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STATE

Glossary

Direct effects are the immediate (or first-round) consequences of a change in economic activity or policy. For example, if a firm spends \$1 million on construction of a new building, the direct effect on output (sales) in the construction sector is \$1 million. If eight workers are employed on the construction of the building, then those eight workers are also a direct effect.

Employment refers to jobs. Jobs may be full- or part-time and a single worker may be employed at multiple jobs.

Indirect effects occur as industries purchase inputs from other industries. If a construction project requires steel beams, there will be indirect effects on iron mining and coke producing industries.

Induced effects result from households spending the wage and salary income received by those employed directly or indirectly on a new activity.

Input-output model refers to a type of economic model designed to capture relationships among industries and ultimate consumers.

Intermediate spending refers to the demand of industry for the goods and services produced by other industries that will be used in the production process.

Labor income consists of employee compensation (including benefits), supplements to wages and salaries (such as employer contributions to pension funds), and proprietor's income.

Merchandise trade refers to international trade in goods: goods exports and goods imports.

Multi-Regional Input-Output (MRIO) expands the region of study to include more than one region of study, allowing for spillover effects to be calculated between regions.

Output refers to gross industry sales or expenditures, depending on the consequences.

Total effects refer to the sum of direct, indirect, and induced effects.

Value added refers to the change in value of a good or service during each stage of production. Gross Domestic Product is a value-added concept.⁵

⁵ (NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts | U.S., 2021)

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Conclusion

The purpose of this study is to estimate the economic benefits resulting from construction and ongoing operating activities of the Questa Green Hydrogen Hub.

Construction activities for the Questa Green Hydrogen Hub are expected to occur from 2024-2028 and total \$181.5 million in construction costs. Expected ongoing employment at the Questa Green Hydrogen Hub was estimated based on available data and estimation tools, and reviewed by Kit Carson Electric Cooperative representatives. We estimate O&M activities at the hydrogen production facility and solar power facilities will support 27 ongoing direct jobs, and 77 total jobs through indirect and induced effects.

Future development opportunities exist if hydrogen demand can be developed or identified near Questa. The Questa Green Hydrogen Hub has the potential to expand to a 100 MW hydrogen production facility from the initial 25 MW facility. Such an expansion would lead to a 300% increase in the economic impacts outlined in this report.

The economic impacts of the Questa Green Hydrogen Hub for construction and first year operations are summarized in Table 25:

Table 25: Estimated Economic Impact, Questa Green Hydrogen Hub

Impact	Construction (2024-2028)	O&M Employment (2029)	Total Construction and First Year Employment
Direct Jobs	1,349	27	1,376
Total Jobs	1,800	77	1,877
Labor Income	\$70,086,964	\$4,904,433	\$74,991,397
Value-Added Production	\$134,701,022	\$12,193,402	\$146,894,424
Economic Output	\$262,912,897	\$35,731,452	\$298,644,349
Total Taxes	\$40,522,634	\$3,758,1592	\$44,280,793
Local	\$6,917,755	\$745,307	\$7,663,062
State	\$15,325,718	\$1,614,145	\$16,939,863
Federal	\$18,279,161	\$1,398,707	\$19,677,868

Future Development

Green Hydrogen is still in its early stages of development. Worldwide, almost all hydrogen produced is “grey”, meaning it is produced from natural gas, and 97% is used in industrial applications.³ McKinsey & Company forecasts a 390% increase in annual hydrogen demand by 2050 driven by expanded mobility, heating, power, and new industrial uses of hydrogen. McKinsey & Company also expects nearly all new hydrogen production coming online after 2025 will be clean hydrogen, meaning either “green” or “blue”.

IEA recognizes a key factor in these assumptions is demand from hydrogen buyers.⁴ Capacity development will follow demand. In Questa, there is potential to expand the hydrogen production facility from 25 MW to 100 MW, if hydrogen demand can be developed or identified. National laboratories are potential sources of demand, due to their desire to utilize green energy sources and their proximity to Questa.

If hydrogen demand can be developed or identified, and an expansion to a 100 MW green hydrogen facility can be realized, the impact numbers stated in this report - construction and operations - would increase proportionally, or 300%.

Additional development opportunities exist for hydrogen fueling stations for automobiles. However, this is dependent on the development of hydrogen automobiles, regional hydrogen automobile infrastructure, and customer uptake, which is currently a long-range possibility. Other opportunities to leverage the benefits of the hydrogen hub would include industries that require local hydrogen sources. Strongest advantages will exist for industries performing weight-losing activities (i.e. inputs are physically larger, heavier or more difficult to transport than outputs), and where all inputs can be sourced reasonably locally and with hydrogen being a key input to the industry.

³ (PwC, 2024) (McKinsey & Company, 2024)

⁴ (IEA, 2024)

Table 22: Tax Impact by Location, Construction and First Year Operations, Questa Green Hydrogen Hub, 2024-2029

Location	Sub County	County	State	Federal	Total
Questa	\$2,826,148	\$2,523,301	\$11,227,867	\$9,358,398	\$25,935,714
Taos County outside of Questa	\$1,051,982	\$938,414	\$4,971,743	\$9,337,778	\$16,299,916
New Mexico outside of Taos County	\$218,461	\$104,754	\$740,249	\$981,692	\$2,045,156
Total	\$4,096,591	\$3,566,469	\$16,939,863	\$19,677,867	\$44,280,792

Table 23: Tax Impact Percentages by Location, Construction and First Year Operations, Questa Green Hydrogen Hub, 2024-2029

Location	Sub County	County	State	Federal	Total
Questa	69%	71%	66%	48%	59%
Taos County outside of Questa	26%	26%	29%	47%	37%
New Mexico outside of Taos County	5%	3%	4%	5%	5%
Total	100%	100%	100%	100%	100%

