



Regional Economic Impact Analysis for the Fenner Gap Mutual Water Company Northern Pipeline



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Executive Summary

Fenner Gap Mutual Water Company (FGMWC) proposes to convert approximately 155 miles of an existing pipeline in Southern California (Northern Pipeline) between Cadiz, California in San Bernardino County and Mojave, California in Kern County, for the transportation of water (the Northern Pipeline Conversion). This report summarizes the regional economic impacts of the Northern Pipeline Conversion. The short-term (construction) regional economic impacts are provided for each year of proposed construction (2025 and 2026). Based on best available information about costs and investment associated with the Northern Pipeline Conversion, the long-term (operations) regional economic impacts are estimated as a reasonable range between lower and higher annual investment levels.

The analysis is conducted using an input-output model called IMPLAN. The investment during construction of the Northern Pipeline Conversion is anticipated to be approximately \$35 million in 2025 and approximately \$226 million in 2026. This direct investment creates additional economic ripple effects throughout the region. The project stimulates supplier industries that provide materials and services for construction (indirect impacts), while the resulting boost in wages and business income leads to increased household spending in the local economy (induced impacts). Together, these direct, indirect, and induced effects make up the total economic impact of the project. Construction of this project will generate over \$50 million in total economic activity in 2025 and more than \$330 million in 2026 (combining direct, indirect, and induced impacts). These investments will support more than 300 jobs in 2025 and close to 1,900 jobs in 2026. The associated fiscal benefits through state and local taxes are estimated at more than \$2 million in 2025 and almost \$16 million in 2026. The analysis assumes construction will begin in 2025. Should construction start later, the economic benefits would be delayed but remain the same as all results are presented in current (2025) dollars. In other words, impacts presented in this report for 2025 correspond to Year 1 of construction activity and 2026 corresponds to Year 2, regardless of when construction begins. The results of this analysis are shown in Table ES-1.

Table ES-1. Construction Benefits for Each of the Two Years - Millions of 2025 Dollars

Impact Year	Total Economic Activity	Jobs	Labor Income	State and Local Taxes
2025	\$52.59	317	\$20.76	\$2.48
2026	\$333.03	1,862	\$127.91	\$15.93

The total annual labor income associated with project operations of the Northern Pipeline is anticipated to be between \$4.6 million and \$5.7 million. During the operations phase, energy costs are estimated at \$11.3 million to \$13.8 million annually and are included in the total economic activity. Both annual labor income and energy costs are the direct impacts used in the long-term (operations) IMPLAN model (labor costs and economic activity or “output”). The total (direct, indirect, and induced) annual benefits of annual operations of the project are approximately \$17 million to \$21 million in economic activity and

between 46 and 56 annual jobs, with fiscal benefits of around \$3 million. The total results of this analysis are provided in Table ES-2.

Table ES-2. Operations Benefits Range (Annual) - Millions of 2025 Dollars

Impacts	Economic Activity	Jobs	Labor Income	State and Local Taxes
Low	\$17.28	46	\$4.64	\$2.77
High	\$21.12	56	\$5.68	\$3.38

1. Overview

This economic analysis relates to the planned conversion of approximately 155 miles of an existing pipeline in Southern California (Northern Pipeline) from oil/natural gas to water conveyance by Fenner Gap Mutual Water Company (FGMWC). FGMWC is a California nonprofit mutual benefit corporation formed by Cadiz in 2010 (previously under the name Fenner Valley Mutual Water Company) whose purpose is to develop, acquire, purchase, distribute, supply, and deliver water on a wholesale basis to its members for irrigation, municipal, industrial, domestic or any other beneficial use at cost. FGMWC is exempt from California Public Utilities Commission jurisdiction under California Public Utilities Code § 2701. FGMWC plans to utilize the Northern Pipeline to transport water between points along the Northern Pipeline route, establishing interties with existing water infrastructure and communities. This would enable the Northern Pipeline to become a regional water infrastructure asset, providing access to new water supplies and groundwater storage facilities that will improve reliability for more than 100 public water systems throughout southern California.

