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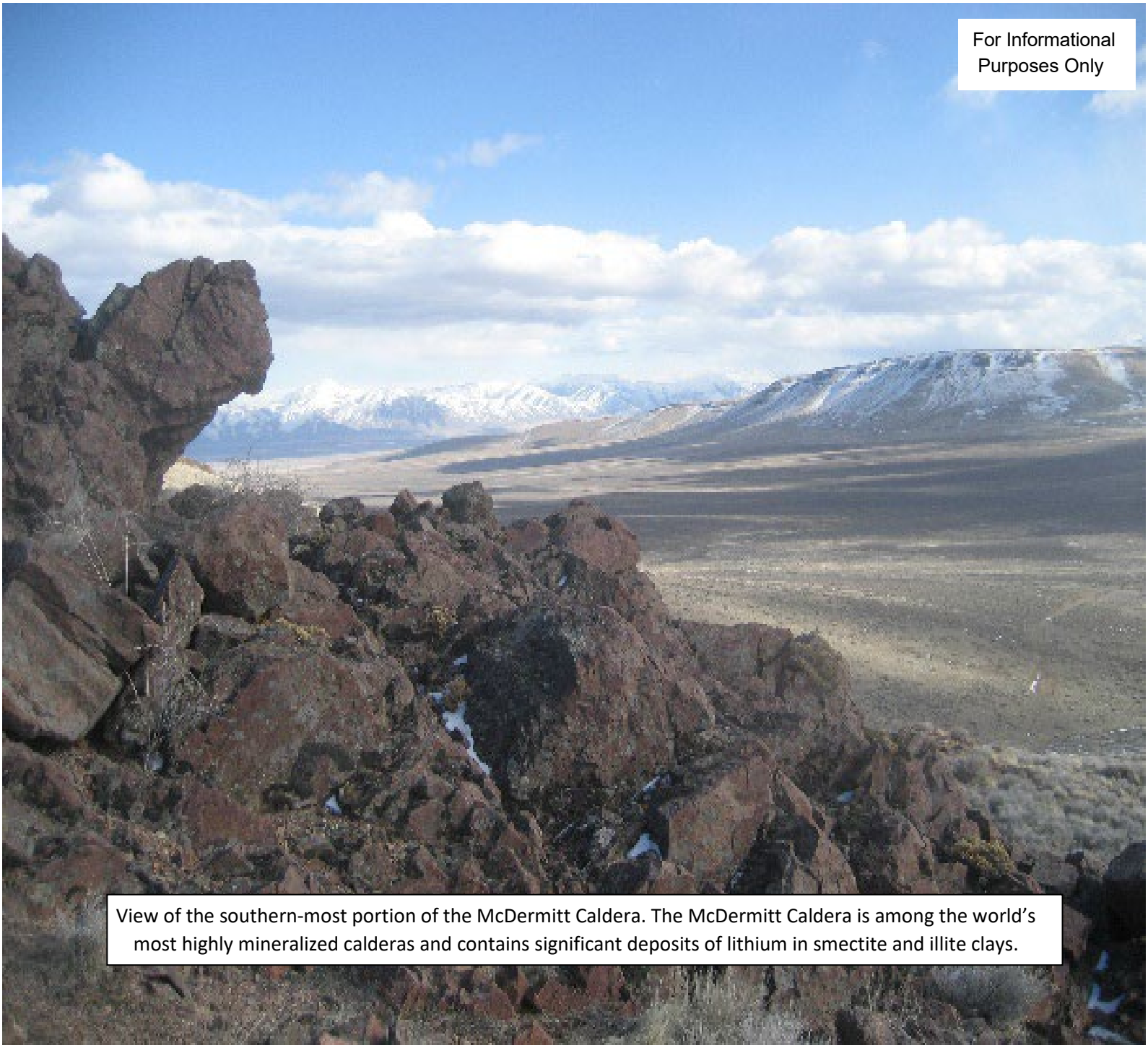

View of the southern-most portion of the McDermitt Caldera. The McDermitt Caldera is among the world's most highly mineralized calderas and contains significant deposits of lithium in smectite and illite clays.

Lithium Americas

EXTENSION
College of Agriculture, Biotechnology & Natural Resources

Estimated Economic and Fiscal Impacts from New Lithium Mining and Processing Operations in Humboldt County, Nevada

September 2023

Estimated Economic and Fiscal Impacts from New Lithium Mining and Processing Operations in Humboldt County, Nevada

Prepared by:

Buddy Borden
Tom Harris

Buddy Borden is a Faculty State Extension Specialist in Community and Economic Development, University of Nevada Cooperative Extension, University of Nevada, Reno

Tom Harris is a Professor in the Department of Economics, State Extension Specialist, and Former Director of the University Center for Economic Development at the University of Nevada, Reno

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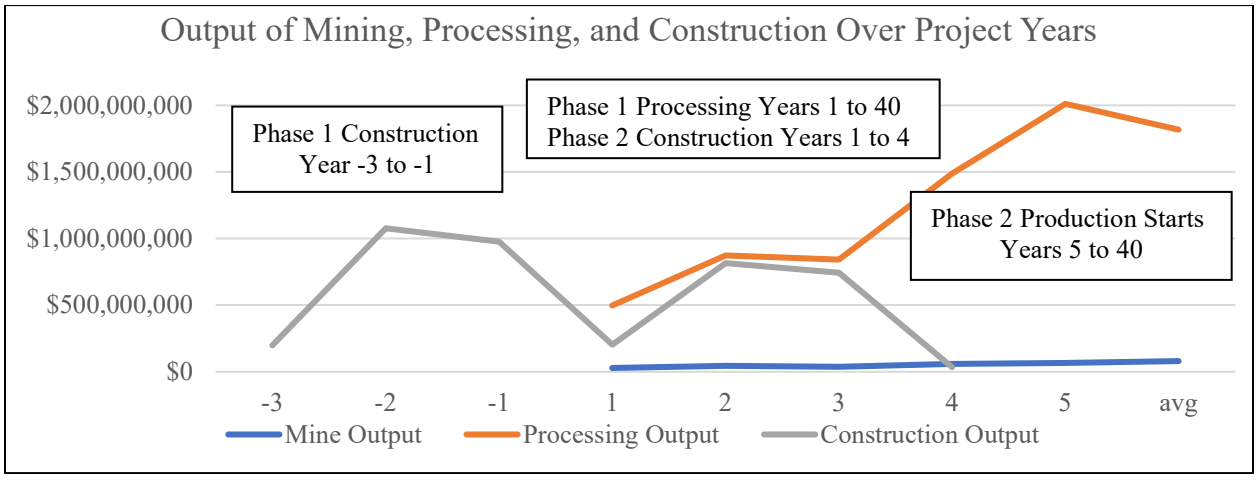
Executive Summary

Humboldt County is the oldest county in Nevada that has built its economy around agriculture, mining, and tourism. Mining has been a cornerstone since the beginning, with rich mineral deposits of gold, dolomite, opal, petrified wood, and silver. Today, Humboldt County is working towards expanding its overall mineral mining portfolio to include lithium. Large lithium deposits have been identified in the McDermitt Caldera area, which presents a unique opportunity to develop a significant supply to satisfy increasing market demands.

This report aims to estimate the economic, fiscal, and community impacts of the construction and operation of a new lithium mine and lithium processing plant in Humboldt County, Nevada. The study gives data to plan for challenges and opportunities in Humboldt County and Nevada.

One of the most used secondary input-output models is IMPLAN. Initially developed by the USFS, IMPLAN is now a private modeling company (IMPLAN, 2014). IMPLAN comprises two main parts: data files and software. The IMPLAN model is reasonably flexible, allowing users to derive economic impacts and customize a model for an analysis, such as constructing a lithium mine and processing plant, and operating a lithium mine and processing plant.

The economic impacts of the Thacker Pass Project were estimated using operational and financial data for each stage of operations supplied by Lithium Americas Corp. (LAC).



Two levels of economic impact were estimated for this study. First, *short-term construction impacts* include capital investment to construct the mine and processing facilities. It will take 7 years to complete Phase 1 and Phase 2 construction or until the mine is producing 80,000 tonnes per annum (tpa) of lithium carbonate. Second, the *long-term sustainable* annual investment in the mine and processing facility operations for the expected mine life of 40 years. Sustainable impacts involve stable annual purchases, wages, jobs, and taxes. Total economic impacts are calculated for Humboldt County and the State of Nevada. ***The results do not consider the potential for new businesses to locate and work with LAC, only the current state of local economies is reflected. As the Lithium industry develops, the economic impacts will increase, and thus additional impacts should be run after a couple of years of full operations.***

Humboldt County Summary Impacts

Construction (7 Year Annual Average)

- Every $1 of LAC capital construction investment will generate an additional $0.26 of spending in Humboldt County.
- Every $1 of LAC labor income, because of capital construction investment, will generate an additional $1.03 in labor income in Humboldt County.
- Every 1 direct job created by LAC capital construction investment will generate an additional 2.3 jobs in Humboldt County.

Annual Operations (35Year Annual Average)

- Every $1 of LAC capital construction investment will generate an additional $0.12 of spending in Humboldt County.
- Every $1 of LAC labor income, because of LAC capital construction investment, will generate an additional $0.68 in labor income in Humboldt County.
- Every 1 direct job created by LAC capital construction investment will generate an additional 1.5 jobs in Humboldt County.

Humboldt County Total Impacts Direct + Indirect + Induced	Construction-Annual Average (7 Years) (Phase 1 & 2)	Operations-Annual Average (35 Years)
Investment or Sales	$727.2M	$2,119.7M
Personal Income	$81.8M	$122.3M
Employment	1,120	1,320
Local & County Taxes	$6.5M	$26.5M
State Taxes	$9.8M	$40.7M
Federal Taxes	$18.1M	$63.3M

State of Nevada Summary Impacts

Construction (7 Year Annual Average)

- Every $1 of LAC capital construction investment will generate an additional $0.76 of spending in the State of Nevada.
- Every $1 of LAC labor income, because of capital construction investment, will generate an additional $3.46 in labor income in the State of Nevada.
- Every 1 direct job created by LAC capital construction investment will generate an additional 6.0 jobs in the State of Nevada.