Table 24: Gross Receipt Tax Estimation, Questa Green Hydrogen Hub, 2024-2029

Location	Construction	O&M	Construction & First Year Operations
Village of Questa	\$1,137,011	\$98,958	\$1,235,969
Taos County	\$1,386,285	\$145,118	\$1,531,403
Other municipalities in Taos County	\$397,934	\$61,722	\$459,655
State of New Mexico	\$7,975,319	\$859,214	\$8,834,533
Other municipalities in New Mexico	\$116,246	\$21,191	\$137,438
Total	\$11,012,796	\$1,186,203	\$12,198,998

Tax Impact

Table 19 shows the estimated tax revenue impacts at the local, state, and federal levels of construction and first year operations. Tables 20 and 21 detail the construction and O&M tax impacts individually. Tables 22 & 23 show the tax impacts of construction and first year operations delineated by location of impact: Questa, the rest of Taos County, and the rest of New Mexico. Table 24 shows estimates of projected Gross Receipts Tax collections for Village of Questa, Taos County, State of New Mexico, and the remaining municipalities in the state from construction and first year operations.

Table 19: Tax Impact, Construction & First Year Operations, Questa Green Hydrogen Hub

Impact	Local	State	Federal	Total
Direct	\$5,240,707	\$11,617,573	\$14,177,279	\$31,035,559
Indirect	\$1,646,838	\$3,557,217	\$2,827,564	\$8,031,620
Induced	\$775,516	\$1,765,072	\$2,673,024	\$5,213,613
Total	\$7,663,062	\$16,939,863	\$19,677,867	\$44,280,792

Table 20: Tax Impact, Construction, Questa Green Hydrogen Hub, 2024-2028

Impact	Local	State	Federal	Total
Direct	\$4,826,736	\$10,723,564	\$13,403,990	\$28,954,290
Indirect	\$1,364,832	\$2,949,563	\$2,373,369	\$6,687,764
Induced	\$726,187	\$1,652,591	\$2,501,802	\$4,880,580
Total	\$6,917,754	\$15,325,718	\$18,279,161	\$40,522,633

Table 21: Tax Impact, First Year Operations, Questa Green Hydrogen Hub, 2029

Impact	Local	State	Federal	Total
Direct	\$413,971	\$894,009	\$773,290	\$2,081,270
Indirect	\$282,007	\$607,654	\$454,195	\$1,343,856
Induced	\$49,329	\$112,482	\$171,222	\$333,033
Total	\$745,307	\$1,614,145	\$1,398,707	\$3,758,158

Table 18: Economic Impact Percentages by Location, Construction and First Year Operations, Questa Green Hydrogen Hub, 2024-2030

Location	Employment	Labor Income	Value Added	Output
Questa	74%	74%	70%	69%
Taos County outside of Questa	22%	21%	24%	25%
New Mexico outside of Taos County	4%	5%	6%	6%
Total	100%	100%	100%	100%

Figure 11: Estimated Job Impact by Location, Construction and First Year Operations, Questa Green Hydrogen Hub, 2024-2030

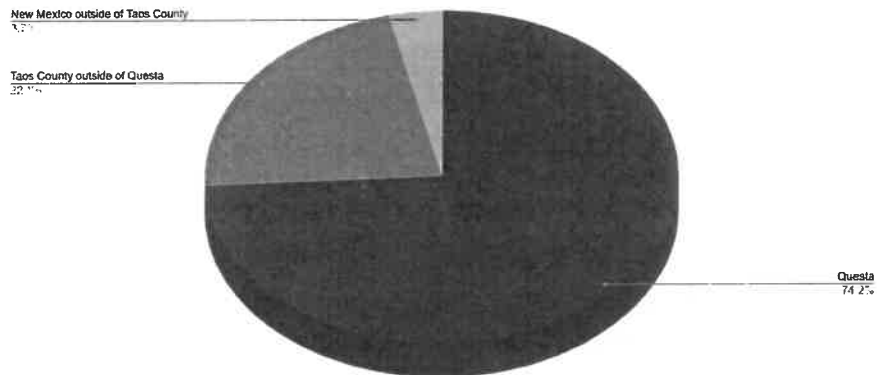


Figure 12: Estimated Economic Impact by Location, Construction and First Year Operations, Questa Green Hydrogen Hub, 2024-2030

