



## Memorandum

Date: July 23, 2024

To: Jerry Bustamante,  
Manager of Public Affairs,  
Copper World, Inc.

From: Rounds Consulting Group, Inc.

Re: Peer Review: *“The Economic Impact of the Proposed Copper World/Rosemont Mine Complex”*

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As requested, a formal peer review was completed by Rounds Consulting Group, Inc. (“RCG”) for the report titled [\*“The Economic Impact of the Proposed Copper World/Rosemont Mine Complex on the Greater Tucson Economy”\*](#) prepared by [Power Consulting Incorporated](#) (Power Consulting), a Montana-based economic consulting firm.

A peer review is an independent evaluation of a professional document by qualified individuals in their relevant field of study. In this case, the field of study is economic development with an emphasis on Arizona-specific economic and fiscal impacts. Our firm’s experience and qualifications are summarized in the attached appendix.

## Synopsis

The following summary highlights the main high-level concerns regarding the reviewed analysis. The subsequent sections provide detailed critiques of each conclusion based on specific topics.

The reviewed report lists several key areas of focus, from economic diversity issues to the development of environmental-supportive industries in the Pima County region. Moreover, there seems to be an inherent bias in the narrative, suggesting that the conclusions may have been drawn before conducting the supporting analysis. This likely explains why many individual findings are open to dispute.

It is recommended that the reviewed report be immediately withdrawn from further distribution. The authors should consider conducting a second review and potentially revising the analyses.

The top-level considerations are outlined in the following bullet points.

- The Tucson market is not as robust and resilient as the report suggests. For context, during the most recent recession, the Tucson metro area experienced an 11.5% decline in jobs and regained the lost jobs in approximately 2.5 years. Conversely, the state as a whole experienced an 11.3% decline in jobs and regained the lost jobs a year sooner than Tucson.<sup>1</sup> Leaders should not overlook the economic benefits of mining activity.

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<sup>1</sup> Based on monthly employment estimates from the U.S. Bureau of Labor Statistics.



- While there are opportunities to advance the local economy, achieving this goal will require aggressive public policy actions through the remainder of this decade and beyond. Implementing many of these essential economic development initiatives will necessitate state and local investment, including the tax revenues generated from mining operations.
- Mining projects are long-term economic drivers due to their substantial fixed costs and extended operational periods.
- To the contrary of what the reviewed report states, according to McKinsey & Company, global electrification, EVs, and electronic devices are projected to boost annual copper demand to 36.6M tonnes by 2031, up from the current demand of approximately 25M tonnes. However, the consulting firm forecasts that copper supply will reach only 30.1M tonnes, resulting in a shortfall of 6.5M tonnes by the beginning of the next decade.<sup>2</sup>
- The “green energy transition” is, in fact, fueling copper demand. According to Goldman Sachs analysts, green uses of copper accounted for 4% of copper consumption in 2020, but this is expected to increase to 17% by 2030.<sup>3</sup>
- Additionally, the green energy transition will need to be subsidized well into the future. Mining and other businesses generate the tax revenue to pay for these initiatives.
- The volatility in copper prices argument is flawed. The volatility of prices does not dictate copper production and employment. Mines cannot simply halt operations during low-price periods and restart when prices improve due to the significant costs involved in employee training, equipment maintenance, and other operational losses. Shutting down and restarting a mine is not feasible as it incurs substantial disruptions and inefficiencies.
- Furthermore, assuming that historical price volatility is a predictor of future prices is inaccurate. Utilizing the report’s historical real copper price data from 1990 to 2023 indicates an increase in prices of approximately 44%, even considering dips in prices during economic contractions. A conservative approach to predicting prices is averaging recent price trends and assuming relatively low growth – an approach taken by Hudbay. There were no credible projections indicating that copper prices are expected to remain flat or decline over the next several years. On the contrary, prices are expected to increase by 20% by 2027 due to supply deficits.<sup>4</sup>
- In the reviewed Power Consulting report, the copper price break-even point (i.e., when the mine would not be profitable) is stated as \$3.75 per pound. However, this assumption is incorrect. According to Hudbay’s [2023 Pre-Feasibility Study](#) of the Copper World Project, in Table 21-7: Cash Cost Summary, Hudbay reports a Sustaining Cash Cost per pound of copper produced at \$1.81, which is equivalent to its break-even point.
- The arguments on worker location being ignored are flawed. All legitimate economic impact models consider the location of the workforce and allocate tax revenues accordingly. Moreover, just like any business relocation or expansion, outside labor is often necessary. Bringing these jobs