Annual Operations (35Year Annual Average)

* Every $1 of LAC capital construction investment will generate an additional $0.15 in spending in the State of Nevada.
* Every $1 of LAC labor income, because of capital construction investment, will generate an additional $1.04 in labor income in the State of Nevada.
* Every 1 direct job created by LAC capital construction investment will generate an additional 2.2 jobs in the State of Nevada.

State of Nevada Total Impacts Direct + Indirect + Induced	Construction-Annual Average (7 Years) (Phase 1 & 2)	Operations-Annual Average (35 Years)
Investment or Sales	$1,018.6M	$2,174.4M
Personal Income	$179.5M	$148.6M
Employment	2,422	1,664
Local & County Taxes	$10.9M	$28.7M
State Taxes	$19.2M	$51.0M
Federal Taxes	$38.2M	$65.6M

The proposed lithium operations will help diversify Humboldt County's mineral industry. The development is also improving the local linkages for electricity. Also, the worldwide demand for lithium carbonate continues to outpace the supply. As clean air technology advances, the use of lithium carbonate in batteries for electric cars will continue to rise. This provides more value-added opportunities and more significant impacts on the State of Nevada. Finally, the possibility of attracting other manufacturing industries exists and may be the beginning of a cluster of industries that use lithium carbonate as part of their production process.

Introduction

Humboldt County is the oldest county in Nevada that has built its economy around agriculture, mining, and tourism. Agriculture leads the state with over 100,000 acres under cultivation, while sustainable tourism is supported through gaming, abundant outdoor recreation opportunities, and excellent hunting and fishing. Mining has been a cornerstone since the beginning, with rich mineral deposits of gold, dolomite, opal, petrified wood, and silver. Humboldt County is looking to broaden its mineral mining to include lithium. McDermitt Caldera has large lithium deposits which can meet the increasing market demands.

This report evaluates the economic and fiscal impacts of a new lithium mine and processing plant on Humboldt County and the State of Nevada. This study will give useful information to Humboldt County and Nevada on how to plan for the challenges and opportunities of this project. An earlier study from 2017 to 2019 met NEPA requirements and helped economic development planning; this report provides an update.

Humboldt County, Nevada

Humboldt County, Nevada, was described in 1881 as having alkali plains, sparse sagebrush, and bunchgrass clumps. It's the oldest county with this description. Humboldt County is known for flat valleys, sudden elevation mountains, sagebrush, rocks, meadows, and lizards. Originally, the county was named after the Humboldt River, but currently, it comprises less than 0.1% of surface water. Humboldt County's environment creates citizens who are both independent and community oriented.

Winnemucca is the only incorporated city in the county, but there are other places designated by the census, such as Paradise Valley and Fort McDermitt. Here, as well as around the rest of the county, summer days are hot, and the temperature drops at night. This city, partly because of its rich history, supports activity that makes the city the chief outsourcing center in

Humboldt County. For example, daily service to San Francisco and Chicago is provided by Amtrak's California Zephyr from Winnemucca. Also, Winnemucca is home to the headquarters of the Winnemucca Indian Colony of Nevada, which is a federally recognized tribe of both Western Shoshone and Northern Paiute Indians.

Winnemucca, together with its surrounding area, is a very involved community. Events are consistently hosted and attended. Winnemucca hosts year-round festivals such as Wine Walks, an archery challenge, and more. There is also the Humboldt Museum, the Winnemucca Sand Dunes, and of course, the visitor center. But perhaps the main pull, as is usual with rural communities, is the school district. The Humboldt County School District serves the northwestern part of the state. Winnemucca is the main location for the schools, but they also serve other areas like Denio, Kings River Valley, McDermitt, Orovada, and Paradise Valley. Winnemucca offers a range of sports for children, including baseball, basketball, football, volleyball, golf, soccer, tennis, and dance. This brings the community together with weekly events and gatherings and provides a sense of hometown pride.

A glance at a satellite map proves Humboldt County's self-reliant solidarity. There are patches of farmland in between the interstates and the dirt roads. The occasional ranch lies between the occasional mountain peaks. I-80 and U.S. 95, the two main highways, intersect in Winnemucca, where most of everything else congregates. Not only do certain citizens appreciate the rural exclusion, but a coming-together too is a big part of living in this region.

Social and Economic Characteristics

A community's social and economic characteristics are one of the first steps in understanding how a community may respond to change. Social and economic trends can be a baseline for future planning. The data on social and economic factors came from ESRI, the Bureau of Census, and the Bureau of Economic Analysis through secondary sources. The following pages present tables, graphs, and summary findings for each variable.

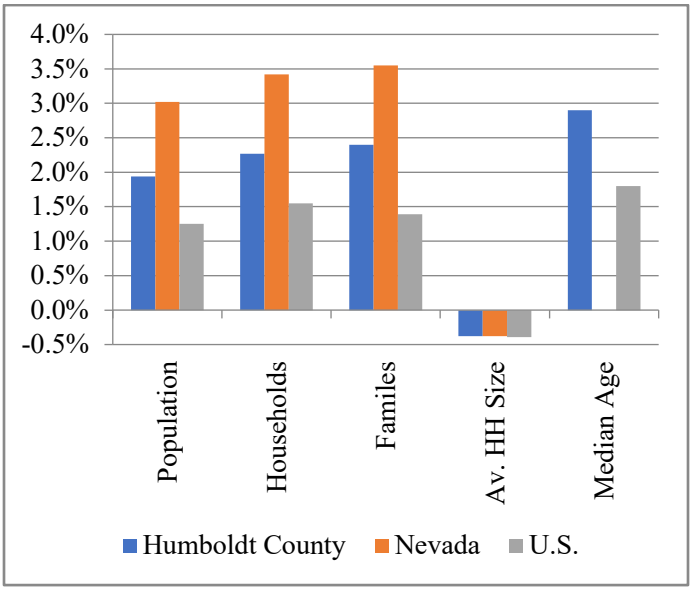
General Demographics

Table 1. General Demographics

	Humboldt County			Nevada	U.S.
	2022	Estimated 2027	% Change 2022-27	% Change 2022-27	% Change 2022-27
Population	17,465	17,804	+1.94%	+3.02%	+1.25%
Households	6,657	6,808	+2.27%	+3.42%	+1.55%
Families	4,536	4,645	+2.40%	+3.55%	+1.39%
Average HH Size	2.60	2.59	-0.38%	-0.38%	-0.39%
Median Age	37.9	39.0	+2.90%	0.00%	+1.80%

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 1. Percent Change 2022 – 2027



Summary:

- Between 2017 and 2022, Humboldt County's population, households, families, and median age are projected to increase by two to three percent.
- Average household sizes in Humboldt County, Nevada, and the U.S. are slightly decreasing.
- Nevada's general demographic indicators are projected to grow at a rate slightly greater than Humboldt County.

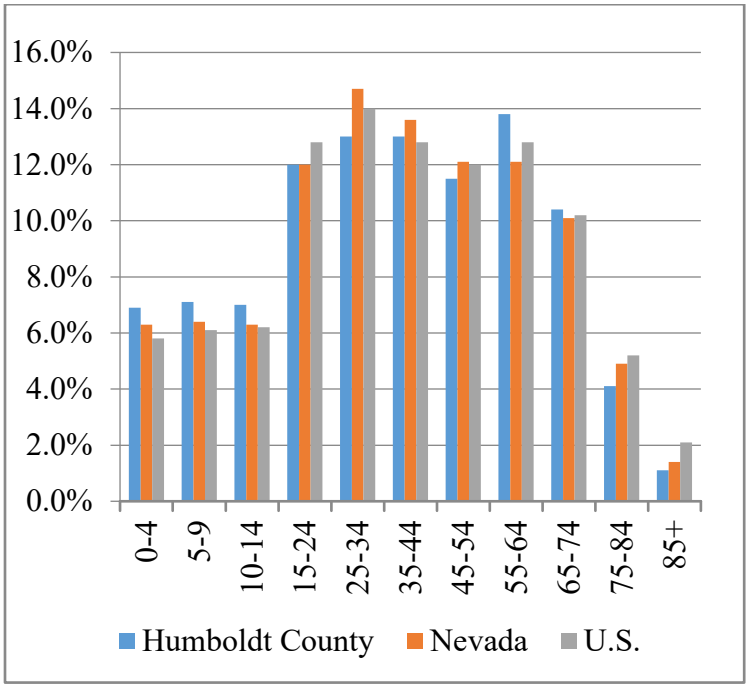
Age Distribution

Table 2. Population by Age

	Humboldt County				Nevada	U.S.
	2022	Percent 2022	Estimated 2027	Percent 2027	Percent 2022	Percent 2022
0-4	1,205	6.9%	1,228	6.9%	6.3%	5.8%
5-9	1,240	7.1%	1,246	7.0%	6.4%	6.1%
10-14	1,223	7.0%	1,282	7.2%	6.3%	6.2%
15-24	2,096	12.0%	2,101	11.8%	12.0%	12.8%
25-34	2,270	13.0%	2,083	11.7%	14.7%	14.0%
35-44	2,270	13.0%	2,421	13.6%	13.6%	12.8%
45-54	2,008	11.5%	2,047	11.5%	12.1%	12.0%
55-64	2,410	13.8%	2,101	11.8%	12.1%	12.8%
65-74	1,816	10.4%	2,047	11.5%	10.1%	10.2%
75-84	716	4.1%	1,015	5.7%	4.9%	5.2%
85+	210	1.1%	231	1.3%	1.4%	2.1%
Total	17,465	100%	17,804	100%	100%	100%

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 2. Percent Age Distribution, 2022



Summary:

- In 2022, over 51 percent of Humboldt County's population is between 25 and 65. This age cohort is projected to decrease to 48.6 percent of the total population by 2027.
- Sixty-five years and older are the fastest growing ages group in Humboldt County and is estimated to account for nearly 19 percent of the total population by 2027.

