Projected Economic Impacts of a Proposed Solar-Powered Hydrogen Facility in Questa, New Mexico: Insights from Regional Input–Output Modeling

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Abstract

The closure of a dominant economic activity can permanently alter rural communities, reshaping labor markets, fiscal capacity, and development trajectories. One such community is the village of Questa, New Mexico, a town of about 2,000 residents in Taos County, New Mexico, roughly twenty-five miles north of the city of Taos. For nearly a century, Questa's economy revolved around a molybdenum mine that provided employment for about 400 workers until its closure in 2014 (Parker, 2008).

Building on community interest in creating jobs, attracting new economic activity, and reusing former mine assets, a coalition of village stakeholders partnered with the U.S. Department of Energy's Communities Local Energy Action Program (LEAP) and the National Laboratory of the Rockies (NLR) to evaluate options for electrolytic hydrogen production. Beyond leveraging existing infrastructure, the assessment was also motivated by the availability of local resources, particularly water, and by Kit Carson Electric Cooperative (KCEC)'s goal of meeting its 100% renewable energy commitments, including addressing nighttime loads and exploring long-duration energy storage solutions. As part of this broader effort, the present study examines the potential economic impacts of a proposed solar-powered hydrogen facility in Questa.

Drawing on locally validated data and stakeholder feedback gathered during late 2023 and early 2024, this study estimates the short- and long-term economic contributions of constructing and operating the proposed facility under three scenarios (*Least-Local, Mid*, and *Most-Local*) which differ by local sourcing assumptions. The locally validated information included the confirmation of industries present in Questa, employment levels by industry and occupation, and output values for known local sectors, drawing on the Questa Economic Development Fund and local officials. These inputs complemented national datasets from the IMPLAN model IMPLAN Group, LLC (2019) and occupational characteristics from

the O*NET's database[1](Version 25.1).

The analysis employs the 2019[2] IMPLAN input–output (I-O) model (IMPLAN data for Questa, a region formed by the rest of Taos County, and a region formed by the rest of New Mexico), modified to reflect Questa's economic structure using locally validated data alongside national workforce information. Hydrogen plant construction and operation costs assumptions for the project were informed by a prior techno-economic assessment (TEA) study (Topolski et al., 2023), NREL's Jobs and Economic Development Impact (JEDI) Solar Photovoltaics Model (National Renewable Energy Laboratory (NREL), 2023) and cost breakdown data from a recent solar project provided by KCEC (Reyes, 2024). These empirically grounded cost inputs and locally validated data provide a robust framework for assessing the potential economic impacts of emerging solar-powered hydrogen projects and to evaluate how different supplier choices influence local value retention and overall economic outcomes.

1 Main Findings

The *Mid* scenario, reflecting current market conditions, indicates that constructing the facility could support approximately 400 statewide full-time equivalent (FTE) jobs (direct, indirect, and induced): 11 in Questa (primarily in construction-related and transportation services), 235 in the rest of Taos County (driven by construction and engineering services) and 164 jobs elsewhere in the state, mainly in manufacturing sectors. As shown in Table 1, construction is projected to generate approximately $70 million in statewide economic output, about $21 million in labor earnings (including wages, salaries, benefits, and proprietor income), and roughly $800,000 in local tax revenues (see Appendix Tables A.1.-A.2. for construction and operation expenditures by category and region).

Table 1: Estimated Economic Impacts, *Mid* Scenario (Baseline).

		Jobs (FTE)	**Earnings (Thousand $)**	**Tax Revenue (Thousand $)**	**Output (Thousand $)**
Construction (Temporary Impacts)	Questa	11	$600	$800	$1,500
	Taos County	235	$9,300	$900	$27,000
	New Mexico	164	$10,700	$4,600	$41,500
	Total	**410**	**$20,600**	**$6,300**	**$70,000**
Operation and Maintenance (Annual Impacts)	Questa	11	$1,100	$210	$2,500
	Taos County	5	$200	$570	$6,400
	New Mexico	4	$300	$400	$550
	Total	**20**	**$1,600**	**$1,180**	**$6,950**

Note: FTE: full-time equivalent (2,080 hr/yr). Monetary values are in 2020 dollars. Numbers may not add up due to rounding.

During operation, the hydrogen facility is expected to directly employ 10 workers, including operators, administrative staff, and managers/supervisors, while the solar facility is expected to directly support 0.5 FTE jobs, mainly solar technicians (See Appendix, Tables A.4.-A.5.). Given that these positions, namely plant operators, shift supervisors, and maintenance technicians, are permanent and facility-bound, most of these workers are expected to reside in Questa, consistent with the locally validated employment data provided by the LEAP coalition, contributing $1.1 million in annual earnings. However, given the limited size of the village's economy and high dependence on the rest of the county for local supplies, a significant portion of induced effects (i.e., the impacts of spending wages) are captured in the rest of Taos County, which gains 5 jobs. In the rest of the state the project is estimated to support 4 jobs, mainly in repair and maintenance. Overall, operations generate $6.9 million in annual economic output, $1.6 million in annual earnings, and about $210,000 in annual local tax revenues.