Greene Economics, LLC (Greene Economics) carried out an analysis of the regional economic impacts of construction and operation of the Northern Pipeline Conversion project using IMPLAN to model the regional economic impacts in San Bernardino, Kern, and Riverside counties for the two phases (construction and operations) of the project.

1.1. About the Northern Pipeline

The Northern Pipeline was originally constructed by Plains All American Pipeline Company between 1985 and 1988 as part of a 1,088-mile-long oil pipeline extending from Texas to the California Coast. In 2001, El Paso Natural Gas (EPNG) purchased the pipeline from Plains All American and converted the pipeline for natural gas conveyance from 2001 to 2005. In 2005, EPNG opted to not put the approximately 220-mile portion of the pipeline from Cadiz to Wheeler Ridge into service for natural gas conveyance and, instead, cleaned the pipeline and established an internal nitrogen blanket with cathodic protection. In 2011, Cadiz Real Estate (CRE) entered into an option agreement to purchase the Northern Pipeline from EPNG to potentially use the pipeline for water conveyance and in 2021 CRE completed the purchase of the pipeline.

The conversion of the existing 30-inch diameter buried Northern Pipeline for water conveyance will require the construction of seven pump stations along the pipeline alignment; the construction of a holding pond for the retention of flushed and hydrostatic testing water; the installation of air release/air vacuum valves and blow-off valves along the existing pipeline; the repair and replacement of the existing cathodic protection system along the pipeline; and the rehabilitation, if necessary, of certain portions of the pipeline. See Figure 1-1 for a map of the Northern Pipeline and planned facilities.



Figure 1-1. Map of Northern Pipeline

When converted, the Northern Pipeline will have the capacity to convey approximately 25,000 acre-feet per year (AFY). The use of the Northern Pipeline for the transport of water would increase water conveyance and storage infrastructure across underserved areas of California and enhance the resiliency of the water supply system in California. In recent years, water from both the State Water Project (SWP) and Colorado River have been subject to mandatory emergency conservation measures during severe and prolonged drought conditions. Such conditions limit access to reliable water - particularly in rural and disadvantaged communities - including communities along the Northern Pipeline route, which traverses portions of the High Desert. The Northern Pipeline is the only existing pipeline capable of transporting 25,000 AFY of water to nearby communities. The use of the Northern Pipeline to transport water will enhance regional water supply management and resilience. Once converted for water conveyance, the Northern Pipeline will be used to transport water from Cadiz Ranch.

1.2. Key Issues and Questions

This analysis quantifies, where possible, the expected regional economic benefits of the conversion of the Northern Pipeline in terms of creating project-supported jobs (including estimates of the associated labor income), and opportunities for an improved state and local tax base. In addition, the analysis quantifies the benefits of the Northern Pipeline operations and expenditures as they ripple through the regional economy.

2. Technical Approach

Four separate input-output models were used to analyze the regional economic impacts of the conversion of the Northern Pipeline. These models calculated the ranges of annual impacts (low and high) for operations and estimated annual impacts for each of the two construction years. The two-phase models (construction or short-term, and operations or long-term) are built using data for San Bernardino, Kern, and Riverside counties, California. The IMPLAN model produces estimates of economic activity, jobs, labor income, and fiscal or tax impacts. Project-specific input data for each of the construction year models and the operations are provided by the client, with calculations for the range (high and low) of operational expenditures developed and presented by Greene Economics.

2.1. About the IMPLAN Model

The anticipated regional economic impacts of construction and operation associated with converting the Northern Pipeline for water conveyance are estimated using an input-output model for the region combining San Bernardino, Kern, and Riverside counties, California. An input-output model is a technique that quantifies the interactions between industries in an economy. These models yield multipliers that can be used to calculate the total direct, indirect, and induced impact on jobs, income, and output resulting from a dollar of spending on goods and services in a specified geography. The model used to estimate economic impacts for this study is IMPLAN, which is an input-output model developed by the United States government and the University of Minnesota (available now from IMPLAN.com). IMPLAN was chosen because it uses regional data compiled from multiple sources involving hundreds of industrial sectors. In addition to being widely used in regional economic analysis, the model and its methodology have been extensively reviewed in professional and economic journals.