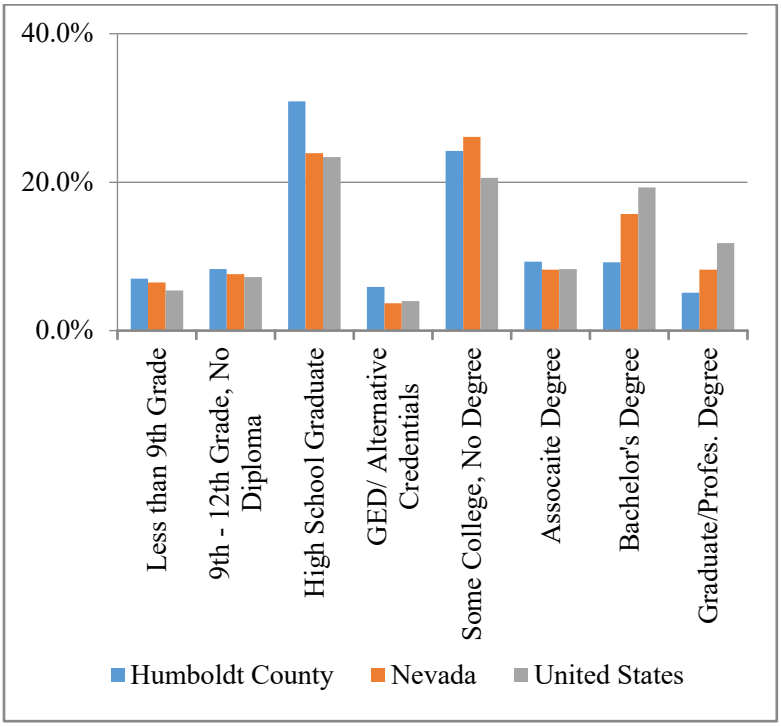
Educational Attainment & School Enrollment

Table 3. Educational Attainment – Population 25+ Years Old

	Humboldt		Nevada	US
	2022	Percent 2022	Percent 2022	Percent 2022
Less than 9th Grade	854	7.3%	4.4%	4.1%
9th – 12th Grade, No Diploma	1,182	10.1%	7.4%	5.9%
High School Graduate	3,124	26.7%	24.2%	23.1%
GED/Alternative Credentials	456	3.9%	4.4%	4.0%
Some College, No Degree	2,972	25.4%	22.3%	18.3%
Associate Degree	1,065	9.1%	9.8%	9.4%
Bachelor's Degree	1,299	11.1%	17.8%	21.7%
Graduate/Professional Degree	761	6.5%	9.6%	13.4%
Total	11,702	100%	100%	100%

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 3. Percent Educational Attainment–Population 25+ Years Old, 2012



Summary:

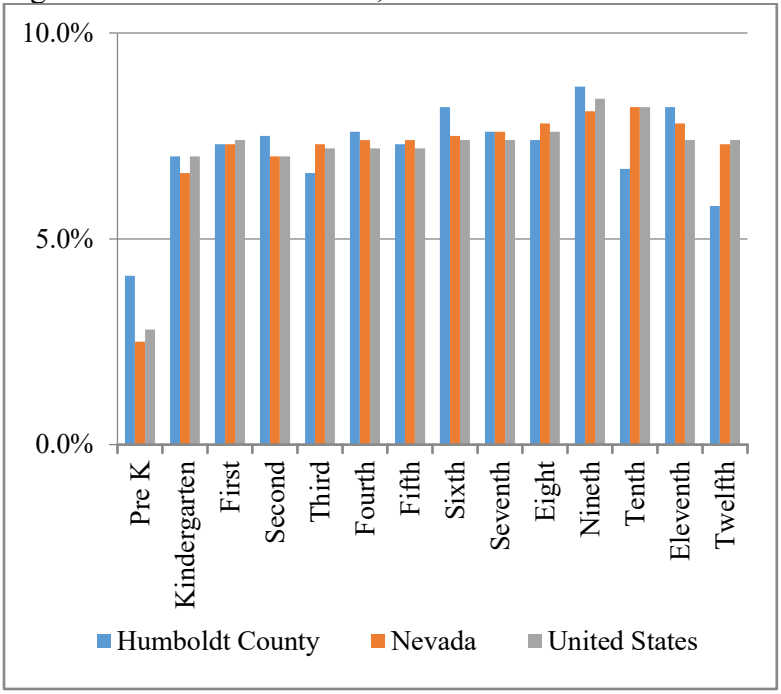
- In 2022, Humboldt County educational attainment for residents 25 years and older reported approximately 17 percent of the population with less than a 12th grade education. However, nearly 31 percent of the population 25 years and older have received a high school diploma or GED.
- Over 52 percent of Humboldt residents 25 and older have received post-high school education. This compares to Nevada, which has nearly 60 percent of residents 25 years and older receiving post-high school education.

Table 4. School Enrollment, 2022-2023

	Humboldt		Nevada	US
	2022-23	Percent 2022-23	Percent 2022-23	Percent 2022-23
Pre K	135	4.1%	2.5%	2.8%
Kindergarten	232	7.0%	6.6%	7.0%
First Grade	241	7.3%	7.3%	7.4%
Second Grade	248	7.5%	7.0%	7.0%
Third Grade	220	6.6%	7.3%	7.2%
Fourth Grade	250	7.6%	7.4%	7.2%
Fifth Grade	241	7.3%	7.4%	7.2%
Sixth Grade	271	8.2%	7.5%	7.4%
Seventh Grade	253	7.6%	7.6%	7.4%
Eight Grade	244	7.4%	7.8%	7.6%
Nine Grade	288	8.7%	8.1%	8.4%
Tenth Grade	223	6.7%	8.2%	8.2%
Eleventh Grade	272	8.2%	7.8%	7.4%
Twelve Grade	192	5.8%	7.3%	7.4%
Total	3,311	100%	100%	100%

Source: Humboldt County and Nevada Data from Nevada Report Card, 2022 academic year (2023 accountability year). Enrollment; Pulled June 5, 2023. U.S. Data from the National Center for Education Statistics; projected 2022 Enrollment; Pulled June 5, 2023.

Figure 4. School Enrollment, 2022-2023.



Summary:

- In 2022, Humboldt County school enrollment was 3,311 students and ranged from 135 students enrolled in Pre-K to 288 students enrolled in the ninth grade.
- Approximately 55 percent of total school enrollment is in grades Pre-K through sixth grade, followed by 15 percent in junior high (grades 7th & 8th) and 29 percent in high school (grades 9th through 12th).

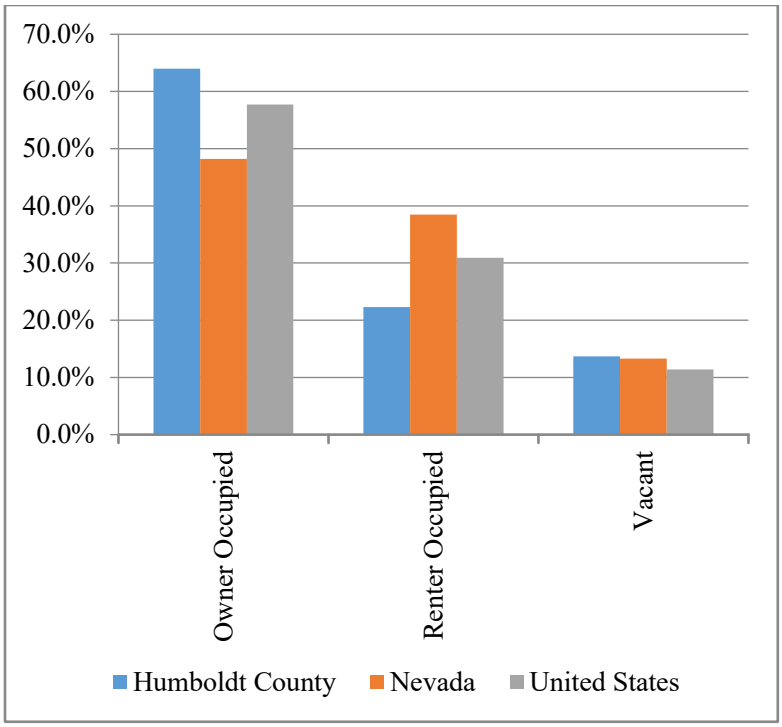
Housing

Table 5. Housing Units.

	Humboldt County				Nevada	US
	2022	Percent 2022	Estimated 2027	Percent 2027	Percent 2022	Percent 2022
Housing Units (Total)	7,714		7,803			
Owner Occupied	4,937	64.0%	5,103	65.4%	48.2%	57.7%
Renter Occupied	1,720	22.3%	1,709	21.9%	38.5%	30.9%
Vacant	1,057	13.7%	991	12.8%	13.3%	11.4%
Median Value	$260,153		$273,138		$350,582	$283,272
Average Value	$323,034		$352,711		$397,377	$374,078

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 5. Housing Units, 2022.



Summary:

- In 2022, Humboldt County reported 7,714 housing units, where 64 percent were owner-occupied, 22.3 percent were renter-occupied, and 13.7 percent were vacant. By 2027, Humboldt County home ownership will increase 166 units.
- It is forecasted that by 2027 housing unit inventory in Humboldt County will grow to 7,803 units (+1.1%).
- Overall, the percentage of home ownership is significantly higher when compared to Nevada and U.S. home ownership.

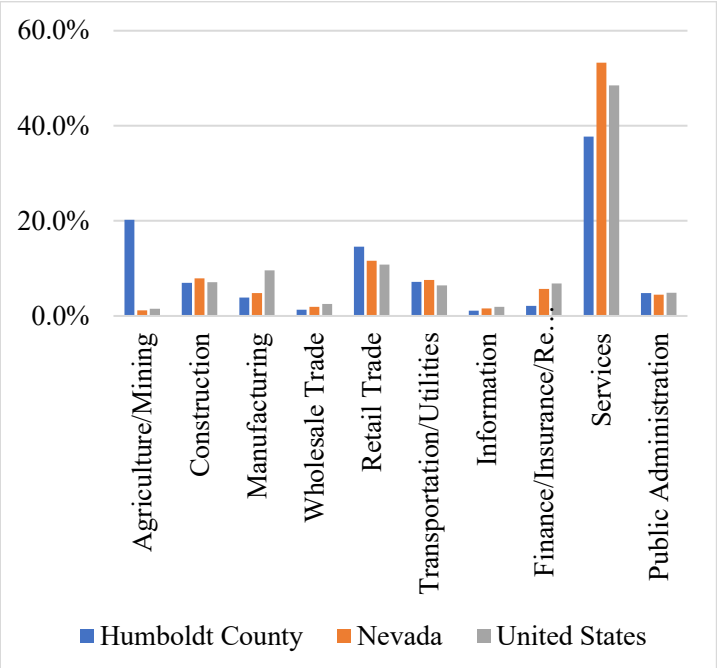
Industry Employment & Occupations

Table 6. Employed Population 16+ by Industry.

