the state of Texas. There were almost 19,000 jobs in the Texas pipeline industry in 2019 and nearly \$13 billion of gross output value generated from ongoing operations. Total impacts (i.e., direct, indirect and induced) from pipeline operations generated and/or sustained 157,000 jobs in Texas. Moreover, the operations-related activities of the industry generated \$35.2 billion in output, and contributed more than \$22.4 billion in total gross state product, i.e., value added. The existence of the pipeline industry generates substantial economic activity and economic benefits to Texas.

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Total Value Added</i>	<i>Output</i>
Direct Effect	18,957	\$18,939,077,944	\$9,993,478,223	\$12,950,712,154
Indirect Effect	19,015	\$1,210,379,774	\$1,761,199,015	\$3,250,612,048
Induced Effect	119,489	\$6,118,318,189	\$10,719,387,457	\$18,961,126,425
Total Effect	157,461	\$26,267,775,907	\$22,474,064,694	\$35,162,450,626

Note: Labor income, total value added and output are measured in current dollars (\$).

Pipeline transportation operations-related activity impacts various sectors differently. The following table illustrates the impacts for the top ten sectors in Texas, ranked by employment. The values clearly illustrate the demand for workers in these sectors is quite high and varied. These sectors benefit greatly from the presence of the oil and gas pipeline industry across Texas.

Description	Employment	Labor Income	Value Added	Output
Pipeline transportation	18,957	\$18,939,077,944	\$9,993,478,223	\$12,950,712,154
Full-service restaurants	6,644	\$176,395,812	\$262,357,652	\$456,644,343
Limited-service restaurants	6,098	\$138,776,163	\$221,079,346	\$476,453,518
Hospitals	5,063	\$447,624,600	\$504,915,955	\$929,053,876
Other real estate	4,310	\$137,143,210	\$281,045,940	\$787,122,190
Employment services	4,295	\$209,153,222	\$355,732,046	\$517,249,772
Other financial investment activities	3,917	\$103,525,512	\$114,753,378	\$430,544,478
Retail - General merchandise stores	3,391	\$109,936,648	\$166,630,411	\$259,411,857
Offices of physicians	3,304	\$375,161,225	\$439,321,353	\$636,044,481
All other food and drinking places	3,053	\$103,965,694	\$132,836,340	\$200,373,385

Note: Labor income, total value added and output are measured in current dollars (\$).

2019 Economic Impacts from Construction

The following table summarizes the 2019 construction-related impacts of the pipeline industry for the state of Texas. The expansion of construction of pipeline in 2019 resulted in nearly 29,000 construction jobs and nearly \$5.5 billion of gross output value generated from construction. Total impacts (i.e., direct, indirect and induced) from construction generated and/or sustained over 73,000 jobs in Texas. Moreover, the construction-related activities of the industry generated \$13.5 billion in output, and contributed \$6.9 billion in total gross state product, i.e., value added. The existence of the pipeline industry generates substantial economic activity and economic benefits to Texas.

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Total Value Added</i>	<i>Output</i>
Direct Effect	28,857	\$4,284,856,299	\$2,517,203,812	\$5,454,759,258
Indirect Effect	13,496	\$948,040,091	\$1,590,864,751	\$3,105,589,556
Induced Effect	30,870	\$1,582,052,646	\$2,779,442,320	\$4,915,091,598
Total Effect	73,223	\$6,814,949,035	\$6,887,510,883	\$13,475,440,413

Note: Labor income, total value added and output are measured in current dollars (\$).

Pipeline transportation construction-related activity impacts various sectors differently. The following table illustrates the impacts for the top ten sectors in Texas, ranked by employment. The values clearly illustrate the demand for workers in these sectors is quite high and varied. These sectors benefit greatly from the presence of the oil and gas pipeline industry across Texas.

Description	Employment	Labor Income	Value Added	Output
Construction of other new nonresidential structures	28,857	\$4,284,856,299	\$2,517,203,812	\$5,454,759,258
Full-service restaurants	1,789	\$47,504,709	\$70,654,874	\$122,977,730
Limited-service restaurants	1,624	\$36,972,442	\$58,899,476	\$126,935,705
Other real estate	1,533	\$48,786,863	\$99,978,334	\$280,008,191
Retail - Building material and garden equipment and supplies stores	1,350	\$60,928,366	\$117,975,746	\$165,991,997
Hospitals	1,291	\$114,181,229	\$128,795,255	\$236,985,442
Truck transportation	1,044	\$66,486,699	\$77,011,297	\$172,299,215
Other financial investment activities	996	\$26,335,314	\$29,191,513	\$109,523,962
Employment services	996	\$48,479,322	\$82,454,616	\$119,892,576
Retail - General merchandise stores	946	\$30,659,092	\$46,469,828	\$72,344,683

Note: Labor income, total value added and output are measured in current dollars (\$).