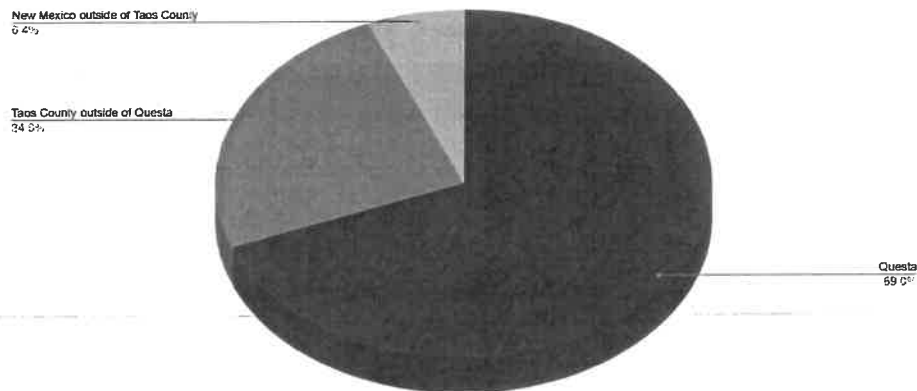
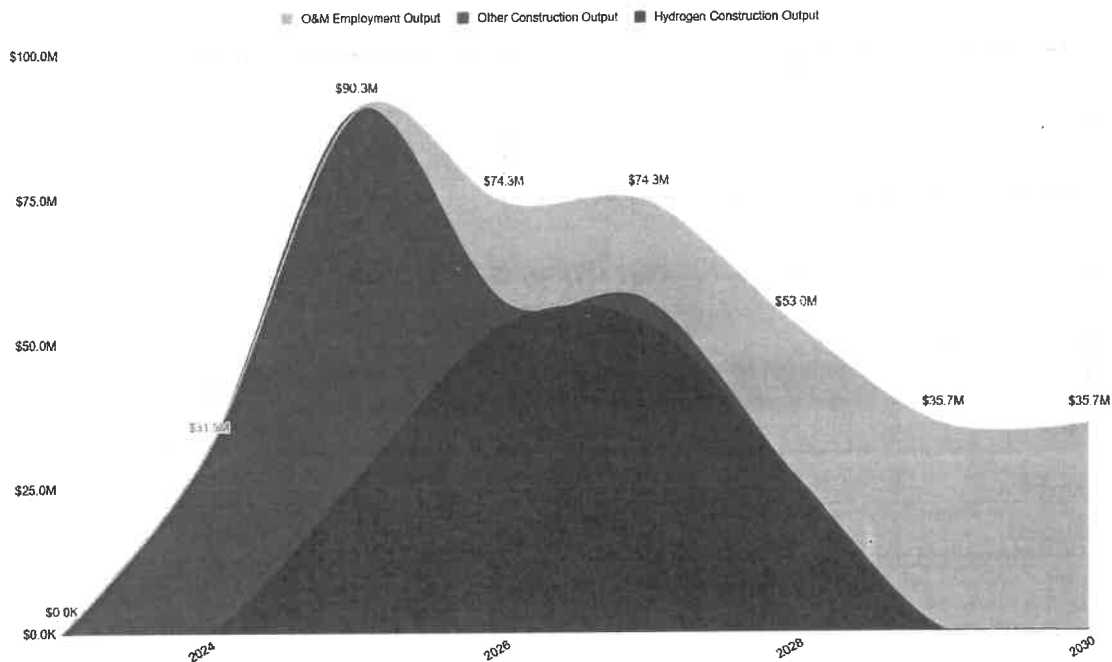


Figure 10: Estimated Economic Impact, Questa Green Hydrogen Hub, 2024-2030



Tables 17 & 18 and Figures 11 & 12 show the impacts of construction and first year operations delineated by location of impact: Questa, the rest of Taos County, and the rest of New Mexico.

Table 17: Economic Impact by Location, Construction and First Year Operations, Questa Green Hydrogen Hub, 2024-2030

Location	Employment	Labor Income	Value Added	Output
Questa	1,393	\$55,189,776	\$103,079,981	\$206,166,842
Taos County outside of Questa	414	\$15,877,027	\$35,365,418	\$73,423,578
New Mexico outside of Taos County	70	\$3,924,594	\$8,449,026	\$19,053,929
Total	1,878	\$74,991,396	\$146,894,422	\$298,644,350

Total Economic Impact

Since the construction activities of this project span several years, and ongoing impacts are expected to continue, the project's economic impact can be summarized as the total construction impact and the impact of first year operations, shown in Table 16. To detail the timing of this project's economic impacts, Figures 9 & 10 show the job and economic impacts over the study period 2024-2030.

Table 16: Economic Impact, Questa Green Hydrogen Hub, Construction and First Year Operations, 2024-2030

Impact	Employment	Labor Income	Value Added	Output
Direct	1,376	\$54,504,258	\$101,632,695	\$202,928,785
Indirect	255	\$10,579,124	\$24,087,747	\$57,610,457
Induced	246	\$9,908,015	\$21,173,981	\$38,105,108
Total	1,878	\$74,991,396	\$146,894,422	\$298,644,350