	Humboldt County		Nevada	US
	2022	Percent 2022	Percent 2022	Percent 2022
Agriculture/Mining	1,843	20.2%	1.2%	1.5%
Construction	639	7.0%	7.9%	7.1%
Manufacturing	356	3.9%	4.8%	9.6%
Wholesale Trade	119	1.3%	1.9%	2.5%
Retail Trade	1,332	14.6%	11.6%	10.8%
Transportation/Utilities	657	7.2%	7.6%	6.4%
Information	100	1.1%	1.6%	1.9%
Finance/Insurance/Real Estate	192	2.1%	5.7%	6.8%
Services	3,446	37.7%	53.3%	48.5%
Public Administration	442	4.8%	4.5%	4.9%
Total	9,126	100%	100%	100%

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 6. Percent Employment– Population 16+ Years Old, 2022.



Summary:

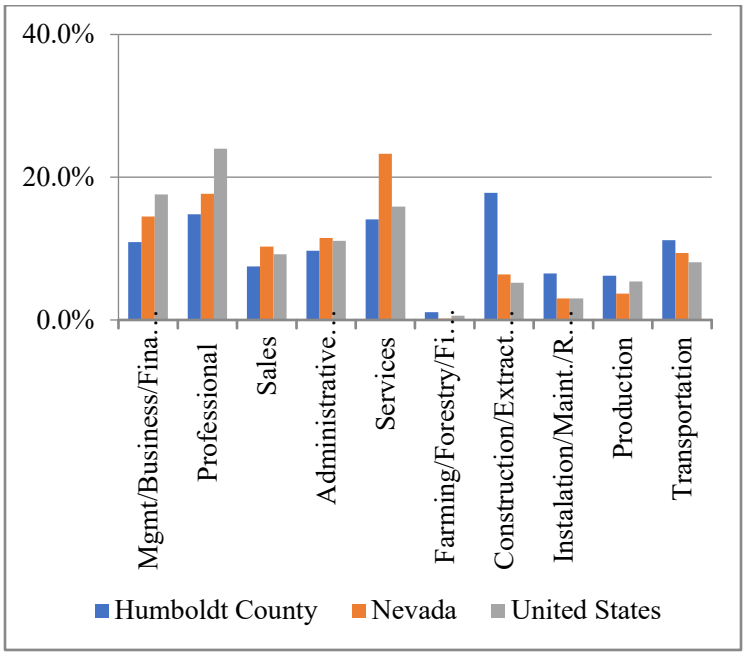
- In 2022 Humboldt County's top three industries account for over 72 percent of the entire county's employment. The service industry accounts for 37.7 percent of Humboldt County's total employment, followed by Agriculture/Mining sector at 20.2 percent and retail trade at 14.6 percent.
- Compared to Nevada and U.S. employment trends, Humboldt County shows more of a diverse employment base across many industries.

Table 7. Employed Population 16+ by Occupation.

	Humboldt County		Nevada	US
	2022	Percent 2022	Percent 2022	Percent 2022
White Collar	3.924	43.0%	54.0%	61.8%
Mgmt./Business/Finance	995	10.9%	14.5%	17.6%
Professional	1,351	14.8%	17.7%	24.0%
Sales	684	7.5%	10.3%	9.2%
Administrative Services	885	9.7%	11.5%	11.1%
Services	1,287	14.1%	23.3%	15.9%
Blue Collar	3,915	42.9%	22.6%	22.3%
Farming/Forestry/Fishing	100	1.1%	0.2%	0.6%
Construction/Extraction	1,624	17.8%	6.4%	5.2%
Installation/Maint. /Repair	593	6.5%	3.0%	3.0%
Production	566	6.2%	3.7%	5.4%
Transport. /Material Moving	1,022	11.2%	9.4%	8.1%
Total	9,126	100%	100%	100%

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 7. Percent Employment– Population 16+ Years Old by Occupation, 2022



Summary:

- Nearly 86 percent of Humboldt County residents 16 years and older are employed in white- and blue-collar jobs, 43 percent, and 42.9 percent, respectively. The remaining 14 percent of the population is employed in service occupations.
- Compared to the State of Nevada and the U.S., Humboldt County has nearly double the percentage of total employment in blue-collar occupations.

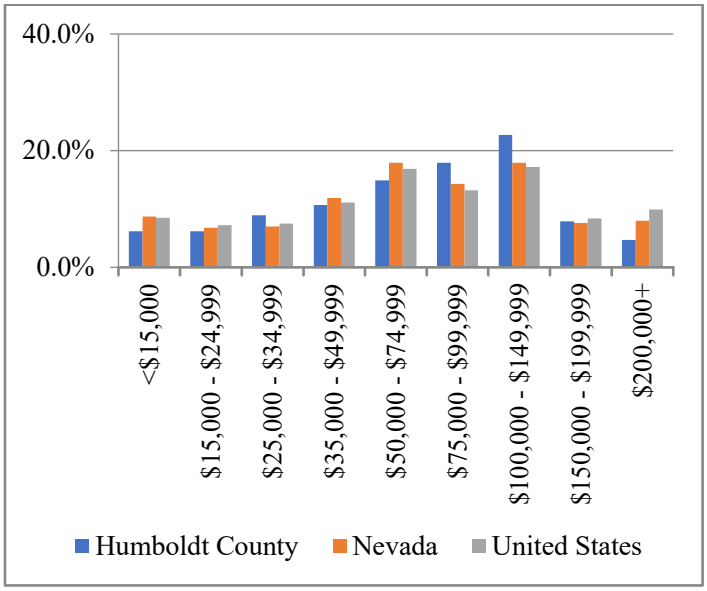
Household Income

Table 8. Household Income

	Humboldt County				Nevada	US
	2022	Percent 2022	Estimated 2027	Percent 2027	Percent 2022	Percent 2022
<$15,000	413	6.2%	361	5.3%	8.7%	8.5%
$15,001-$24,999	413	6.2%	381	5.6%	6.8%	7.2%
$25,000 - $34,999	592	8.9%	477	7.0%	7.0%	7.5%
$35,000 - $49,999	712	10.7%	647	9.5%	11.9%	11.1%
$50,000 - $74,999	992	14.9%	878	12.9%	17.9%	16.9%
$75,000 - $99,999	1,192	17.9%	1,376	20.2%	14.3%	13.2%
$100,000 - $149,999	1,508	22.7%	1,603	23.5%	17.9%	17.2%
$150,000 - $199,999	522	7.9%	718	10.5%	7.6%	8.4%
$200,000+	313	4.7%	368	5.4%	8.0%	9.9%
Total	6,657	100%	6,808	100%	100%	100%
Median HH Income	$78,169		$84,800		$70,770	$72,414
Average HH Income	$93,209		$104,887		$98,273	$105,029
Per Capita Income	$35,543		$40,123		$37,434	$40,363

Source: ESRI Forecast for 2022 and 2027. U.S. Census Bureau 2000 and 2010 Decennial Census data converted by ESRI into 2020 geography.

Figure 8. Percent Household Income Distribution, 2022



Summary:

- Between 2022 and 2027, Humboldt County Median Household income is projected to increase by approximately 8.5 percent.
- Nearly 44 percent of Humboldt County households have income between $35,000 and $99,999, 35 percent over $100,000, and 21 percent below $35,000.

Lithium Industry

What is Lithium?

Lithium is the lightest metal in the periodic table with the symbol Li and atomic number 3. It is a soft, silver-white metal belonging to the alkali metal group. Under standard conditions, it is the least dense solid element. Like all alkali metals, lithium metal is highly reactive and flammable. It's great for batteries and various industries because of its lightness and high reactivity. Pure lithium never occurs freely in nature, only in compounds. Lithium is present in pegmatitic minerals, particularly spodumene, and can also be extracted from sea water, brines, and clays.

Lithium has gained increased attention and importance due to the development of the lithium-ion battery storage market. Over the past 5 years, the demand for lithium has increased because of electric transportation and alternative energy. Manufacturing lithium-ion batteries demands lithium chemical compounds that meet specific physical and chemical standards.

Lithium Demand

As this decade began, the market for lithium chemicals could only be described as tiny compared to other metals such as copper or nickel. In 2012, the entire global market for lithium chemicals was less than U.S. $1 billion in sales. The global lithium market size is valued at $7.49 billion in 2022 and is expected to grow at a compound annual growth rate of 11% from 2023 to 2040[1]. The cost of lithium is not significant in applications like rechargeable batteries, glass, grease, and medicine. Demand for lithium chemicals is relatively price inelastic.

Investing in the lithium industry is a good opportunity for the next decade because of high demand and limited supply. In 2016, global demand for lithium chemicals was approximately 180,000 Metric tonnes (MT) of lithium carbonate equivalent (LCE). Benchmark

[1] Benchmark Mineral Intelligence Q2 2023

Mineral Intelligence (2023 Q2 report) estimates the lithium-ion battery share of demand was 38% or approximately 68,000 MT LCE. Glass-related applications are the second largest in demand at 23% followed by grease at 11%. The top three applications account for over 70% of demand.

Lithium carbonate is a common ingredient in lithium-ion batteries. Lithium hydroxide is used for high nickel materials in cells that need more charge and discharge and have a longer life. Several experts project that existing mineral deposits must produce twice as much lithium within the next 5-8 years. The transportation industry needs a lot more lithium production for full electrification.

In the past, batteries were mostly used for cell phones, laptops, and power tools. But in the next decade, batteries will be in high demand for electric bikes, scooters, cars, and renewable energy storage systems. Projections for the speed of development of both e-transportation and ESS vary widely. Benchmark Mineral Intelligence predicts that battery demand will make up 81% of market demand, or around 493,000 MT LCE, in 2022, with total lithium demand rising to 10,000 MT LCE.

Lithium Landscape

There are a few companies that have the knowledge and ability to produce the right quality and quantities of these lithium compounds. Albemarle, Ganfeng, and Livent make a lot of high-quality lithium hydroxide and carbonate. SQM is a big player in the lithium carbonate market. These compounds can be produced from several types of lithium deposits (lithium brine, hard rock, and clay). Albemarle, SQM, Orocobre, and Livent have brine assets, and Albemarle and Tianqi share the largest hard rock deposit in Australia. The only operating lithium resource in the U.S. is in Silver Peak, Nevada, where Albemarle operates a small brine deposit.