IMPLAN data come from various sources. Employment and wage and salary income data at the state and county levels are from the Bureau of Labor Statistics. Data regarding national-, state-, and county-level proprietors, proprietor income, and the relationship between employee compensation and wage and salary income (to infer benefits) are from the Bureau of Economic Analysis. Data from the U.S. Census Bureau include the number of firms by size at the national, state, county, and zip-code levels.

IMPLAN model results produce three types of estimates. These are: (1) direct effects, (2) indirect effects, and (3) induced effects. These impacts represent different, yet related, responses to development of the conversion project. Each of the three is described briefly below:

- **Direct** impacts indicate the initial change in economic activity due to the project. Direct impacts capture project activities and activities in other industries that directly support the project in the region. Direct impacts measure the total amount of economic activity in terms of the value and employment in the local economy directly due to the project. The direct impacts measure employment including, but not limited to, construction workers on the ground as well as support positions in offices, and those providing planning and management services.
- **Indirect** impacts measure the response of local industries to demand from inter-industry transactions. The indirect impacts trace the “ripple effect” through the local economy as local industries vary in terms of output and employment based on the demand generated from project-related activities.

- **Induced** impacts are the responses in local industries from changes in household incomes generated from direct and indirect effects (this is a further “ripple” derived from the original direct impacts).

2.2. Input Data and Sources

The expenditure data for both the construction and operational phases of the Northern Pipeline are obtained from FGMWC. The data are then separated between construction and operational phases. Total construction investment is provided by FGMWC for each year of construction (2025 and 2026). A low and a high estimate of costs for the operations phase are developed to allow for uncertainty in the estimated costs. The range for the operational phase is the estimated operational costs minus 10 percent for the low end of the range, and plus 10 percent for the high end of the range. These base data are defined as the direct impacts.

For the construction phase analysis, the IMPLAN models evaluate impacts using Industry Output data for all construction elements. For the operational phase analysis, the IMPLAN models evaluate impact using both Industry Compensation and Industry Output for the various operational elements.

2.3. Model Assumptions

The project includes two phases, each analyzed with a separate group of IMPLAN models and assumptions. The two phases are defined as:

1. **Short-term Construction Phase**, which includes improvements to the 25,000 AFY Northern Pipeline within the boundaries of San Bernardino, Kern, and Riverside counties, California. This will occur over two years, between 2025 and 2026.
2. **Long-term Operation Phase**, which includes operation of the 25,000 AFY Northern Pipeline within the boundaries of San Bernardino, Kern, and Riverside counties, California.

It should be noted that any cost estimates provided by FGMWC are only in reference to the Northern Pipeline Conversion project, which includes the construction of pumping stations and installation of other appurtenant facilities. This information does not provide estimates of the cost to construct and operate FGMWC’s Water Project, such as the development of any other pipelines or well field infrastructure.

2.3.1. Construction

The direct impact inputs for the short-term model, Construction, are provided by FGMWC by construction element, (e.g., booster pumping stations, natural gas generators, natural gas connections, cleaning and in-line inspection of pipeline). These estimated costs were provided by the client by month on a projected construction schedule between 2025 and 2026.¹ These elements are summed by IMPLAN sector for each calendar year of construction. All direct impact inputs are in 2025 dollars modeled as Industry Output. Construction costs include considerable uncertainty concerning the project impact on

¹ The analysis assumes construction will begin in 2025. However, should construction start later, the economic benefits would be delayed but remain the same, as all estimated benefits are in current (2025) dollars. In other words, impacts presented in this report for 2025 correspond to Year 1 of construction activity and 2026 corresponds to Year 2 regardless of when construction begins.

the economy. Therefore, the costs of each element are considered conservative estimates. Total direct impact inputs are estimated to sum to approximately \$35 million for 2025 and about \$226 million for 2026. As IMPLAN provides an annual analysis, two construction analyses are developed using each of these respectively for the annual direct impact inputs for 2025 and 2026. Table 2-1 provides the details for the total input values for industry output by IMPLAN sector for each year of construction.