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<sup>2</sup> McKinsey & Company. (February 17, 2023). “Bridging the Copper Supply Gap.” <https://www.mckinsey.com/industries/metals-and-mining/our-insights/bridging-the-copper-supply-gap>

<sup>3</sup> Wall Street Journal. (April 18, 2023). “Copper Shortage Threatens Green Transition.” <https://www.wsj.com/articles/copper-shortage-threatens-green-transition-620df1e5>

<sup>4</sup> BloombergNEF. (October 12, 2023). “Copper Prices May Jump 20% by 2027 as Supply Deficit Rises.” <https://about.bnef.com/blog/copper-prices-may-jump-20-by-2027-as-supply-deficit-rises/>



to Pima County would help expand the current economic base by introducing new skills and resources, thereby strengthening the local economy.

- The analysis contained in the reviewed report compares mining impacts to the size of the economy, then makes the assertion that the small percentage impact is irrelevant. If this argument were to be taken seriously, then no new projects should ever be pursued.
- Overall, the report demonstrates a fairly significant lack of knowledge of how an economy functions and what makes the *state's* economy “tick.” It ignores the most basic principles related to advancing the local economy through quality economic development and public policy.

## Review of Primary Report Conclusions

The individual findings included in the reviewed analysis are highlighted below, with some of the more general conclusions aggregated into a short narrative review. Overall, the individual suggestions that mining activity is irrelevant to a local economy are proven to be incorrect.

Furthermore, the reviewed report’s basic lack of understanding of the Arizona economy, public policy, economic development, government budgeting, and how an economy functions creates additional cause for concern.

- **Reviewed Report Suggestion: The Greater Tucson area already has a strong and resilient economy with a large service industry and a significant amount of non-labor income.**

**Independent Finding - False:** The Tucson market is not yet strong and resilient, but the region has opportunities to further develop and increase in terms of job growth and household income. Rejecting projects that will produce tax revenue for a region that can then be reinvested is a bad economic development policy.

**Backup Detail:** The Tucson region has outstanding economic potential, but lacks in areas such as population growth, job growth, and growth in income. The region needs to expand the volume of high paying base sector businesses. This is the opposite of what the reviewed report is recommending.

From 2000 to 2023, the population in the Tucson Metropolitan Statistical Area (MSA) experienced a lower rate of growth compared to Phoenix and the state as a whole. This is demonstrated in Figure 1. In the past ten years, the average population growth rate for Tucson was 0.8%. For comparison, over the same period, the Phoenix MSA’s growth rate was 1.7%, and the State’s growth rate was 1.4%.

Similarly, the Tucson MSA demonstrated lower rates of employment growth from 2000 to 2023 than the Phoenix MSA and the state as a whole (Figure 2). Over the past decade, Tucson has demonstrated an average annual employment growth rate of 1.0%. In comparison, the Phoenix MSA exhibited an average growth rate of 2.3%, while the state as a whole maintained an average of 2.8%.