Hard rock deposits are usually an open pit mine. The ore must undergo beneficiation and then be roasted with sulfuric acid at a high temperature to extract lithium. The lithium enriched solution is then purified and converted to either lithium carbonate or lithium hydroxide.

Brine based lithium deposits are typically lithium chloride in a saturated sodium chloride solution. This requires a different purification process than the hard rock process. In areas with very high evaporation rates, natural evaporation is used to enrich the brine. Lithium is then

precipitated as lithium carbonate to separate and purify it. The lithium carbonate is then used as the feedstock for other lithium compound production.

The only new, viable type of deposit currently under development is clay-based deposits. These clays may be found in or around old calderas with special geographic attributes. Within the State of Nevada, one such deposit has been identified in the McDermitt Caldera area. The deposit on the Nevada-Oregon border can satisfy the high demand for lithium.

According to the USGS, there is no global consensus on the definition of "strategic and critical" commodities. It has been accepted as those materials that are vital to support societal requirements and Government policy (USGS 2016a). Lithium has been identified as a material that is not found or produced in sufficient quantity in the United States to meet the Nation's requirements and the material is currently being stockpiled by the Defense Logistics Agency (USGS 2016a).

According to the USGS, smectite and illite clays at the Kings Valley Lithium deposit (Thacker Pass) have a large amount of lithium. USGS recognizes Thacker Pass lithium resources as critical for clean energy development as defined in the American Recovery and Reinvestment Act (USGS 2016b). Currently, the Thacker Pass contains approximately 16.1 tonnes of LCE, with an average 2.070 lithium parts per million (ppm) (Measured and Indicated Resource Estimate as on November 2, 2022).

Methodology

To estimate the economic impact of changes in Humboldt County's economy, such as building and operating a lithium mine and processing plant, an input-output or inter-industry model was used. This will help see how new industries affect jobs and household income. Inter-industry analysis was developed by Wassily Leontief in 1936 to show how different economic sectors in a study area are related. The connection between economic sectors can be seen by analyzing their sales and purchases. Since its inception, the framework of inter-industry models has continued to be improved and is one of today's most applied analytical techniques in economics (Baumol, 2000). The advantage of inter-industry analysis is its ability to provide an easy-to-understand, transparent, and detailed picture of the economic structure of a study area's economy at a point in time. Another advantage is that inter-industry models do not incorporate

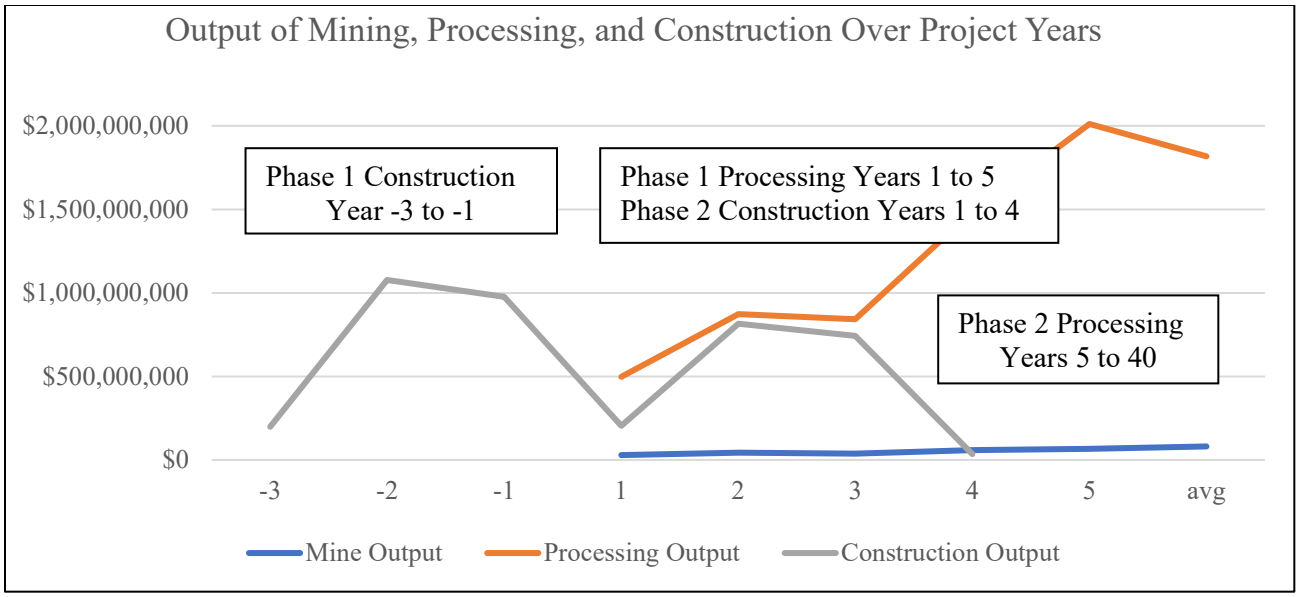
behavioral equations of individuals or businesses, so they are politically and ideologically neutral (Foran, Lenzen, and Dey, 2005).

One of the most used secondary input-output models is IMPLAN. Initially developed by the USFS, IMPLAN is now a private modeling company (IMPLAN, 2014). The two primary components of IMPLAN are its data files and software. The desktop database includes information on 528 different economic sectors and a national input-output model to derive regional or county-level input-output models. The IMPLAN model is reasonably flexible, allowing users to derive economic impacts and customize a model for an analysis, such as constructing a new lithium mine and processing plant, and operating a lithium mine and processing plant.

Data

The data used to estimate the economic impact comes from a financial analysis of the Thacker Pass Project from Lithium Americas Corp. (LAC). LAC uses financial analysis to determine operational feasibility and contains information on expected production levels and revenue, total employment and labor costs, inputs for production, services, and estimated tax burden. These are the prerequisite values for any economic impact analysis. This analysis models the first eight years and an average of the remaining 35 years.

- Years -3 through -1 are designated as Phase 1 construction, which involves building the mine and facilities.
- Years 1 to 4 marks Phase 2 construction, which boosts mine capacity by 100% or full capacity.
- Years 1-5 is the startup stage for mining and processing operations, but at less than 100% capacity. Also, during this stage, Phase 2 construction will be completed to increase mining and process to 100% capacity.
- Year 5, and the completion of phase 2 construction, LAC lithium mining and processing operation should be at full capacity.
- Years 5 through 40 (35 years) are at full capacity with necessary capital improvements and plant maintenance.



Custom Industries

Industries in economic impact analysis software are modeled on *averages* across several sectors of the economy. Therefore, the default sectors may not represent the modeled operations. The analysis uses detailed operational expenditure information from the financial analysis to create two custom industries that reflect the best *ex-ante* projections of intermediate inputs.

Operations are managed by two divisions: Sawtooth Mining for mining and Thacker Pass for processing. The IMPLAN industries altered to model these industries are 22 (for mining) and 27 (for processing). The custom mining sector is an intermediate input for the process sector.

Industry Impact Analysis & Impact Components

The financial analysis gives the information to complete a detailed industry impact analysis. This includes total employment, labor costs, taxes, profits, and total output. Total impacts are estimated using the following components:

Direct affects

Represents the expenditure amounts from the project made directly in the regional economy. Operating expenses are what the project needs to run, and employment is how people are directly employed with the project.

Indirect Effects

The purchases made by vendors to restock their inventory have an indirect impact when they buy goods and services from other vendors who also do the same. These purchases are also commonly referred to as the "ripple effect."

Induced Effects

The activity caused a chain reaction of economic benefits, including more jobs, more money, and higher household spending on goods and services. These impacts reflect the increase in spending in the household sector as income increases or decreases because of changes in the production of goods and services.

Total Impact

The increase in potential productivity in the regional economy is based on the expenditure from the project. Each component of the project (direct + indirect + induced) generates economic impacts that can be combined to show the total economic impact of the project.

Tax affects

Represents the various taxes collected at local, state, and federal levels. The following table summarizes the different taxes collected at each level.

State & Local Taxes		Federal Taxes
Dividends		*Social Insurance*
Social Insurance:		Employee Contribution
Employee Contribution		Employer Contribution
Employer Contribution		
Tax on Production and Imports:		*Tax on Production and Imports*
Sales Tax		Excise
Property Tax		Custom Duty
Motor Vehicle License		Fed Non-Taxes
Severance/Net Proceeds		
Other Taxes		*Corporate Profit*
S/L Non-Taxes		
Corporate Profits		*Personal Income Tax*
Personal Tax		
Income Tax		
Fine & Fees		
Motor Vehicle		
Other Tax		

Impact Multipliers

Impact multipliers are predicated upon a domino theory of economic change. The change in one sub-sector causes a change in related sub-sectors. Multipliers are estimators of the "ripple effect." Examples and interpretations include:

An ***Output*** multiplier of 1.5 shows that for every $1 in output, an additional $0.50 of additional output is produced in the local economy.

An ***Income Multiplier*** of 1.5 shows that every $1 of direct income generates an additional $0.50 of income in the local economy.

An ***Employment Multiplier*** of 1.5 shows that every direct job generates an additional 0.5 jobs in the local economy.

Economic Impacts

Two levels of economic impact are estimated for this study. First, short-term construction impacts include capital investment to construct the mine and processing facilities. The construction stage will last up to seven years or until both phases of the mine and processing facility are operating at 80,000 tonnes per year. Second, the long-term sustainable annual investment in the mine and processing facility operations for 40 years. Sustainable impacts include consistent annual levels of direct, indirect, and induced purchases, wages and salaries, employment, and taxes. Total economic impacts are calculated for Humboldt County and the State of Nevada.