Table 2-1. Construction Annual Input Values for San Bernardino, Kern, and Riverside Counties

Activity	IMPLAN Sector	2025 US Dollars (Millions)	
		Total Industry Output	
		2025	2026
Northern Pipeline Construction ²	51 - Construction of other new nonresidential structures	\$28.39	\$220.74
Northern Pipeline Engineering and Construction Management	444 - Management consulting services	\$6.56	\$4.76
TOTAL		\$34.95	\$225.50

2.3.2. Operations

The direct impact inputs for the long-term model, Operations, were provided by FGMWC by operational element (e.g., labor, power). The low-range scenario includes the costs provided by FGMWC less 10 percent, and the high-range scenario includes the provided costs plus 10 percent. These operational elements are then summed up by IMPLAN sector. All direct impact inputs are in 2025 dollars, with Operations Employee Compensation (ranging between \$0.75 million to \$0.92 million) being modeled as industry employee compensation and operations power (ranging between \$11.3 million and \$13.8 million) modeled as Industry Output. These are not additive, as Industry Employee Compensation is one component of Industry Output and is, therefore, not directly linked between sectors. Total direct impact inputs for the full range (low and high) of the operational scenario for both elements of the analysis are provided in Table 2-2.

² “Construction” does not mean construction of a new pipeline, but rather construction of supporting facilities needed for water conveyance.

Table 2-2. Operations Input Values for San Bernardino, Kern, and Riverside Counties

Activity	Impact Type	IMPLAN Sector	2025 US Dollars	
			Low	High
Northern Pipeline Operations Labor	Industry Employee Compensation	44: Water, sewage, and other systems	\$750,201	\$916,913
Northern Pipeline Operations Power	Industry Output	43: Natural gas distribution	\$11,250,000	\$13,750,000

3. Regional Economic Impact (IMPLAN) Results

This section shows the results of the regional IMPLAN modeling, providing breakdowns for economic activity (Gross Domestic Product, or “GDP”), job creation, labor income, and fiscal (tax) impacts. The summary tables provide tabulations on the potential impact of both the construction and operational scenarios for the Northern Pipeline Conversion project, with ranges of values for each. Section 3.1 presents the results of the annual construction models, while section 3.2 discusses the annual operations impacts.

3.1. Construction

Tables 3-1 and 3-2 illustrate the ripple effects (direct, indirect and induced) of the Northern Pipeline Conversion project construction activities to the region for each of the two years of construction, 2025 and 2026, respectively. The two-year construction period of the project will result in an average annual 1,089 jobs created (317 jobs in 2025 and 1,862 jobs in 2026), total labor income impacts of about \$149 million (\$21 million in 2025 and \$128 million in 2026), and total economic activity impacts of almost \$386 million (\$53 million in 2025 and \$333 million in 2026). The total state and local fiscal impacts are estimated at over \$18 million (\$2 million in 2025 and \$16 million in 2026). Direct employment and income are calculated based on the IMPLAN model and data based on the direct economic impacts of the Northern Pipeline Conversion project construction activities. It should be noted that direct employment includes more than the construction workers physically converting the Northern Pipeline for water transportation. Direct employment also includes support positions in offices, as well as those providing planning and management services. Further, since the input is only the economic activity (costs) of construction, and the construction cost is materials-heavy, the input may generate a higher-than-expected employment number.

Table 3-1. Construction 2025 - Millions of 2025 Dollars

Impacts	Economic Activity	Jobs	Labor Income	State and Local Taxes
Direct	\$34.95	220	\$15.42	\$0.95
Indirect	\$7.80	38	\$2.35	\$0.68
Induced	\$9.83	58	\$2.99	\$0.85
Total	\$52.59	317	\$20.76	\$2.48

Table 3-2. Construction 2026 - Millions of 2025 Dollars

Impacts	Economic Activity	Jobs	Labor Income	State and Local Taxes
Direct	\$225.50	1,302	\$96.04	\$5.92
Indirect	\$47.10	204	\$13.52	\$4.81
Induced	\$60.42	356	\$18.35	\$5.20
Total	\$333.03	1,862	\$127.91	\$15.93