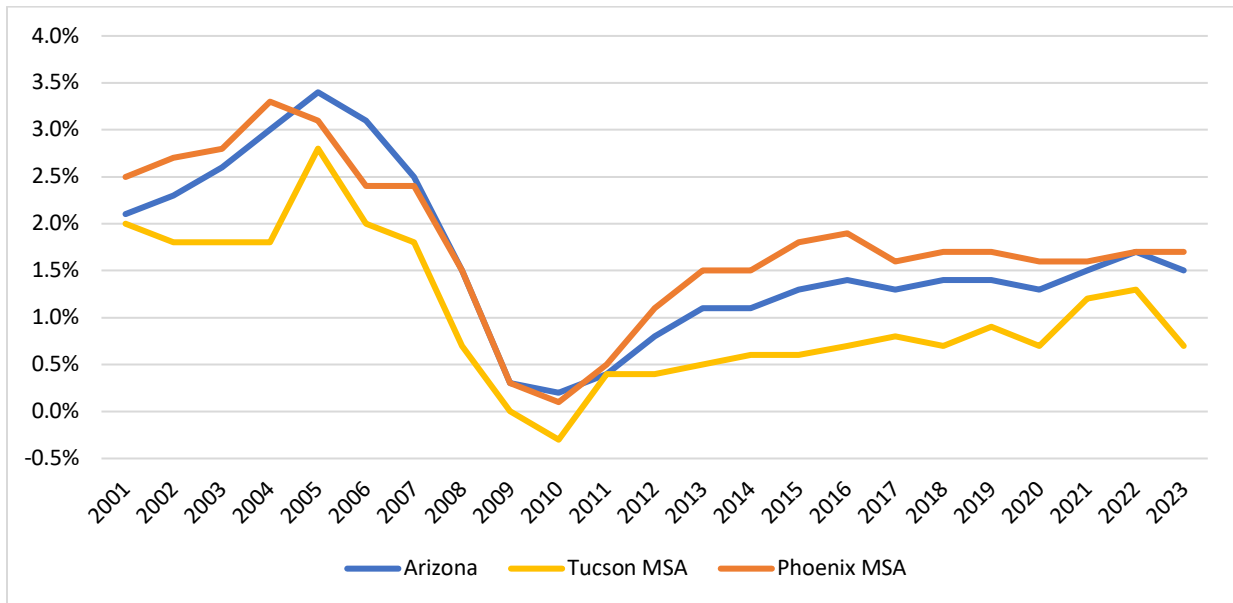
The information presented in Figure 3 offers valuable insights into the industry composition for the Tucson MSA, Phoenix MSA, and Arizona in 2023. The industries that employed the largest share of the



workforce in Tucson included the government, private education and health services, leisure and hospitality, retail trade, and accommodation and food services.

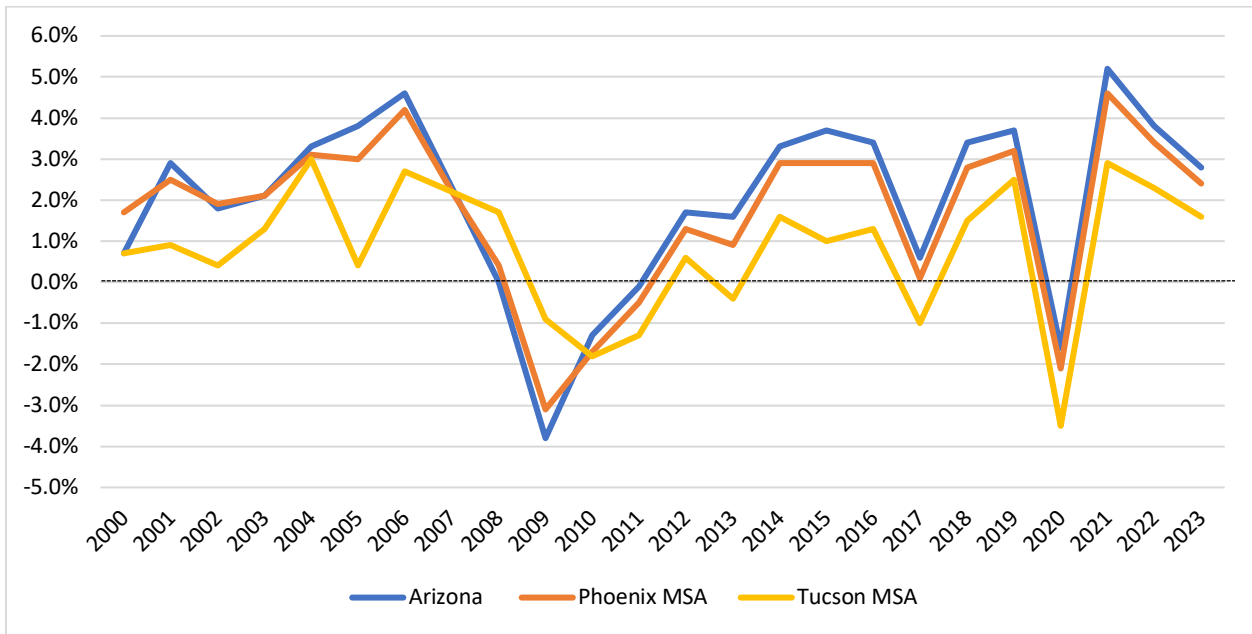
Upon careful review, it becomes apparent that the industries with the highest levels of employment do not align with the typical high-paying sectors. This disparity has the potential to adversely impact the overall growth of the region's economy. Tucson's economy would benefit by increasing the level of employment in the professional and business services industry and in the financial activity industry.