2019 Total Economic Impacts from Pipeline Operations and Construction Activities

The following table summarizes the 2019 operations- and construction-related impacts of the pipeline industry for the state of Texas. The total pipeline impacts in 2019 resulted in 47,814 direct jobs and \$18.4 billion of gross output. Overall, the total impacts (i.e., direct, indirect and induced) from operations and construction generated and/or sustained over 230,000 jobs in Texas. Moreover, the pipeline-related activities generated \$48.6 billion in output, and contributed \$29.4 billion in total gross state product, i.e., value added. The existence of the pipeline industry generates substantial economic activity and economic benefits to Texas.

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Total Value Added</i>	<i>Output</i>
Direct Effect	47,814	\$23,223,934,243	\$12,510,682,035	\$18,405,471,412
Indirect Effect	32,511	\$2,158,419,864	\$3,352,063,765	\$6,356,201,604
Induced Effect	150,359	\$7,700,370,834	\$13,498,829,777	\$23,876,218,023
Total Effect	230,684	\$33,082,724,942	\$29,361,575,577	\$48,637,891,039

Note: Labor income, total value added and output are measured in current dollars (\$).

The preceding discussion and tables highlighted the economic benefits created and sustained by the ongoing operations and recent expansions (i.e., construction) associated with the Texas oil and gas pipeline industry. When interpreting impact results it is important to recognize that some capital or income leaves the Texas economy as not all monies spent are entirely contained within the state (i.e., there are out-of-state impacts not measured here). Generally speaking, the larger the study area, the more able the model is to capture the spending and consequently reduce the capital or income that flows to regions outside the study area. Moreover, standard economic impact analysis follows the convention used by the U.S. Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA) in which jobs are defined as the average annual number of jobs in a sector, industry, county or region over a period of time such as a month or year. For example, a 40 hour per week job is equivalent to two part-time jobs.

The Texas pipeline industry also generates other economic benefits that are not measured in terms of current jobs, income, value added and output. The IMPLAN economic impact model provides estimates for taxes on production and imports, property, and various other taxes. In 2019, the operations and construction activities of the Texas pipeline industry accounted for \$2,726,208,747 in state and local government revenues.

Of those state and local government revenues, a typical Texas county receives an estimated \$12,350 in property taxes per year for each mile of pipeline located in their county. Counties containing meter stations and associated infrastructure may also receive property tax revenues on those properties but

that value is not included in the “per mile” figure. County property tax revenue estimates are based on information provided by a sample of Texas counties Independent School District taxing authorities and county tax assessor offices. Depending on the actual location of the pipeline, there may be additional taxable value assessed by numerous other taxing authorities.

Quantifying the Future Economic Impacts of the Texas Oil and Gas Pipeline Industry

Pipeline infrastructure is a long-lasting asset that produces benefits for years to come. One way in which economists estimate benefits that are generated over many years is to compute the cumulative impact for those impacts that are expressed in dollars. For purposes of this study, the cumulative economic impacts are quantified by conservatively estimating the stream of benefits, which effectively represent cash flows, over 40 years and discount the future values to today's dollars. Cumulative impacts refer to the amount of total impact generated over the next 40 years from pipeline operations and construction and are presented in today's dollars. Additionally, the amount of employment that can be attributed to the existence of Texas pipeline operations and construction 40 years in the future is conservatively estimated. All dollar figures are expressed in Present Value (i.e., in today's dollars).

Cumulative Economic Impacts over the Next 40 Years from Operations:

Cumulative additions to the Gross State Product of Texas will exceed \$691.07 billion

Cumulative additions to Economic Output in Texas will exceed \$1.08 trillion

Cumulative additions to state and local government revenues will exceed \$70.88 billion

Cumulative Economic Impacts over the Next 40 Years from Construction:

Cumulative additions to the Gross State Product of Texas will exceed \$211.79 billion

Cumulative additions to Economic Output in Texas will exceed \$414.36 billion

Cumulative additions to state and local government revenues will exceed \$12.95 billion

Cumulative Economic Impacts over the Next 40 Years from Operations and Construction:

Cumulative additions to the Gross State Product of Texas will exceed \$902.86 billion

Cumulative additions to Economic Output in Texas will exceed \$1.49 trillion

Cumulative additions to state and local government revenues will exceed \$83.83 billion

Of those state and local government revenues, the present value (i.e., in today's dollars) cumulative property tax revenues over the next 40 years generated per mile of pipeline for a typical Texas county is \$380,000. The conservative estimate is based on 2019 miles, assumes no additional net pipeline mileage change and no change in tax rates. Counties containing meter stations and associated infrastructure may also receive property tax revenues on those properties over the next 40 years but

that value is not included in the “per mile” figure. County property tax revenue estimates are based on information provided by a sample of Texas counties Independent School District taxing authorities and county tax assessor offices. Depending on the actual location of the pipeline, there may be additional taxable value assessed by numerous other taxing authorities.