3.1.1. Economic Activity

Economic activity reflects how an investment or project impacts a defined economic area (i.e., statewide, regional, local), capturing the multiplier, or ripple effect of introducing a new source of production, spending, or purchasing. Economic activity is typically estimated as a measure of GDP, which is the total market value of all final goods and services produced within a defined area in a given period of time (typically a year); in IMPLAN, this is denoted as output. For this project, total economic output from construction is estimated at \$53 million in 2025 and \$333 million in 2026 (see tables 3-1 and 3-2, respectively). Of these, \$35 million in 2025 and \$226 million in 2026 are directly from the project. In addition to direct impacts, \$8 million in 2025 and \$47 million in 2026 are due to indirect impacts (accrued from inter-industry demand). The total economic output also includes \$10 million in 2025 and \$60 million in 2026 due to induced impacts (accrued from household spending). These results indicate an average (over the two construction years) economic activity multiplier of 1.49, meaning that for every \$1 invested directly, economic activity increases by \$1.49 in the region.

3.1.2. Job Creation

The regional economic impact stimulated by the Northern Pipeline Conversion project construction activities results in a total of 317 jobs in 2025 and 1,862 jobs in 2026 (see tables 3-1 and 3-2, respectively). Of the total jobs, 220 jobs in 2025 and 1,302 jobs in 2026 are direct jobs from the Northern Pipeline Conversion project construction activities. Job creation numbers include jobs in various sectors including, but not limited to construction, administration, engineering, and management. Another 38 jobs in 2025 and 204 jobs in 2026 would be created due to indirect impacts of project construction activities. In addition to the direct and indirect jobs, 58 jobs in 2025 and 356 jobs in 2026 would stem from the induced impacts of project construction activities within the region. This indicates an average (over the two construction years) employment multiplier of 1.43, meaning that for every job created by Northern Pipeline Conversion project construction activities, over 1 job is created throughout the region.

3.1.3. Labor Income

Labor income reflects the total value of all forms of employment income paid throughout a defined economy during a specified period of time. Further, labor income represents the combined cost of total payroll paid to employees (e.g., wages and salaries, benefits, payroll taxes) and payments received by self-employed individuals and/or unincorporated business owners across the defined economy. As provided in tables 3-1 and 3-2, total labor income impacts for the short-term construction phase are estimated at \$21 million in 2025 and \$128 million in 2026, respectively. Of these, \$15 million in 2025

and \$96 million in 2026 are from direct jobs created by the construction of the project. In addition to direct labor income impacts, \$2 million in 2025 and \$14 million in 2026 are due to indirect impacts. The labor income due to project construction also includes \$3 million in 2025 and \$18 million in 2026 due to induced impacts. These results indicate an average (over the two construction years) labor income multiplier of 1.34, meaning that for every direct dollar for project labor, total labor income in the region increases by \$1.34.

3.1.4. Fiscal Impacts

Temporary new jobs and economic growth stemming from the project will produce new revenue streams for California through the project’s contribution to state and local taxes during the construction phase. These are modelled and estimated in IMPLAN on an annual basis for several levels of taxing jurisdictions, from local to federal. For the purposes of this analysis, the focus is on taxes paid to the State of California and local jurisdictions. The direct state and local taxes during the two-year construction period are estimated at \$2 million in 2025 and \$16 million in 2026 (see tables 3-1 and 3-2, respectively). Of these, \$1 million in 2025 and \$6 million in 2026 are directly related to the Northern Pipeline Conversion project construction activities. Another \$1 million in 2025 and \$5 million in 2026 would be due to indirect impacts of project construction activities. In addition to the direct and indirect fiscal impacts, \$1 million in 2025 and \$5 million in 2026 would stem from the induced impacts of project construction activities within the region.

3.2. Operations

Tables 3-3 and 3-4 illustrate the ripple effect on an average annual basis of long-term operations of the project to the region, which results in total job impacts of 46 to 56 jobs, labor income impacts between \$5 million and \$6 million per year, and economic activity impacts ranging from \$17 million to \$21 million. Total average annual state and local fiscal (tax) impacts are estimated at approximately \$3 million.