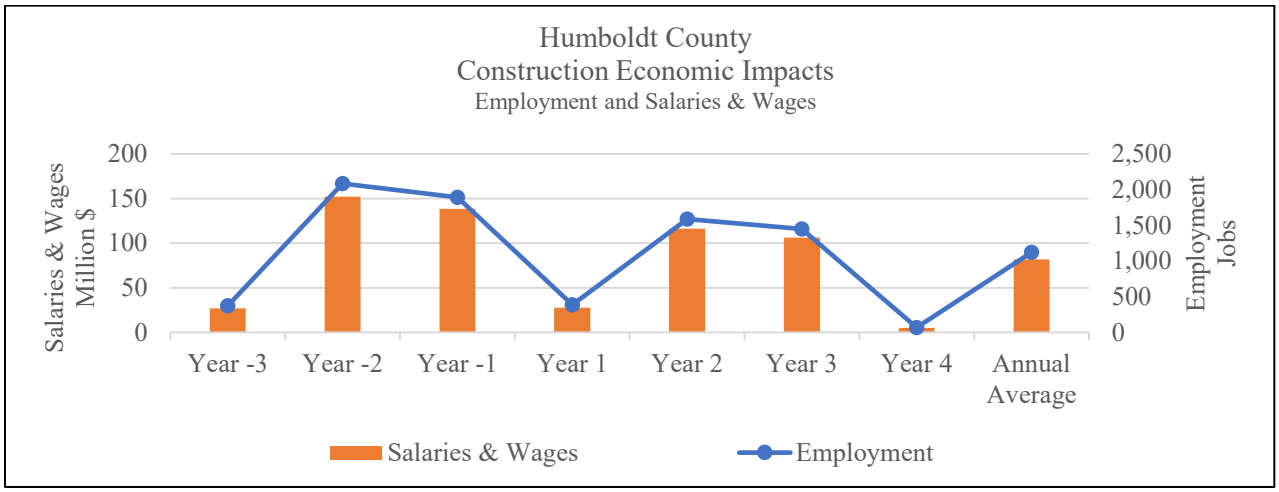
Construction Impacts

Approximately $4 billion of capital construction expenditures will occur over seven years. During the initial years of the lithium operation, there are substantial expenses involved in constructing the facility, mine, and processing infrastructure. The expenditures by the mine and processing operations are modeled using the IMPLAN industry code 56 New Nonresidential Building Construction. The impacts are modeled using the estimated output demanded by the lithium operations and the per-worker metrics for Humboldt County, Nevada. Therefore,

employment and other metrics (intermediate inputs, labor costs, profit, and taxes) are based on the per-worker values in the Humboldt County IMPLAN region for sector 56. The same per-worker values are used for the state-level analysis.

Tables 9 and 10 summarize the capital construction impacts on Humboldt County and the State of Nevada. The LAC investment in Humboldt County will impact various industries, including construction, professional services, mining, transportation, wholesale, and retail trade.

- **Humboldt County Construction Impacts.** During the seven-year mine and facility construction, *an average annual investment* of $578.4 million will create $727.2 million in total economic activity in Humboldt County, including $148.8 million in secondary effects. This includes $81.8 million in salaries and wages and supporting 1,120 jobs throughout the county. This will also generate $6.5 million in local and county taxes and $9.8 million in state taxes. (Table 9).



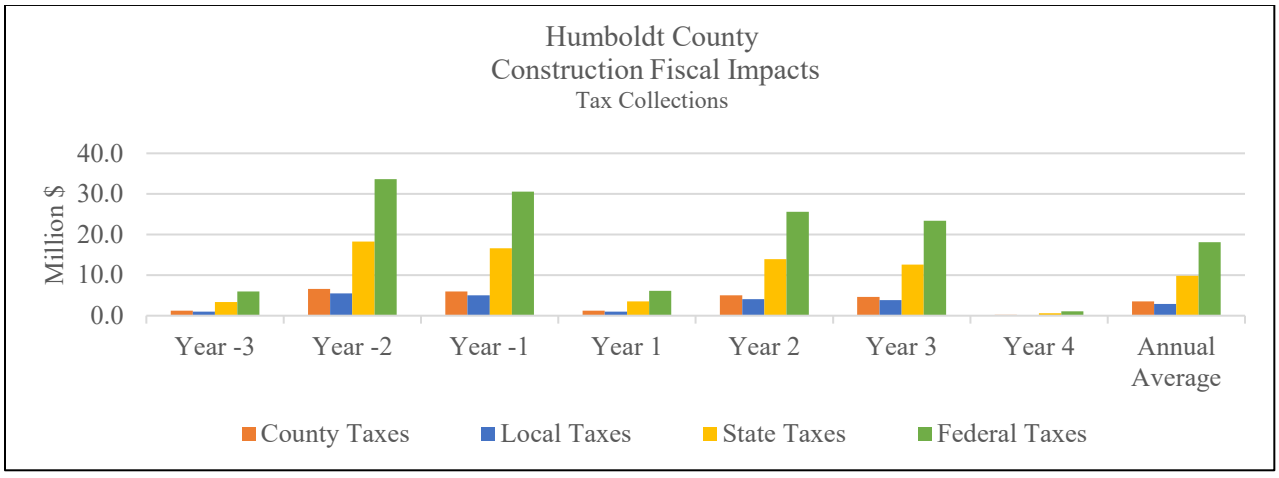
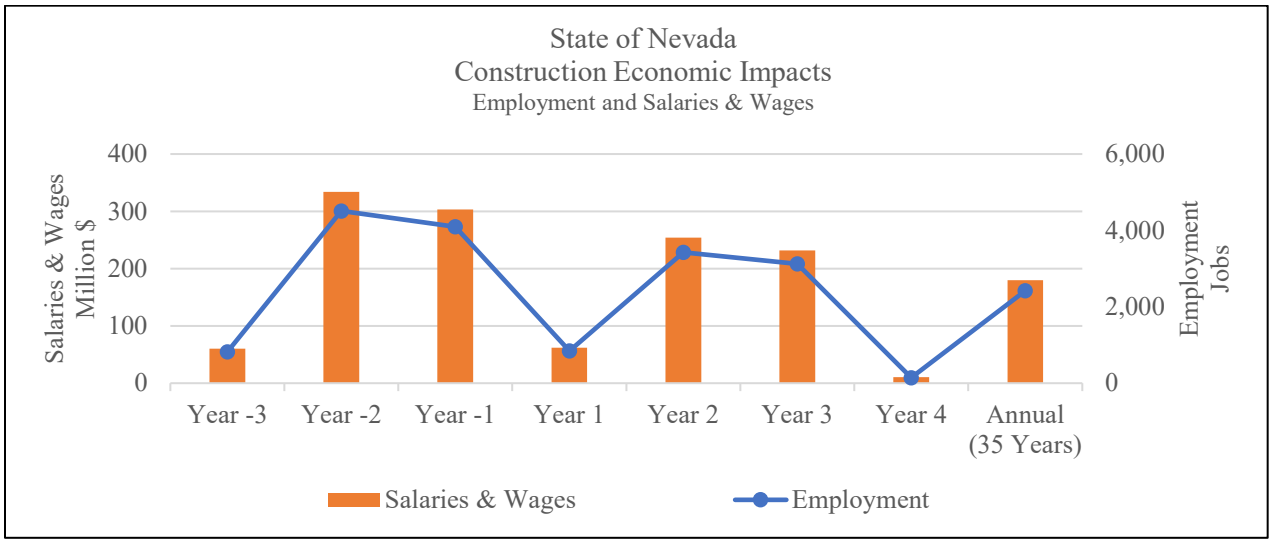


Table 9. Capital Construction Expenditure Impacts on Humboldt County.

	Year -3	Year-2	Year -1	Year 1	Year 2	Year 3	Year 4	Average Annual
Employment								
Direct	108	635	581	110	490	448	21	342
Indirect	221	1,191	1,078	227	901	820	38	639
Induced	46	259	235	47	198	180	8	139
Total	374	2,085	1,895	384	1,588	1,448	68	1,120
Salaries & Wages								
Direct	$12.7M	$74.8M	$68.4M	$13.0M	$57.7M	$52.8M	$2.5M	$40.3M
Indirect	$12.4M	$67.2M	$60.8M	$12.8M	$50.8M	$46.2M	$2.2M	$36.1M
Induced	$1.8M	$10.1M	$9.2M	$1.8M	$7.8M	$7.1M	$0.3M	$5.5M
Total	$27.0M	$152.1M	$138.5M	$27.6M	$116.2M	$106.1M	$4.9M	$81.8M
Economic Output								
Direct	$198.4M	$1077.2M	$976.0M	$204.0M	$815.7M	$742.8M	$34.5M	$578.4M
Indirect	$43.2M	$233.3M	$211.2M	$44.5M	$176.4M	$160.6M	$7.5M	$125.2M
Induced	$7.8M	$43.9M	$40.0M	$8.0M	$33.6M	$30.6M	$1.4M	$23.6M
Total	$249.4M	$1354.4M	$1227.1M	$256.4M	$1025.7M	$934.0M	$43.4M	$727.2M
Taxes								
SC*-General	$0.2M	$1.0M	$0.9M	$0.2M	$0.7M	$0.7M	$0.0M	$0.5M
SC* Special District	$0.8M	$4.5M	$4.1M	$0.8M	$3.4M	$3.1M	$0.1M	$2.4M
County	$1.2M	$6.6M	$6.0M	$1.2M	$5.0M	$4.6M	$0.2M	$3.5M
State	$3.4M	$18.3M	$16.6M	$3.5M	$13.9M	$12.6M	$0.6M	$9.8M
Federal	$6.0M	$33.6M	$30.6M	$6.1M	$25.6M	$23.4M	$1.1M	$18.1M
Total	$11.6M	$64.0M	$58.1M	$11.9M	$48.7M	$44.4M	$2.1M	$34.4M
Employment Multiplier								3.28
Income Multiplier								2.03
Output Multiplier								1.26

*sub-county

- **State of Nevada Construction Impacts.** Investing an average of $578.4 million each year during the 7-year mine and facility construction will create $1,018.6 million in economic activity in Humboldt County, with $440.2 million coming from secondary effects. This includes $179.5 million in salaries and wages and supporting 2,422 jobs throughout the state. This will also generate $10.9 million in local and county taxes and $19.2 million in state taxes. (Table 10).