Figure 1: Historical Population Growth Comparison



Source: Arizona Office of Economic Opportunity

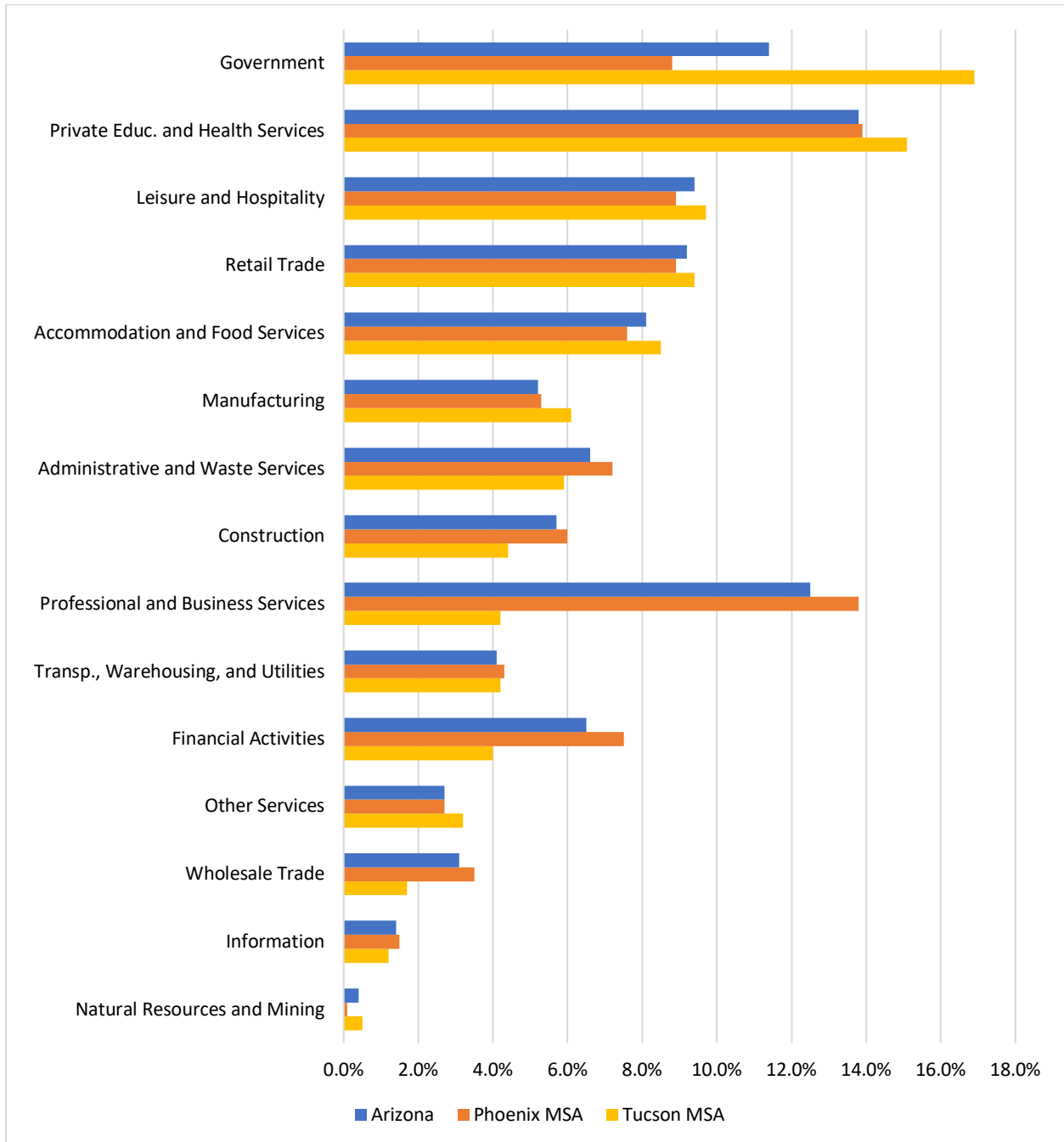
Figure 2: Historical Employment Growth Comparison