However, because results are highly sensitive to local procurement patterns and worker residence, two additional sourcing scenarios were evaluated alongside the Mid scenario (See Appendix Table A.3. for sourcing

[1]See https://www.onetcenter.org/dictionary/25.1/excel/.

[2]Although data up to 2022 is available, we opted to use 2019 data to avoid data anomalies that might be present in 2020–2022 data because of the COVID-19 pandemic and subsequent recovery.

patterns by scenario):

a) ***Least-Local Scenario (lower bound):*** Most equipment and services are sourced from outside New Mexico, with construction largely supplied by firms and workers commuting from the rest of Taos County. The village therefore retains only limited benefits, primarily through tax revenues.

b) ***Mid Scenario (baseline):*** This scenario corresponds to the previously presented results and reflects current market conditions, IMPLAN regional purchase coefficients, and coalition feedback. It is therefore considered the most realistic baseline. Electrolyzers and stationary fuel cells are supplied by New Mexico firms located outside Taos County, while solar modules are imported from outside the United States. Questa benefits through local labor, construction, and transportation services shared with the rest of Taos County.

c) ***Most-Local Scenario (upper bound):*** This scenario assumes that all major goods and services are sourced from New Mexico businesses and that Questa supplies most of the construction workforce, transportation services, and ongoing operational labor. This outcome is policy-contingent, requiring prior development of local procurement institutions, supplier capacity, and workforce training; it is therefore an aspirational upper bound, not a forecast.

Table 2 presents the results for the Least and Most-Local scenarios. The Most-Local scenario, which prioritizes local suppliers, yields the greatest benefits for Questa and the broader New Mexico economy, supporting up to 400 construction jobs and 13 long-term jobs above the Least-Local scenario. In contrast, under the Least-Local scenario, which is heavily import-dependent, local employment would be fewer than 200 FTEs statewide due to the limited use of local firms and labor.

Table 2: Estimated Economic Impacts, *Least* and *Most-Local* Scenarios.

		Jobs (FTE)	**Earnings (Thousand $)**	**Tax Revenue (Thousand $)**	**Output (Thousand $)**
Construction (Temporary Impacts)	Questa	0.2 – 98	$0 – $4	$0.8 – $0.8	$0 – $11
	Taos County	163 – 229	$7 – $9	$0.7 – $0.9	$18 – $28
	New Mexico	4 – 245	$0 – $15	$3.3 – $5.1	$1 – $62
	Total	**167 – 572**	**$7 – $28**	**$4.8 – $6.8**	**$19 – $100**
Operation and Maintenance (Annual Impacts)	Questa	0 – 11	$0.0 – $1.1	$0.2 – $0.2	$0.0 – $0.0
	Taos County*	7 – 5	$0.6 – $0.2	$0.6 – $0.6	$6.0 – $6.4
	New Mexico	0 – 4	$0.0 – $0.3	$0.4 – $0.4	$0.0 – $0.6
	Total	**7 – 20**	**$0.6 – $1.6**	**$1.1 – $1.2**	**$6.0 – $6.9**

Note: *Most-Local results for Taos County in the operational phase are lower than Least-Local results because, in the former, plant operators live in Questa, and Taos supplies some maintenance/equipment to the plant, whereas in the latter, plant operators live in the rest of the county instead of in Questa.

The 0.2 FTE jobs supported in Questa in the *Least-Local* scenario concentrate on transportation- and sales-related occupations because in this scenario construction labor is assumed to commute from adjacent areas, resulting in only small indirect and induced effects in the village. Therefore, in the rest of Taos County, most of the 163 FTE jobs supported are in the construction sector. In the rest of New Mexico, the 4 FTE jobs supported are in the transportation, sales, and office support sectors, because most materials and services are produced outside the state.

In contrast, in the *Most-Local* scenario, most of the 98 FTE jobs supported in Questa are construction- and transportation-related, while the 229 FTE jobs supported in the rest of Taos are distributed across almost all sectors of the economy, most prominently in professional services. In the rest of New Mexico, most of the 245 FTE jobs supported arise from manufacturing and transportation activities linked to upstream supply-chain needs, such as equipment fabrication, component processing, and freight services, that are not part of Questa's or Taos County's economic base.

2 Implications

The results of this analysis highlight several opportunities for policymakers, regional planners, and community leaders to strengthen the economic benefits associated with solar-powered hydrogen development in rural areas like Questa.