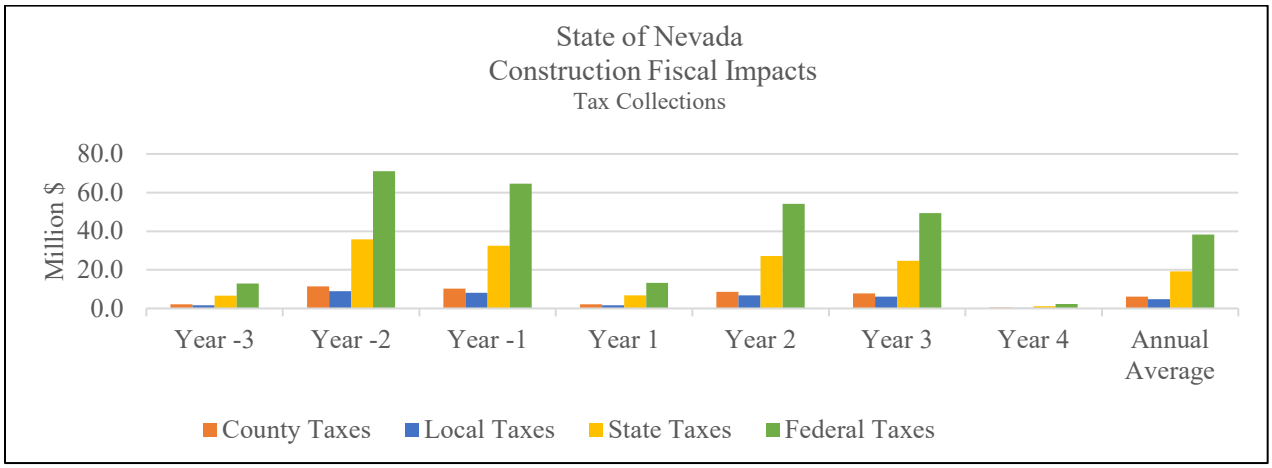


Table 10. Capital Construction Expenditure Impacts on the State of Nevada.

	Year -3	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Average Annual
Employment								
Direct	108	635	581	110	490	448	21	342
Indirect	518	2,798	2,533	533	2,116	1,926	90	1,502
Induced	195	1,077	978	200	819	747	35	579
Total	821	4,510	4,092	843	3,425	3,120	145	2,422
Salaries & Wages								
Direct	$12.7M	$74.8M	$68.4M	$13.0M	$57.7M	$52.8M	$2.5M	$40.3M
Indirect	$36.5M	$197.3M	$178.6M	$37.6M	$149.2M	$135.8M	$6.3M	$105.9M
Induced	$11.2M	$62.1M	$56.4M	$11.5M	$47.2M	$43.0M	$2.0M	$33.3M
Total	$60.5M	$334.1M	$303.4M	$62.1M	$254.1M	$231.6M	$10.8M	$179.5M
Economic Output								
Direct	$198.4M	$1,077.2M	$976.0M	$204.0M	$815.7M	$742.8M	$34.5M	$578.4M
Indirect	$114.9M	$620.3M	$561.6M	$118.2M	$469.1M	$427.0M	$19.9M	$333.0M
Induced	$36.1M	$199.6M	$181.2M	$37.1M	$151.8M	$138.3M	$6.4M	$107.2M
Total	$349.4M	$1,897.1M	$1,718.8M	$359.3M	$1,436.6M	$1,308.2M	$60.8M	$1,018.6M
Taxes								
SC*-General	$0.6M	$3.3M	$3.0M	$0.6M	$2.5M	$2.3M	$0.1M	$1.8M
SC* Special District	$1.0M	$5.6M	$5.1M	$1.1M	$4.2M	$3.8M	$0.2M	$3.0M
County	$2.1M	$11.4M	$10.3M	$2.1M	$8.6M	$7.8M	$0.4M	$6.1M
State	$6.6M	$35.8M	$32.4M	$6.8M	$27.1M	$24.7M	$1.1M	$19.2M
Federal	$12.9M	$71.1M	$64.6M	$13.2M	$54.1M	$49.3M	$2.3M	$38.2M
Total	$23.2M	$127.1M	$115.3M	$23.8M	$96.5M	$87.9M	$4.1M	$68.3M
Employment Multiplier								7.09
Income Multiplier								4.46
Output Multiplier								1.76

*sub-county

Lithium Mining & Processing Operations

Lithium Mining Operations

The economic impact analysis includes a custom industry for Sawtooth's Mining and tailings placement activities, the contracted mining company for the Thacker Pass Project. As with the processing sector, employment and labor costs, taxes, and profits for Sawtooth Mining are gathered from the financial analysis. The intermediate inputs are modeled from the estimated material requirements for Sawtooth Mining included in the same financial analysis. The mining operations are modeled such that the processing sector uses 100% of the mine output, representing the reality of the contract between the two entities.

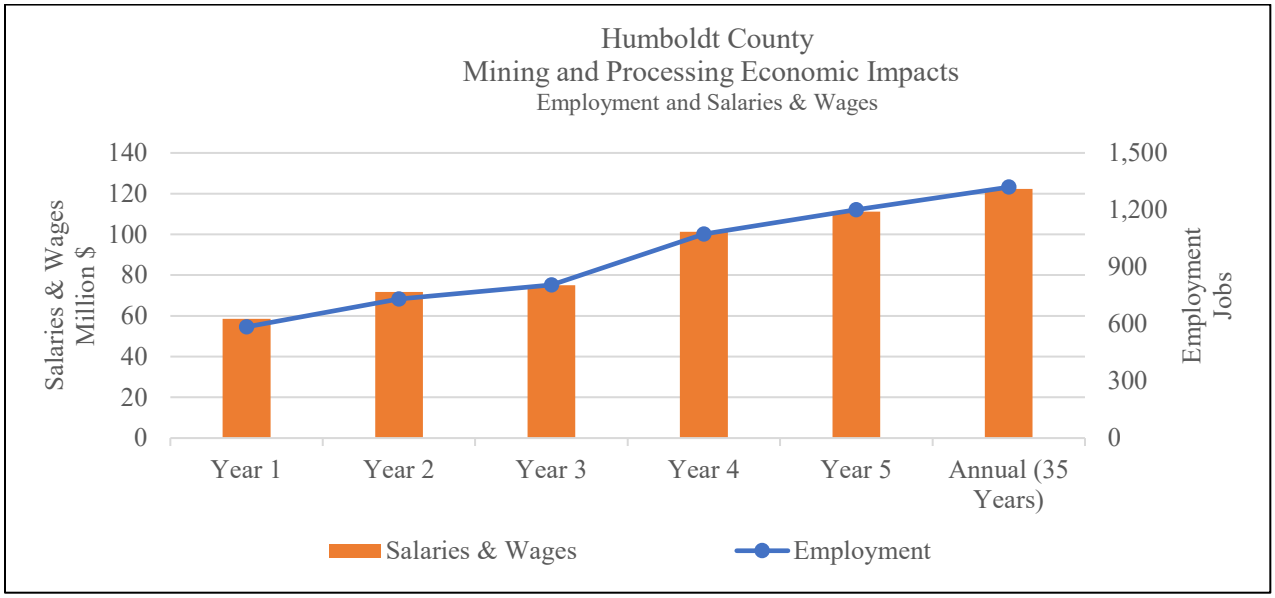
Lithium Processing Operations

A new industry was created in IMPLAN with the help of Lithium Americas' financial analysis. The financial analysis models the capital, material, and labor inputs for processing the lithium mined from Thacker Pass. The model assumes a sale price of $24,000 per metric tonnes (1000 kilograms) of lithium carbonate equivalent (LCE). The expected yearly production at Thacker Pass is 80,000 tonnes, but over the mine's 40-year lifespan, the actual average is 66,783 tonnes because of differing ore grades. The analysis's economic output of the processing sector is the estimated annual revenue ($24,000* tonnes of LCE processed).

The financial analysis estimates the expenses for labor, capital, services, and materials necessary for production. Labor employment and expenses are used by IMPLAN to simulate employee compensation in the custom processing field. The annual spending on capital (machinery and long-lived equipment) and materials (parts, fuel, chemicals, etc.) are matched with the appropriate IMPLAN commodity code and used to construct the intermediate input requirements in IMPLAN so that the spending of the custom processing sector represents that of the operations and not an industry average. The construction and mining operations are modeled as intermediate inputs in the processing sector. Tables 11 and 12 report the annual operation estimated economic impacts on Humboldt County and the state of Nevada.

- **Humboldt County Mining and Processing Impacts.** The mining and processing operations will increase over the first five years. Economic contributions will also increase and reach total capacity by year six. By the sixth year, LAC operations will support 1,320 jobs, generate $2.1 billion in economic activity, and create $122.3 million in personal income in Humboldt County. Local and county tax revenues include $26.5 million and $40.7 million in tax collection at the state. (Table 11).

  Different sectors in Humboldt County benefit from continued economic activity, such as mining, utilities, professional services, transportation, wholesale, and retail. There are chances to develop industries that assist Lithium Americas' daily operations.