Figure 9: Estimated Job Impact, Questa Green Hydrogen Hub, 2024-2030

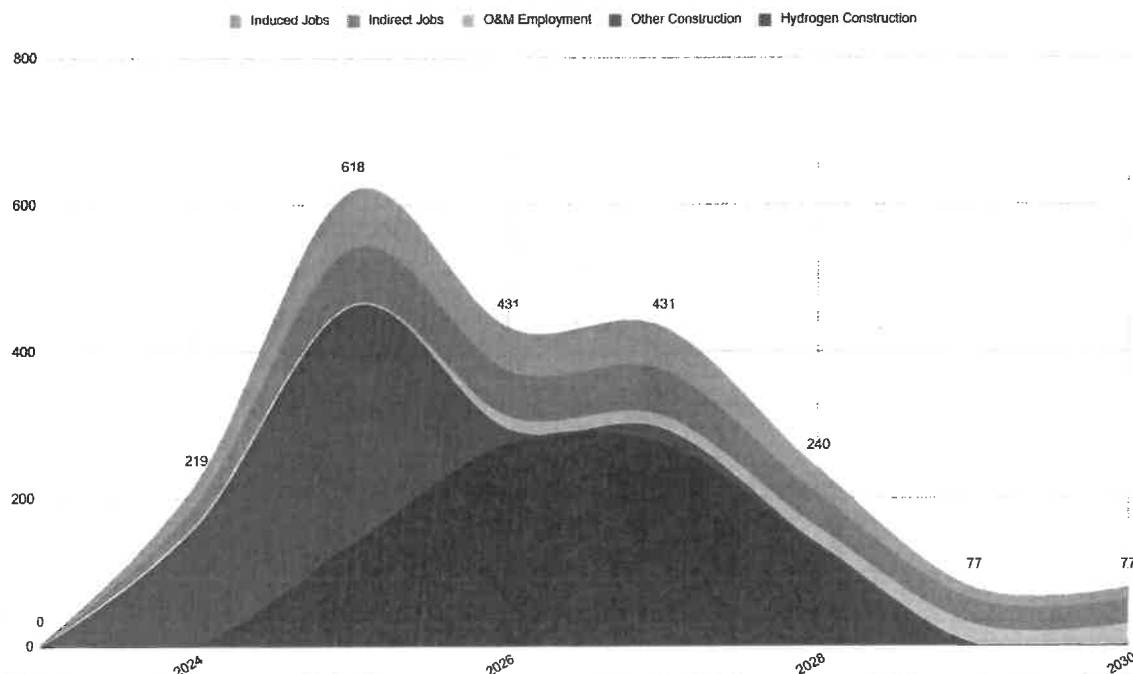


Table 15: Economic Impact Percentages by Location, O&M, Questa Green Hydrogen Hub, 2029

Location	Employment	Labor Income	Value Added	Output
Questa	37%	56%	56%	61%
Taos County outside of Questa	54%	35%	35%	31%
New Mexico outside of Taos County	9%	9%	9%	7%
Total	100%	100%	100%	100%

Figure 7: Job Impact by Location, O&M, 2029

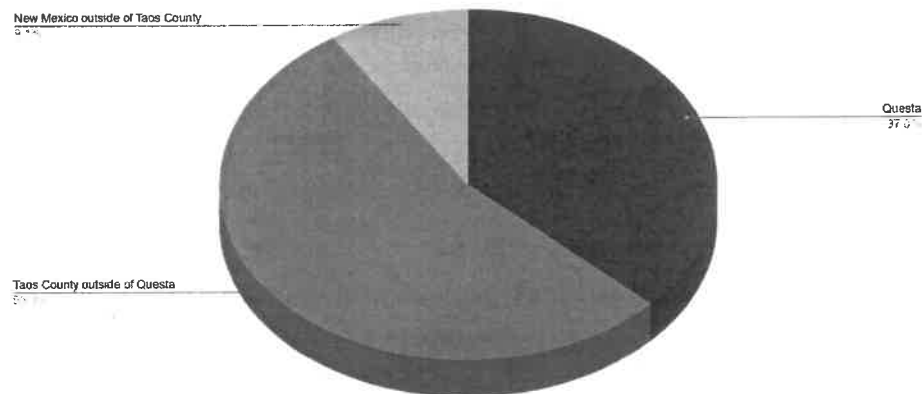
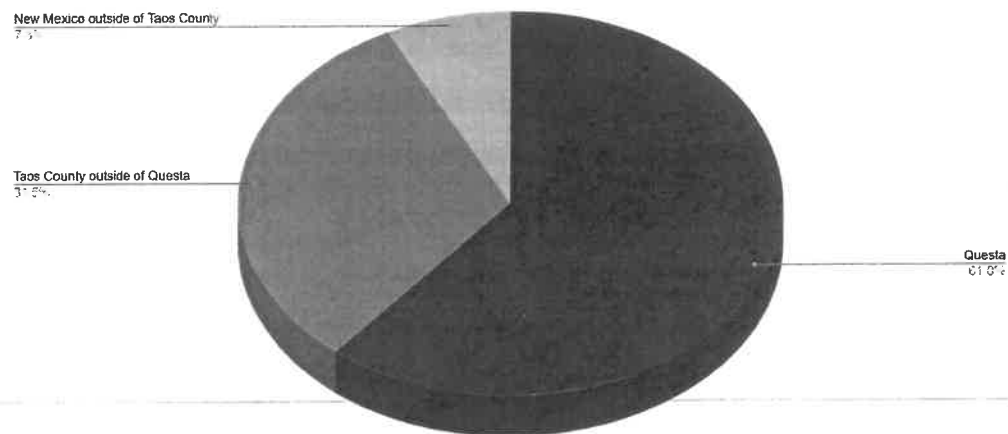


Figure 8: Economic Impact by Location, O&M, 2029



important to note that O&M employment differs from construction employment as it is expected to continue for the foreseeable future as long as the facilities are in operation.

Table 11: Economic Impact, O&M, Hydrogen Production Facility, 2029

Impact	Employment	Labor Income	Value Added	Output
Direct	10	\$1,105,944	\$2,671,567	\$11,437,203
Indirect	20	\$774,973	\$2,086,828	\$6,034,290
Induced	7	\$280,764	\$596,776	\$1,072,190
Total	37	\$2,161,680	\$5,355,172	\$18,543,682

Table 12: Economic Impact, O&M, Solar Power Facility, 2028

Impact	Employment	Labor Income	Value Added	Output
Direct	17	\$1,558,848	\$3,991,017	\$9,993,734
Indirect	14	\$826,069	\$2,085,241	\$5,823,952
Induced	9	\$357,835	\$761,973	\$1,370,083
Total	40	\$2,742,752	\$6,838,232	\$17,187,769

Table 13: Economic Impact, O&M, Questa Green Hydrogen Hub, 2029

Impact	Employment	Labor Income	Value Added	Output
Direct	27	\$2,664,792	\$6,662,585	\$21,430,937
Indirect	34	\$1,601,042	\$4,172,070	\$11,858,242
Induced	16	\$638,599	\$1,358,749	\$2,442,273
Total	77	\$4,904,432	\$12,193,403	\$35,731,451