First, the wide differences across sourcing scenarios demonstrate the importance of strengthening local procurement and supplier networks. Economic returns increase markedly when local firms provide materials, construction services, and operational support. State and county governments can help expand these opportunities through supplier registries, local-content incentives, streamlined certification programs, and support for small businesses entering energy supply chains.

Second, long-term economic participation hinges on workforce readiness. Access to high-quality jobs depends on specialized training in hydrogen technologies, construction trades, and plant operations. Workforce initiatives through local training institutions can strengthen the talent pipeline for construction and long-term operations. Partnerships among developers, educational institutions, and local governments can ensure that training aligns with emerging energy sector labor demand.

Third, hydrogen development in Questa depends on key local resources and coordinated community engagement. The project relies on several local assets, including water access, the existing mine site, and nearby transmission infrastructure, which positioned Questa as a viable site. Effectively leveraging these resources requires coordination across land-use planning, permitting processes, grid capacity, and industrial development strategies. This need for coordinated planning is reinforced by the engagement of the LEAP coalition: local government, KCEC, and community organizations participated because the project aligns with their long-term priorities (e.g., electricity reliability, energy affordability, reuse of mine assets, and expanded economic activity and employment).

3 Best Practices Discussion

3.1 Local Model Calibration and Validation

Standard I-O datasets are highly uncertain for small or rural economies given the limited official data at that spatial granularity. In this case, the model was refined using locally sourced data and stakeholder feedback from the Questa Communities LEAP coalition to improve alignment with known local conditions. This involved confirming which industries operate in Questa, reviewing local employment and output values, and incorporating community inputs, such as KCEC's solar cost breakdown, to refine sector-specific allocations. These locally validated inputs informed adjustments to the sectoral composition, economic structure, employment by sector, and relevant tax rates, yielding a model that offers a more context-specific and locally trusted representation of Questa's economy, enhancing the plausibility of both direct and indirect impact estimates.

3.2 Scenario-Based Local Sourcing Analysis

Another best practice is scenario-based analysis to assess how varying levels of local sourcing affect economic outcomes. This approach is particularly valuable because, even when informed by stakeholder input, locally validated data for small or transitioning economies, and especially for emerging industries, remain subject to uncertainty. By developing three sourcing scenarios (*Least-Local, Mid, and Most-Local*), informed by local business input, procurement data, and feedback from the Questa LEAP coalition, the analysis captures a plausible range of labor, material, and service procurement patterns. This approach allowed the analysis to test the sensitivity of economic impacts to different degrees of local supply-chain participation and sourcing and to identify which linkages offer the greatest opportunities for retaining value within the community. Incorporating scenario-based local sourcing is particularly valuable in small or changing economies, where supplier capacity and workforce availability can vary significantly.

3.3 Integration of Empirically Grounded and Technology-Specific Cost Inputs

A third best practice involves strengthening the accuracy of impact estimates by integrating empirically grounded and technology-specific cost data into the modeling framework. In this study, cost assumptions were informed by a TEA developed specifically for Questa, as well as expenses from a recent solar facility from the local utility company, complemented by additional modeling work using JEDI. These sources provided detailed and credible benchmarks for capital expenditures, equipment, labor, and operational costs associated with hydrogen and solar technologies. Combining these with locally validated LEAP coalition data ensured the analysis reflected both national technological parameters and local economic conditions.

4 Limitations

These estimates reflect the modeling assumptions and inherent constraints of the I-O framework (Miller and Blair, 2022). First, the analysis assumes the project is fully financially viable and does not assess how financing structures, incentives, or grants might affect regional outcomes.

Consistent with standard demand-driven I-O models, the analysis assumes unlimited supply of goods, services, and labor (Clouse et al., 2023) , as well as excess production capacity, so it does not capture price adjustments, labor market constraints, or displacement effects in related markets such as electricity or construction. The results therefore represent gross (absolute) impacts rather than net impacts. In particular, the model does not capture what economic activity may be displaced in Questa by the facility's construction or operation, nor does it assess whether the project is welfare-improving or for whom.

The model is static, reflecting New Mexico's economic relationships and spending patterns as of 2019. It does not capture dynamic changes such as shifts in demographics, energy systems, or business conditions, nor post-COVID-19 structural adjustments.

Workforce estimates are based on national averages and exclude proprietor jobs, meaning they may not fully reflect local labor market conditions in the regions studied.

Finally, the study does not evaluate the workforce training needs required for successful project implementation. Job and occupation estimates represent the demand for workers but do not address whether the local labor supply can meet that demand.

This study did not assess potential increased demand for public services (safety, roads, water treatment, housing, schools, etc.), environmental impacts, cultural impacts, potential spin-off business or industry expansion, or ownership and distribution of benefits, cost recovery, or ratepayer impacts.

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