Projected Texas Employment in 40 Years from Operations and Construction of Pipelines:

The operations and construction of pipelines over the next 40 years will lead to a greater number of Texans being employed. Conservatively accounting for historical growth trends in new pipeline mileage, the number of workers directly involved with pipeline operations and their construction, and advances in technology that result in economies of scale, the economic impact on jobs attributed to the operation and construction of Texas pipelines will exceed 492,000. Overall, the existence of the pipeline industry will generate substantial economic activity and economic benefits to Texas for years to come.

Summary

The oil and gas pipeline industry is an important driver of economic activities in the state of Texas and beyond. The industry's activities generate and sustain jobs, income, and output and contribute to state and local government revenues. The total effects from construction and operation are estimated to include 238,000 jobs, \$48.6 billion in output, and \$29.3 billion in value added in 2019. The industry provides substantially to the gross state product of Texas.

Even with the changes in prices and industry cycles experienced over the last several years, the innovations and discoveries in both plays and technologies have given rise to increased production of oil and gas and have led to additional demands on the pipeline system. Provided that the pipeline industry maintains effective transportation capabilities, it will continue to generate economic benefits that will likely impact Texas for years to come.

Conservative projections show that over the next 40 years, the Texas pipeline industry will generate cumulative economic impacts (in today's dollars) of around \$1.49 trillion in economic output, \$903 billion in additional gross state product, and contribute \$84 billion in state and local government revenues. Additionally, the industry will continue to sustain jobs each and every year in the state of Texas and the employment impacts will grow over time. The projected state-wide jobs impact from the operations and construction of pipelines will grow from 238,000 in 2019 to well over 492,000 workers in 40 years.

Overall, the pipeline industry plays a vital and valuable role in both oil and gas activities and broader economies across Texas. The state of Texas competes to attract and retain companies engaged in the exploration, production, processing and refining of oil and natural gas. The confirmed Resource Plays and Reservoirs in Texas can result in decades of drilling activity, thus sustaining or increasing production. The pipeline transportation system is a key component in the realization of value and the associated economic benefits that will come from the continued growth and expansion of the oil and gas industry.

A pipeline system capable of effectively handling increased levels of oil and gas activity is necessary for oil and gas companies to find it economic to operate in Texas. From an economic standpoint, the ability to retain and attract oil and gas investments requires a pipeline system that can manage the flow of hydrocarbons in a timely and cost-effective manner. Accordingly, as shown in this study, the economic benefits attributable to the pipeline system are substantial in the state of Texas. Moreover, the upstream and downstream portions of the energy industry (i.e., exploration and production, refining activities, etc.) will generate even more economic benefits to Texas in the form of additional economic impacts provided that these companies have an efficient and effective way to transport their product.

Definitions of a Few Key Terms Used in Economic Impact Analysis

(Heavily adapted from Principles of Impact Analysis and IMPLAN Applications, F. Day, 1st edition):

Employment – total annual average jobs (converted to a full-time basis)

Labor Income – sum of employment compensation and proprietor income, the latter of which represents the excess of revenue over explicit production cost of owner-operated businesses

State and Local Government revenues – comprised of (1) Indirect Business Taxes, that is, payment to governments except for payroll and end-of-year income taxes; includes excise taxes, sales taxes, customs taxes, and various fees; and (2) Other Property Type Income which includes profits, capital consumption allowances, payments for rent, royalties and interest income

Value Added – is analogous to the US Gross Domestic Product but at the state level and is comprised of labor income, indirect business taxes, and other property type income (often referred to as Gross Regional or State Product)

Intermediate Inputs – the goods and services produced by one industry that will be incorporated in the production of another industry (i.e., materials and services, other than employment, required to create products)

Output – total value of an industry' production, comprised of intermediate inputs and value added

Economic Multiplier – describes the total output, value added, labor income, or employment generated as a result of one dollar (or job) of output, value added, labor income, or employment in the target (or core) industry

IMPLAN – a software package designed to estimate economic impacts

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