Table 14: Economic Impact by Location, O&M, Questa Green Hydrogen Hub, 2029

Location	Employment	Labor Income	Value Added	Output
Questa	28	\$2,727,180	\$6,805,975	\$21,812,014
Taos County outside of Questa	41	\$1,713,785	\$4,250,233	\$11,246,024
New Mexico outside of Taos County	7	\$463,468	\$1,137,194	\$2,673,414
Total	77	\$4,904,432	\$12,193,403	\$35,731,451

Figure 5: Job Impact by Location, Construction, 2024-2028

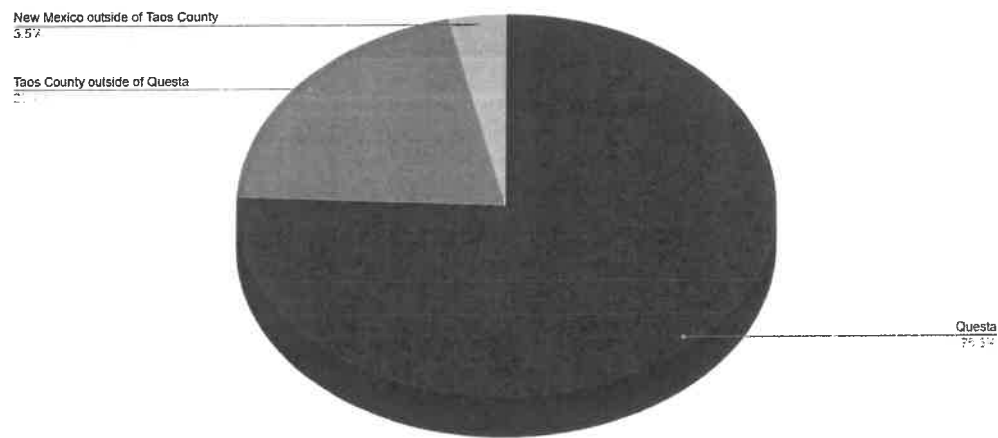
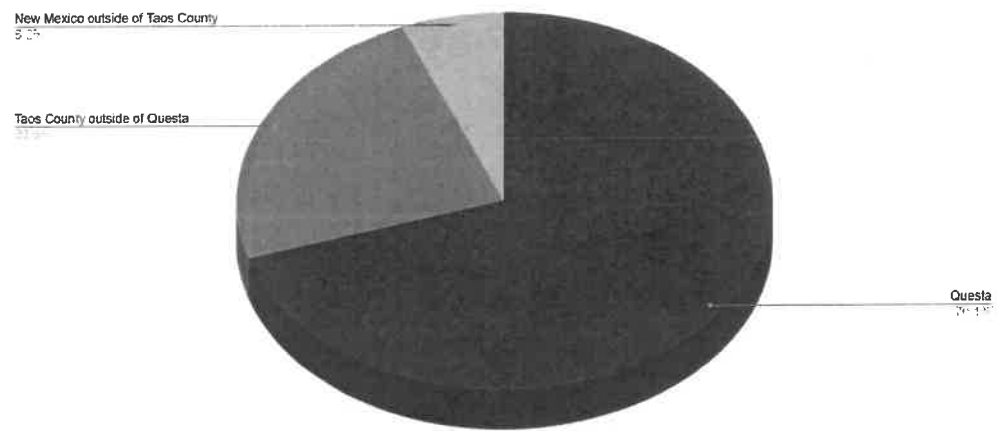


Figure 6: Economic Impact by Location, Construction, 2024-2028



Ongoing Employment

Ongoing employment at the Questa Green Hydrogen Hub will support O&M activities at the hydrogen production and solar power facilities. Table 11 and 12 show the individual impacts from O&M at each individual facility in the first year of their operation. Table 13 shows the combined O&M for both facilities in 2029 once both facilities are operational. Tables 14 & 15 and Figures 7 & 8 show the ongoing employment impacts delineated by location of impact: Questa, the rest of Taos County, and the rest of New Mexico. It is

Table 10: Economic Impact Percentages by Location, Construction, Questa Green Hydrogen Hub, 2024-2028

Location	Employment	Labor Income	Value Added	Output
Questa	76%	75%	71%	70%
Taos County outside of Questa	21%	20%	23%	24%
New Mexico outside of Taos County	3%	5%	5%	6%
Total	100%	100%	100%	100%