Source: U.S. Bureau of Labor Statistics



Figure 3: Employment Industry Composition Comparison (2023)

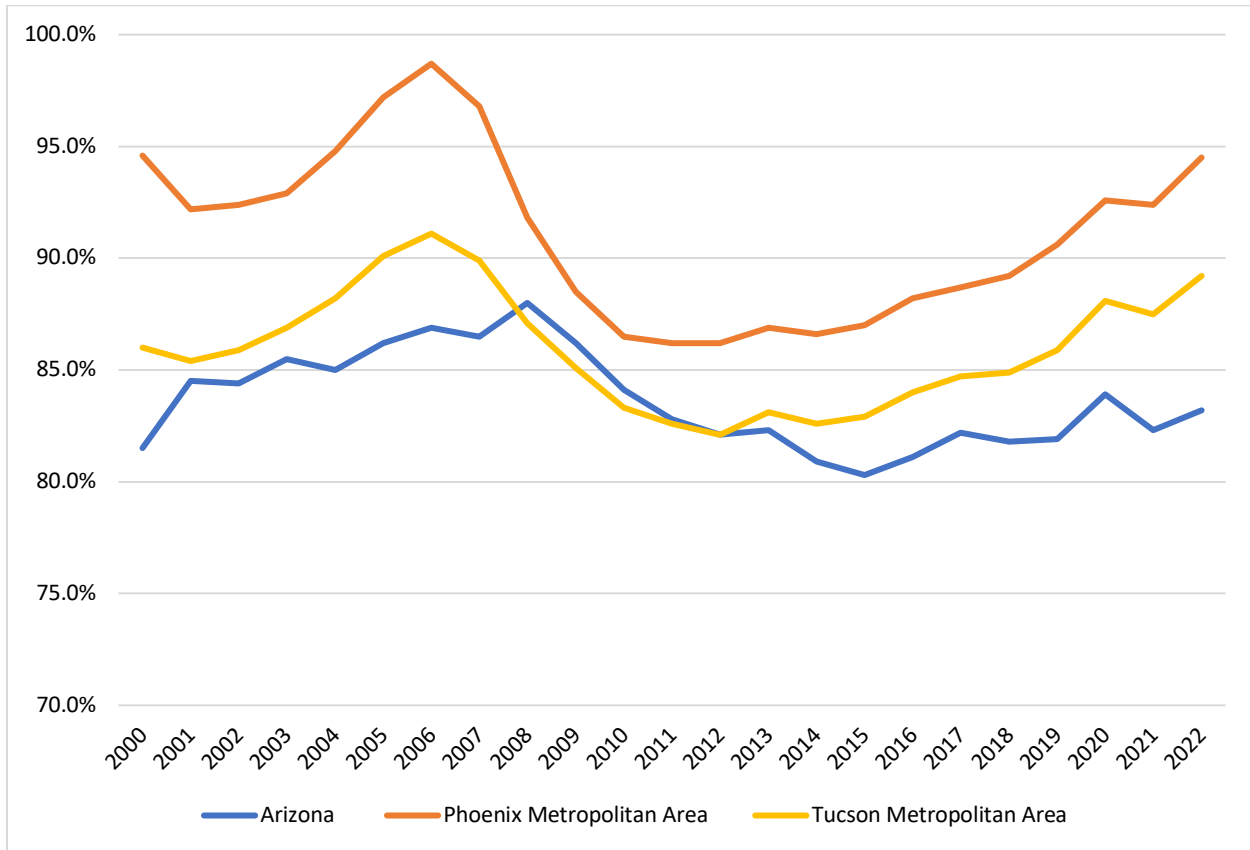


Source: Arizona Office of Economic Opportunity

Figure 4 illustrates the per capita personal incomes (PCPI) in Tucson MSA, Phoenix MSA, and Arizona as a whole as a percentage of the United States. In recent years, data reveals that the Tucson MSA has outpaced the PCPI of the entire state. However, it is noteworthy that the Phoenix MSA displays even higher levels of PCPI compared to Tucson.



Figure 4: Per Capita Personal Income as a Percent of the U.S.



Source: U.S. Bureau of Economic Analysis

• **Reviewed Report Suggestion: Copper World is unlikely to be essential for the U.S. Green Energy Transition.**

**Independent Finding – False:** First, not every economic development project needs to be tied to the green energy transition. However, the green energy transition will need to be subsidized well into the future by both the individual states and the federal government. Mining and other base sector businesses generate the tax revenue to pay for the required subsidies.

**Backup Detail:** Arizona has historically produced a smaller percentage of the workforce related to “green jobs” than the nation as a whole. If the state simply improved to the national average, total statewide tax collections would increase by approximately \$250M each year. These numbers were produced for The Nature Conservancy by RCG.

Green jobs occur in many places, from construction employment to farming to, yes, mining. Environmental technology improvements in mining are continually being researched. The long-term goal is for Arizona to partner with the mining companies to jointly work on new technological advances in these areas. Omitting mining from the green job discussion will create many future economic development problems.



- **Reviewed Report Suggestion: Analysts have concluded that over the next five to ten years, copper suppliers will be able to cover the demand with available mines and available technology.**