Table 3-3. Operations Low Range (Annual) - Millions of 2025 Dollars

Impacts	Economic Activity	Jobs	Labor Income	State and Local Taxes
Direct	\$12.90	19	\$3.19	\$2.47
Indirect	\$2.17	14	\$0.78	\$0.10
Induced	\$2.21	13	\$0.67	\$0.19
Total	\$17.28	46	\$4.64	\$2.77

Table 3-4. Operations High Range (Annual) - Millions of 2025 Dollars

Impacts	Economic Activity	Jobs	Labor Income	State and Local Taxes
Direct	\$15.76	23	\$3.90	\$3.02
Indirect	\$2.66	17	\$0.95	\$0.13
Induced	\$2.71	16	\$0.82	\$0.23
Total	\$21.12	56	\$5.68	\$3.38

3.2.1. Economic Activity

For the long-term operational phase of this project, total economic output ranges from \$17 million to \$21 million (see tables 3-3 and 3-4, respectively). Of this, \$13 million to \$16 million is direct impact from the project, with \$2 million to \$3 million due to indirect impacts (accrued from inter-industry demand), and another \$2 million to \$3 million due to induced impacts (accrued from household spending). These results indicate an economic activity multiplier of 1.34, meaning that for every \$1 invested directly to operations of the project, economic activity increases by \$1.34 in the region.

3.2.2. Job Creation

The long-term regional economic impact stimulated by the operation of this project results in a total of 46 to 56 annual jobs (see tables 3-3 and 3-4, respectively). Of those, 19 to 23 are direct jobs from the annual operation of the project, which include the direct employees of the project along with the additional energy jobs required to support the project's natural gas operational needs. Another 14 to 17 jobs are due to indirect impacts, with 13 to 16 additional jobs due to induced impacts within the region. This indicates an employment multiplier of 2.42, meaning that for every job created by long-term operation of the project, a total of over 2 jobs are created throughout the region.

3.2.3. Labor Income

As provided in Tables 3-3 and 3-4, total labor income impacts for the long-term operational phase of the Northern Pipeline Conversion Project range from \$5 million to \$6 million. Of that, \$3 million to \$4 million is directly related to operations of the project, with approximately \$0.8 million to \$1 million due to indirect impacts and another \$0.7 million to \$0.8 million related to induced impacts. These results indicate a labor income multiplier of 1.45, meaning that for every direct dollar for project operations labor, the total labor income in the region increases by \$1.45.

3.2.4. Fiscal Impacts

Permanent long-term new jobs and economic growth, stemming from operating the project, will produce new revenue streams for the state, through its contribution to state and local taxes during the construction phase. As with the short-term impacts, these are modelled and estimated in IMPLAN on an annual basis for several levels of taxing jurisdictions, from local to federal. For the purposes of the long-term operations analysis, the taxes paid to the State of California and local jurisdictions are also the focus. The direct state and local taxes over the long-term operational phase are estimated at approximately \$2.8 million annually to approximately \$3.4 million total per year (see tables 3-3 and 3-4, respectively).

4. Summary

This report provides the documentation and results of a regional economic impact analysis of the Northern Pipeline Conversion using IMPLAN.

The Northern Pipeline Conversion will provide both short-term (during construction) and long-term (during operations) beneficial economic impacts to the region in which it is located and vicinity, San Bernardino, Kern, and Riverside counties, California. Total benefits include not only the direct benefits from the Northern Pipeline Conversion construction activities and Northern Pipeline operations, but also the indirect benefits that occur from the response of local industries to demand from inter-industry transactions, as well as the indirect benefits that accrue from expenditures resulting from changes in household income generated from direct and indirect effects. The short-term construction benefits of the project are expected to occur over two years. Northern Pipeline Conversion project construction activities are expected to create a total of 317 jobs in 2025 and 1,862 jobs in 2026, with the total economic output from construction estimated at \$53 million in 2025 and \$333 million in 2026. The long-term ongoing operational benefits are expected to include approximately 46 to 56 annual jobs and approximately \$17 million to \$21 million in economic activity annually throughout the region, implying positive overall economic benefits to the region through indirect and induced impacts.

5. References

IMPLAN. 2025. San Bernardino County, California, Kern County, California, and Riverside County, California Data. Purchased at www.implan.com in July and October 2025.