Figure 4: Estimated Job Impact, Construction, 2024-2028

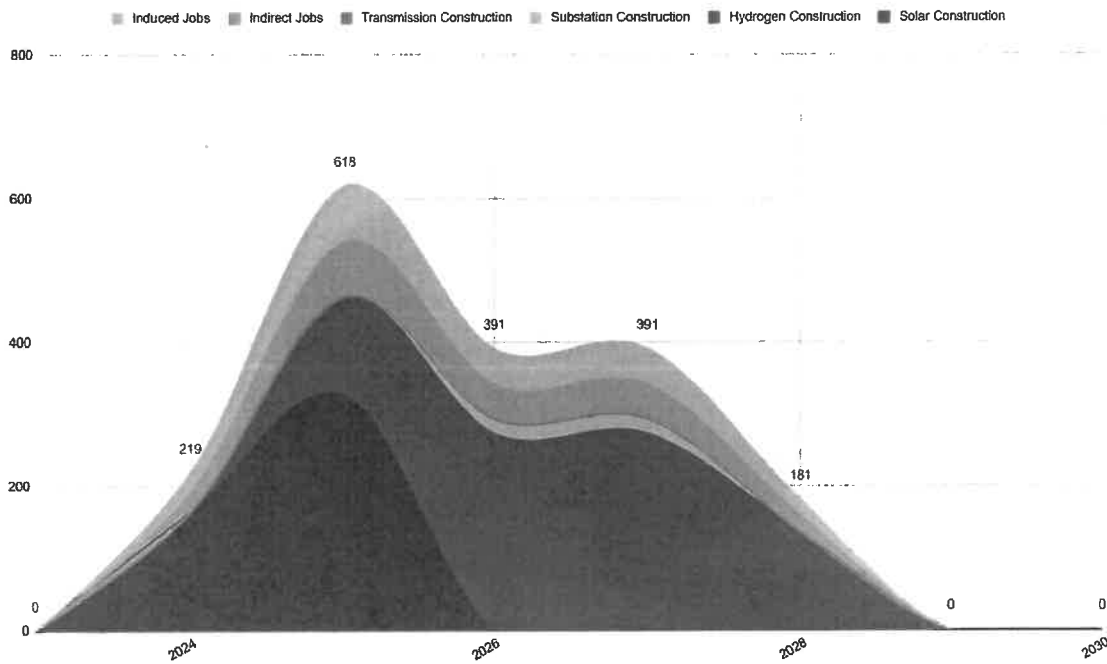


Table 6: Economic Impact, Construction, Substation, 2026-2027

Impact	Employment	Labor Income	Value Added	Output
Direct	40	\$1,541,735	\$2,824,464	\$5,397,848
Indirect	7	\$266,329	\$591,096	\$1,357,370
Induced	7	\$275,472	\$588,903	\$1,059,906
Total	54	\$2,083,536	\$4,004,464	\$7,815,124

Table 7: Economic Impact, Construction, Transmission Infrastructure, 2026-2027

Impact	Employment	Labor Income	Value Added	Output
Direct	1	\$28,562	\$52,326	\$100,000
Indirect	0	\$4,424	\$10,034	\$23,042
Induced	0	\$4,985	\$10,674	\$19,221
Total	1	\$37,970	\$73,034	\$142,263

Table 8: Economic Impact, Construction, Questa Green Hydrogen Hub, 2024-2028

Impact	Employment	Labor Income	Value Added	Output
Direct	1,349	\$51,839,466	\$94,970,110	\$181,497,848
Indirect	221	\$8,978,082	\$19,915,677	\$45,752,215
Induced	231	\$9,269,416	\$19,815,232	\$35,662,835
Total	1,801	\$70,086,964	\$134,701,019	\$262,912,899

Table 9: Economic Impact by Location, Construction, Questa Green Hydrogen Hub, 2024-2028

Location	Employment	Labor Income	Value Added	Output
Questa	1,364	\$52,462,596	\$96,274,006	\$184,354,828
Taos County outside of Questa	373	\$14,163,242	\$31,115,185	\$62,177,554
New Mexico outside of Taos County	63	\$3,461,126	\$7,311,832	\$16,380,515
Total	1,801	\$70,086,964	\$134,701,019	\$262,912,899

Analysis of Impacts

The economic impacts of the Questa Green Hydrogen Hub include (1) one-time impacts from construction activity for hydrogen production facilities, solar power facilities, and transmission infrastructure; and (2) ongoing impacts from O&M employment for the hydrogen production and solar power facilities. This section details the impacts of each of these activities in terms of employment, economic activity, and tax revenue.

Construction Expenditures

Construction activities for the Questa Green Hydrogen Hub are expected to occur from 2024-2028 involving the construction of four individual facilities with a total construction cost of \$181.5 million. Tables 4-7 show the impacts of the construction of each individual facility. Table 8 shows the total impact of all construction activities involved in this project during the 2024-2028 period. Tables 9 & 10 and Figures 5 & 6 show the construction impacts delineated by location of impact: Questa, the rest of Taos County, and the rest of New Mexico. Figure 4 shows the job impacts over time to detail the timing of the construction jobs supported by this project.

Table 4: Economic Impact, Construction, Hydrogen Production Facility, 2025-2028

Impact	Employment	Labor Income	Value Added	Output
Direct	818	\$31,418,231	\$57,558,325	\$110,000,000
Indirect	134	\$5,441,904	\$12,071,309	\$27,731,718
Induced	140	\$5,618,040	\$12,009,667	\$21,614,610
Total	1,091	\$42,478,175	\$81,639,301	\$159,346,328

Table 5: Economic Impact, Construction, Solar Power Facility, 2024-2025

Impact	Employment	Labor Income	Value Added	Output
Direct	491	\$18,850,938	\$34,534,995	\$66,000,000
Indirect	80	\$3,265,425	\$7,243,237	\$16,640,086
Induced	84	\$3,370,919	\$7,205,989	\$12,969,097
Total	655	\$25,487,282	\$48,984,221	\$95,609,183

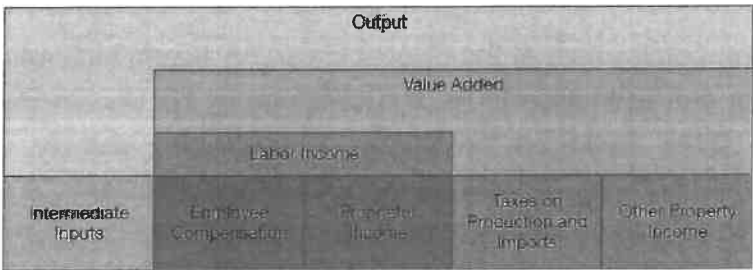
Ongoing Employment

Expected ongoing employment at the Questa Green Hydrogen Hub was estimated based on available data and estimation tools, and reviewed by Kit Carson Electric Cooperative representatives. Since hydrogen production facilities are relatively new in terms of operating history, limited data is available for operating requirements. A variety of sources were consulted to estimate the requirements for ongoing O&M employment at a hydrogen production facility. Employment estimates for solar facilities are more well understood, and were calculated using National Renewable Energy Lab's (NREL) Jobs and Economic Development Impact (JEDI) model for photovoltaics. Table 3 shows the estimated ongoing O&M employment for each facility. Employment is expected to start following completion of each facility. Employment at the hydrogen facility was assigned to IMPLAN Industry Code 160-Industrial gas manufacturing, and employment at the solar facility was assigned to 42-Electric power generation - Solar.