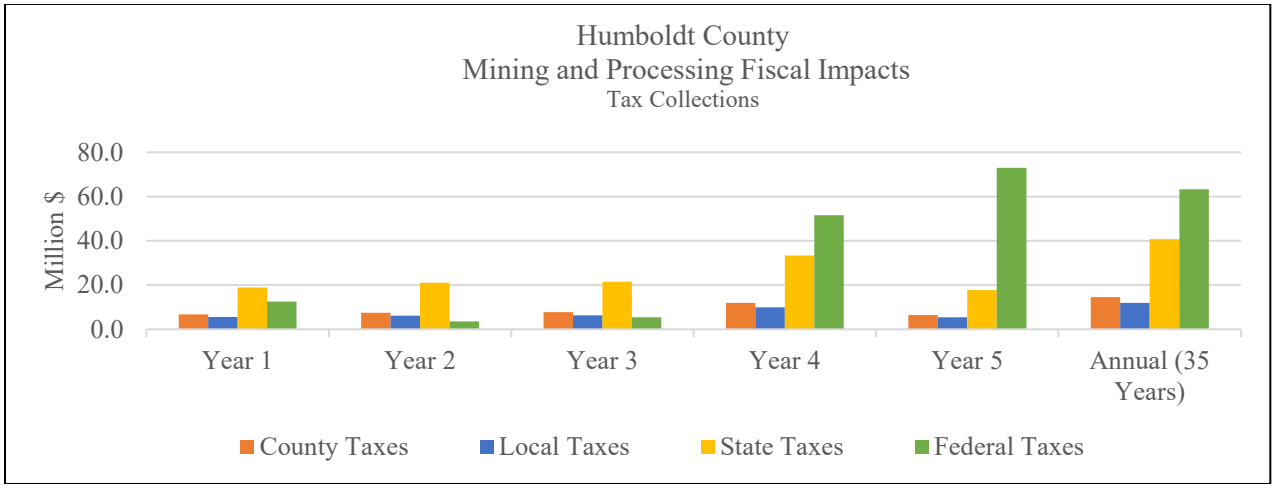


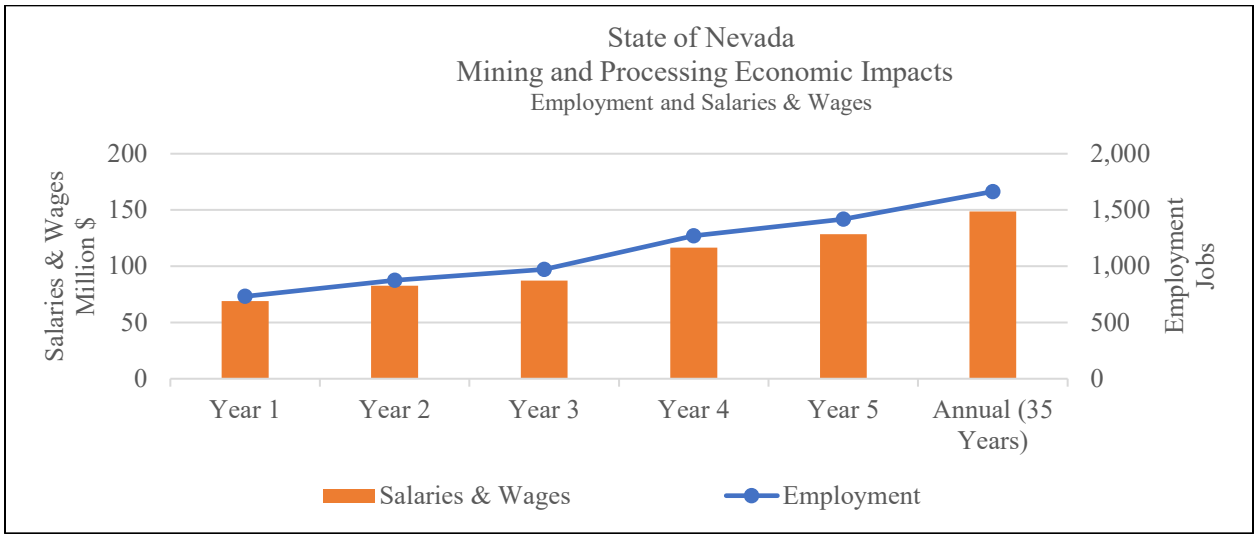
Table 11. Lithium Mining and Processing Impacts on Humboldt County.

	Year 1	Year 2	Year 3	Year 4	Year 5	Annual Average 35 Years
Employment						
Direct	313	356	386	459	479	527
Indirect	174	255	293	443	536	588
Induced	98	120	126	171	187	205
Total	585	731	805	1,073	1,202	1,320
Salaries & Wages						
Direct	$42.9M	$49.5M	$49.3M	$63.1M	$66.1M	$72.9M
Indirect	$11.7M	$17.6M	$20.7M	$31.5M	$37.7M	$41.3M
Induced	$3.9M	$4.7M	$5.0M	$6.7M	$7.3M	$8.1M
Total	$58.5M	$71.8M	$75.0M	$101.3M	$111.1M	$122.3M
Economic Output						
Direct	$526.4M	$917.5M	$879.8M	$1,546.2M	$2,078.3M	$1,897.4M
Indirect	$53.7M	$85.0M	$89.6M	$141.4M	$174.7M	$187.5M
Induced	$16.7M	$20.5M	$21.4M	$28.9M	$31.7M	$34.9M
Total	$596.8M	$1,023.0M	$990.8M	$1,716.5M	$2,284.7M	$2,119.7M
Taxes						
SC*-General	$1.0M	$1.1M	$1.1M	$1.8M	$1.0M	$2.2M
SC* Special District	$4.6M	$5.1M	$5.2M	$8.1M	$4.4M	$9.8M
County	$6.8M	$7.5M	$7.7M	$12.0M	$6.5M	$14.5M
State	$18.9M	$21.0M	$21.5M	$33.4M	$17.8M	$40.7M
Federal	$12.5M	$3.5M	$5.5M	$51.6M	$73.0M	$63.3M
Total	$43.8M	$38.3M	$41.0M	$106.9M	$102.7M	$130.5M
Employment Multiplier						2.50
Income Multiplier						1.68
Output Multiplier						1.12

*sub-county

- **State of Nevada Mining and Processing Impacts.** The first five years will see a gradual increase in mining and processing operations as phase two capacity comes online. By year six, LAC operations will support 1,664 jobs in Nevada and bring $2.17 billion in economic activity, as well as $148.6 million in salaries. Local and county tax revenues include $28.7 million and $51.0 million in tax collection at the state. (Table 12).

- LAC operations will have a positive impact on several industries in Nevada, including mining, utilities, transportation, professional services, wholesale, and retail sectors. There are also opportunities to expand and create new industries that can support LAC operations.



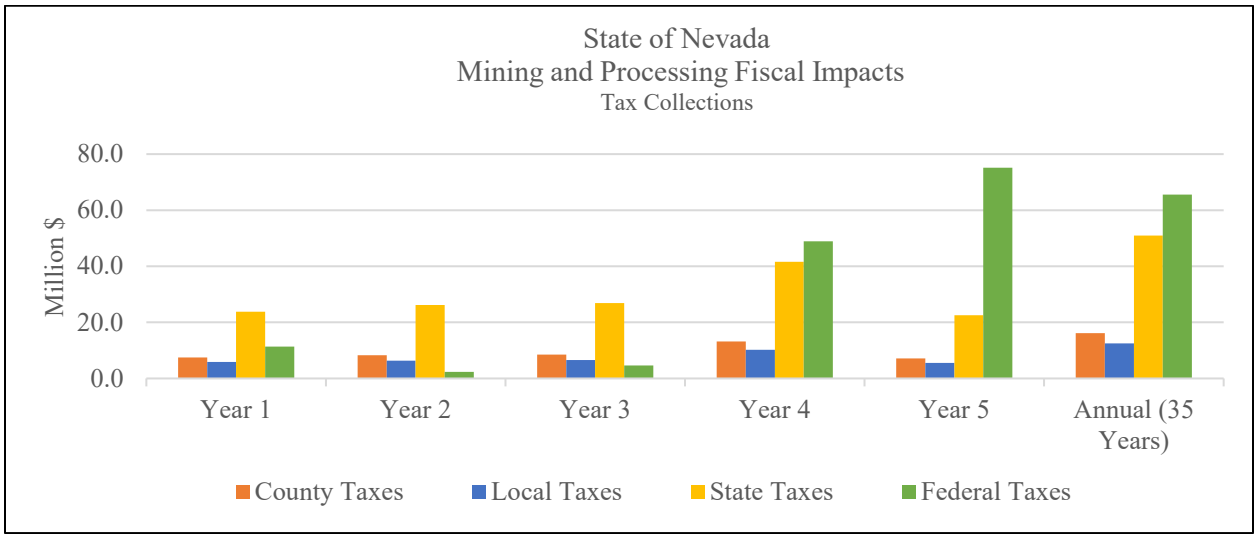


Table 12. Lithium Mining and Processing Impacts on the State of Nevada.

	Year 1	Year 2	Year 3	Year 4	Year 5	Annual Average 35 Years
Employment						
Direct	313	356	386	459	479	527
Indirect	198	254	307	437	526	659
Induced	221	265	280	375	412	478
Total	732	875	973	1,271	1,417	1,664
Salaries & Wages						
Direct	$42.9M	$49.5M	$49.3M	$63.1M	$66.1M	$72.9M
Indirect	$13.2M	$17.8M	$21.7M	$31.9M	$38.5M	$48.2M
Induced	$12.8M	$15.3M	$16.1M	$21.6M	$23.8M	$27.5M
Total	$68.9M	$82.6M	$87.1M	$116.6M	$128.4M	$148.6M
Economic Output						
Direct	$526.4M	$917.5M	$879.8M	$1,546.2M	$2,078.3M	$1.897.4M
Indirect	$49.8M	$71.3M	$81.3M	$121.8M	$151.6M	$188.5M
Induced	$41.0M	$49.2M	$51.9M	$69.5M	$76.4M	$88.5M
Total	$617.2M	$1,038.0M	$1,013.0M	$1,737.5M	$2,306.3M	$2,174.4M
Taxes						
SC*-General	$2.2M	$2.4M	$2.5M	$3.8M	$2.1M	$4.7M
SC* Special District	$3.7M	$4.0M	$4.1M	$6.4M	$3.5M	$7.8M
County	$7.5M	$8.3M	$8.5M	$13.2M	$7.1M	$16.2M
State	$23.8M	$26.2M	$26.9M	$41.6M	$22.6M	$51.0M
Federal	$11.4M	$2.3M	$4.6M	$48.9M	$75.1M	$65.6M
Total	$48.6M	$43.2M	$46.6M	$113.9M	$110.4M	$145.3M
Employment Multiplier						3.16
Income Multiplier						2.04
Output Multiplier						1.15

*sub-county

Conclusions & Discussion

This report provides an analysis for estimating the economic and fiscal impacts on Humboldt County and the State of Nevada from developing and operating new lithium mining and processing operations in Humboldt County. Industry operators and LAC data were used to gather primary data and establish a new lithium sector due to IMPLAN's lack of disaggregated

data. The new steps help us assess the economic and fiscal effects of the new lithium operations in Humboldt County and the State of Nevada. Economic models' results can help Humboldt County leaders predict impacts on government services and infrastructure demands.

LAC's operations in construction, mining, and processing lead to job creation and higher tax revenue, which positively impacts the economy and income of Humboldt County and Nevada. The construction will take seven years and cost almost $4 billion. This will annually generate approximately $727.2 million of economic activity and provide jobs for 1,120 people in Humboldt County. Thacker Pass's operations will have an annual economic impact of $2.1 billion, creating 1,320 jobs and generating $122.3 million in salaries for Humboldt County. In addition, this level of activity will generate annually $26.5 million in local and county taxes and $40.7 million in state taxes. Overall, impacts are more significant when expanding the trade region to the state level.

The proposed lithium operations will strengthen the already diverse mineral-based industry in Humboldt County. The development is improving local electricity and sulfuric acid connections used in mining, which are currently imported from outside the state. Also, the worldwide demand for lithium carbonate continues to outpace the supply. Lithium Carbonate usage will be driven by the advancements in clean air technology used in battery-powered cars. This provides more value-added opportunities and more significant impacts on the State of Nevada. This could be the start of a cluster of new industries using lithium carbonate.

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