**Independent Finding – False:** This conclusion assumes that future copper demand will remain constant or decline. Neither scenario is supported by facts.

**Backup Detail:** The market demand for copper is anticipated to experience expanded growth due to its essential role as a primary component in the manufacturing of an extensive range of state-of-the-art technological products. Arizona is once again becoming a global leader in these sectors.

This trend is driven by the increasing integration of high-tech materials in various industries, including electronics, telecommunications, renewable energy systems, and electric vehicles, among others. As a result, the reliance on copper as a critical input is expected to further solidify in the foreseeable future.

Demand for copper has been increasing in recent years and is expected to remain strong over the long term. According to S&P Global, “Copper prices are anticipated to ascend in the long-term as a result of the clean energy transition, notwithstanding prevailing short-term apprehensions.”

The organization forecasted that copper demand will double by 2035. The areas expected to have significant demand include the United States, China, Europe, and India.

- **Reviewed Report Suggestion: Company tax payments will represent only 0.03% of Arizona’s 2022 tax revenues of \$27.8 billion. This represents an insignificant amount of tax revenue.**

**Independent Finding – Irrelevant/Incorrect Context:** The comparison of tax payments from the mine to the overall economy as a means of project dismissal lacks validity and is offensive to the individuals that would benefit from enhanced government tax collections for needed programs.

**Backup Detail:** If this argument were to be considered valid, it would imply the dismissal of need for all other business expansions as well. This suggestion further indicates a significant lack of understanding by the authors of the reviewed report for how an economy works, and a full lack of understanding of how the Tucson economy has performed and could perform into the future.

Many things make an economy function, and all of the items have some form of cost. The report also lists the wrong value for state tax collections. The referenced value is off by approximately \$10B regarding state taxes and ignores all local tax collection considerations.