Table 3: Estimated Ongoing O&M Employment by Facility, Questa Green Hydrogen Hub

Ongoing jobs	O&M Jobs	Source
25 MW Hydrogen Facility	10	(Bower et al., 2023), (Newborn, 2023), (Louisiana Economic Development, 2022)
60 MW Solar Facility	17	(NREL, 2021)
25 MW Substation	0	Covered through existing utility team
1/4 Mile Transmission Infrastructure	0	Covered through existing utility team

Figure 3: Components of Economic Output²



The economic impacts presented in this analysis include the direct, indirect, and induced impacts. All terms are defined in the Glossary at the end of this document. The impacts are based on project activity occurring in the Village of Questa, New Mexico. Spillover effects between counties in New Mexico are estimated using Multi-Regional Input-Output (MRIO) analysis. Impact figures are presented for New Mexico as a whole, however delineated figures are presented for Questa, the rest of Taos County, and the rest of New Mexico. Gross Receipts tax impacts are also estimated for Village of Questa, Taos County, State of New Mexico, and the remaining municipalities in the state. Employment refers to full- and part-time jobs. Dollar impacts are presented in 2024 dollars. The study period for this analysis is 2024-2030. Components may not sum to totals due to rounding.

Construction Expenditures

Construction activities for the Questa Green Hydrogen Hub are expected to occur from 2024-2028. Table 2 shows the expected construction schedule and specific projects included in this analysis. These projects are expected to cost \$181.5 million based on estimates from Kit Carson Electric Cooperative. All of these projects were assigned to IMPLAN Industry Code 52-*Construction of new power and communication structures*.

Table 2: Expected Construction Schedule, Questa Hydrogen Production Facilities, 2024-2028

Facility	2024	2025	2026	2027	2028	Total
25 MW Hydrogen Facility	\$0	\$18,333,333	\$36,666,667	\$36,666,667	\$18,333,333	\$110,000,000
60 MW Solar Facility	\$22,000,000	\$44,000,000	\$0	\$0	\$0	\$66,000,000
25 MW Substation	\$0	\$0	\$2,698,924	\$2,698,924	\$0	\$5,397,848
1/4 Mile Transmission Infrastructure	\$0	\$0	\$50,000	\$50,000	\$0	\$100,000
Total	\$22,000,000	\$62,333,333	\$39,415,591	\$39,415,591	\$18,333,333	\$181,497,848

² (Lucas, 2023)

Methodology

The purpose of this study is to estimate the economic benefits resulting from construction and ongoing operating activities of the Questa Green Hydrogen Hub.

Economic Impact Analysis seeks to measure the impact on the local economy from economic activity associated with a new project. New economic activity often refers to new spending or employment associated with a new business or the expansion of an existing business. In this case, the economic impacts of this project include (1) one-time impacts from construction activity for hydrogen production facilities, solar power facilities, and transmission infrastructure; and (2) ongoing impacts from O&M employment for the hydrogen production and solar power facilities.

Economic impacts are composed of three parts: direct effects, indirect effects, and induced effects. Direct effects stem from the initial change in economic activity associated with new spending. For this study, direct effects include construction expenditures and O&M employment. As a result of the direct effects, additional spending occurs in other industries, such as building material manufacturing, hydrogen production equipment manufacturing, and solar panel manufacturing. The total of this secondary spending is categorized as the indirect effect. The economic activity from the direct and indirect effects supports employees who then spend their wages in the local economy. This spending is referred to as the induced effects. Together, the direct, indirect, and induced effects comprise the total economic impact of the analysis. The main idea behind economic impact analysis is that a new dollar spent in a local area results in more than one dollar in economic activity in the area.

The project's economic impacts were estimated using IMPLAN economic modeling software.¹ Economic impacts were measured in terms of changes in output, value-added production, labor income, and employment. Figure 3 shows the subcomponents of output and value-added production, also referred to as the Leontief Production Function. Output is the dollar value of total production generated by an industry and can be thought of as total revenue for a particular industry or industries. Intermediate inputs are goods and services used in production and purchased from other industries. Value-added production is the contribution from economic activity to gross domestic product. The value of intermediate inputs plus value-added production add up to total output. Business profits are included under proprietor income and other property income.

¹ (IMPLAN, 2023)

Figure 1: Estimated Job Impact, Questa Green Hydrogen Hub, 2024-2030

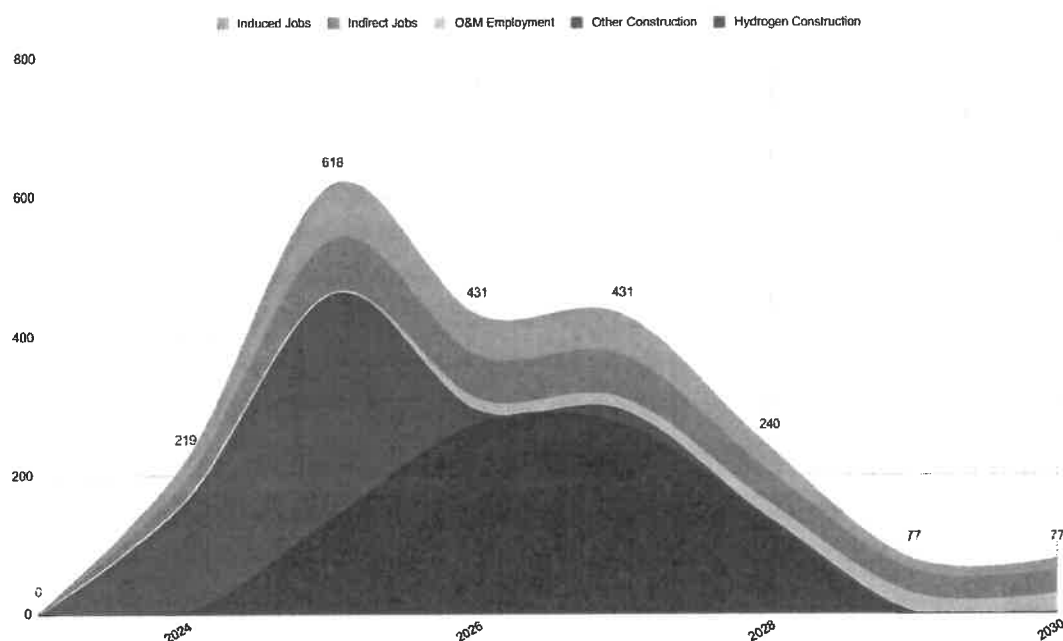
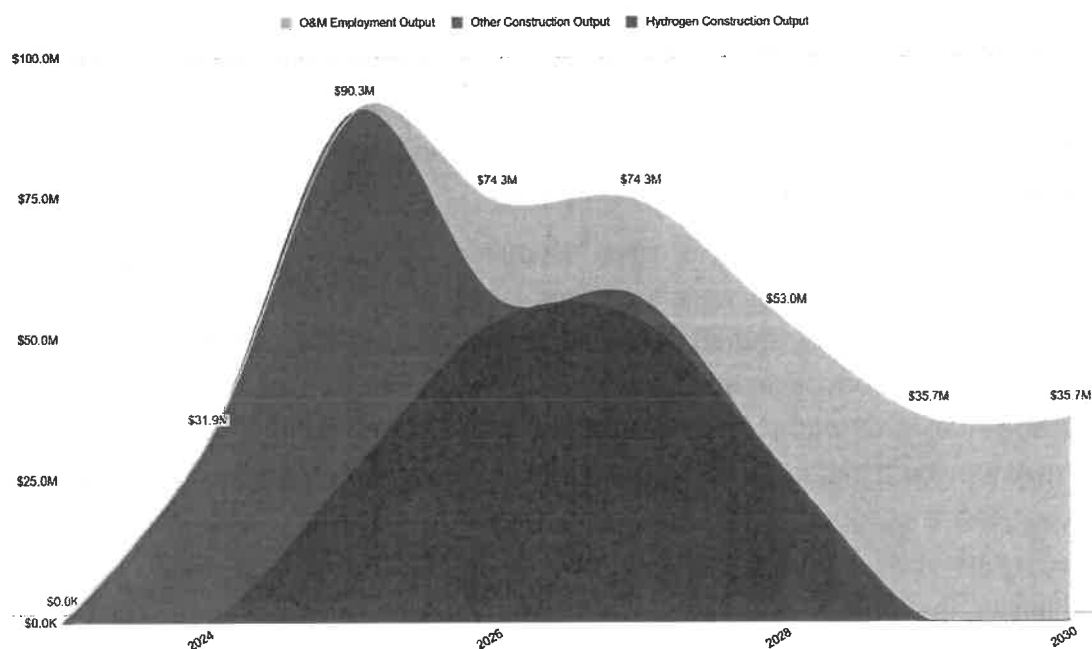


Figure 2: Estimated Economic Impact, Questa Green Hydrogen Hub, 2024-2030



Executive Summary

Arrowhead Center at New Mexico State University has prepared a study of the economic impact of a proposed Green Hydrogen Hub in Questa, NM (Questa Green Hydrogen Hub). The purpose of this study is to estimate the economic benefits resulting from construction and ongoing operating activities of the Questa Green Hydrogen Hub.

Economic Impact Analysis seeks to measure the impact on the local economy from new economic activity associated with a new project. The economic impacts of the Questa Green Hydrogen Hub were estimated using IMPLAN economic modeling software and are based on economic activity occurring in the Village of Questa, New Mexico. Spillover effects to the rest of the counties in New Mexico were measured using Multi-Regional Input-Output (MRIO).

The primary impacts of the Questa Green Hydrogen Hub are: (1) construction of hydrogen production facilities, solar power facilities, and transmission infrastructure; and (2) ongoing operations and maintenance (O&M) employment at the hydrogen production and solar power facilities.

The economic impacts of the Questa Green Hydrogen Hub were estimated from 2024-2030, shown in Figure 1 & 2. Table 1 details the impacts of the primary components of the project:

Table 1: Estimated Economic Impact, Questa Green Hydrogen Hub

Impact	Construction (2024-2028)	O&M Employment (2029)	Total Construction and First Year Operations
Direct Jobs	1,349	27	1,376
Total Jobs	1,800	77	1,877
Labor Income	\$70,086,964	\$4,904,433	\$74,991,397
Value-Added Production	\$134,701,022	\$12,193,402	\$146,894,424
Economic Output	\$262,912,897	\$35,731,452	\$298,644,349
Total Taxes	\$40,522,634	\$3,758,1592	\$44,280,793
Local	\$6,917,755	\$745,307	\$7,663,062
State	\$15,325,718	\$1,614,145	\$16,939,863
Federal	\$18,279,161	\$1,398,707	\$19,677,868

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Questa Green Hydrogen Hub Economic Impact Analysis, 2024-2030

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Questa Green Hydrogen Hub Economic Impact Analysis, 2024-2030

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