- **Reviewed Report Suggestion: The Copper World break-even world market price is \$3.75.**

**Independent Finding – False:** This statement is incorrect and demonstrates a lack of understanding in the economics of the Copper World project.

**Backup Detail:** According to Hudbay’s [2023 Pre-Feasibility Study](#) of the Copper World Project, in Table 21-7: Cash Cost Summary, Hudbay reports a Sustaining Cash Cost per pound of copper produced at \$1.81, which is equivalent to its break-even point.





## Additional Unsupported Conclusions

The remaining statements are clearly biased, improperly researched, and were included in the reviewed report to diminish the impact of the mine and create political issues. This is a serious flaw in a report that is being distributed and portrayed as an accurate, academic evaluation of the mine. No legitimate academic institution would have allowed this paper to be approved, even under the least strenuous peer review.

- **The Statement:** Mining pay per worker will be higher than the average pay in Pima County. However, it is unclear how many of the miners will actually come from Pima County since the jobs may attract miners from other areas of the country.

*The Response: Impact analyses indeed incorporate assumptions regarding the geographical origin of workers. The contention that the issue of worker location has been overlooked is fundamentally flawed. Furthermore, spending patterns also matter but are ignored in the discussion.*

- **The Statement:** The proposed mine has the potential to negatively affect important industries that depend on Pima County's natural environment and/or groundwater, notably tourism, outdoor recreation, the housing industry, and agriculture.

*The Response: The reviewed report did not properly analyze tourism characteristics in the region, nor did it accurately analyze the housing market or agriculture activity. Statements are made based on speculation and not statistical facts.*

- **The Statement:** The heavy truck traffic passing through the SRER on its way to and from the mine will disturb natural animal behavior and conflict with the ecological and rangeland purposes of the SRER.

*The Response: This assertion has no legitimate backup analysis.*

- **The Statement:** House prices in Corona de Tucson, the community closest to the mine, could drop more than \$100 million due to the combined effects of air pollution and lost scenic vistas alone, while aggregated home values for the communities of Corona de Tucson, Sahuarita, Green Valley, and Vail could drop between \$355 million and almost \$2 billion, depending on which methodologies are used for estimation.

*The Response: This assertion has no legitimate backup analysis. An overly restrictive environmental plan will have a larger negative impact on the local economy compared to a balanced plan that incorporates methods of bringing manufacturing and research, and development to the region to assist with global environmental concerns. Arizona has the potential of being a global leader in this area and that should be the focus of Tucson policymakers.*

- **The Statement:** Very small percentage decreases in net in-migration could cause a loss of jobs in the service industry that alone could offset any economic benefits from the mine. For example, a loss of only 0.1% of service industry jobs would offset the mine's 430 direct jobs.



*The Response: This assertion has no legitimate backup analysis. A responsible pro-business policy package is necessary to improve the in-migration statistics as well as leading to higher local incomes.*

## **Final Recommendations**

The reviewed report has been determined to be extremely biased, lacks legitimate economic support, and likely has caused confusion within the local economy rather than providing clarification.

If the authors would like to respond to these facts and rewrite their analysis, RCG staff will volunteer time to assist with proper data collection and provide an explanation of basic economic fundamentals so policymakers in the Tucson region receive unbiased facts and recommendations.



## Appendix A – RCG Experience & Qualifications

RCG is comprised of leading economists and analysts with nearly 50 years of combined experience providing economic research, policy advising, tax and regulatory analyses, formulating economic development initiatives, advising university boards, and performing impact analyses for organizations in Arizona and throughout the nation.

This includes everything from highly comprehensive analyses related to proposed statewide legislations and how they impact the economy to highly specialized analyses related to analyzing the potential economic benefits and costs associated with proposed projects. Our assessments help clients understand the broader economic implications of their initiatives, how projects and policies effect communities, including aspects such as job creation, income distribution, and quality of life.

Our firm routinely monitors nationwide economic, real estate and community development trends, and has decades of experience summarizing this information to provide the proper storytelling and interpretation. It allows our team to stay informed on matters that affect the crossover between public policy and economics.