



# ECONOMIC BRIEF:

## ADVANCING ARIZONA'S ECONOMIC BASE THROUGH HIGHWAGE JOB CREATION IN SUSTAINABLE INDUSTRIES

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PREPARED FOR:

The Nature  
Conservancy 

  
AZ THRIVES

PREPARED BY:



Rounds Consulting  
Group, Inc.

The Nature Conservancy Arizona • Arizona Thrives Alliance  
1819 E. Morten Ave #100, Phoenix, AZ 85020  
(602) 712-0048 • [nature.org/Arizona](https://www.nature.org/Arizona) • [AZThrives.org](https://www.AZThrives.org)

Rounds Consulting Group, Inc.  
51 W. 3rd Street, Suite E-110, Tempe, AZ 85281  
(480) 508-4911 • [www.roundsconsulting.com](https://www.roundsconsulting.com)

# SUMMARY

## SUSTAINABILITY & THE ECONOMY

### Interest has been growing in further developing the state's economy through job creation in sustainable industries.

The goal is to make the local economy more sustainable through additional income and job creation. Environmental issues are increasingly becoming a part of everyday business decisions. If somebody needs to conduct the related research and develop innovative products and solutions, why not Arizonans?

This initial review provides an economic and fiscal perspective into the extent the state's economy could more fully recover and advance if the share of "green" jobs were to grow beyond current levels of performance.

Economists define green jobs to include jobs in businesses that produce goods or services that benefit the environment or conserve natural resources, and jobs that implement practices or technologies that have a positive impact on the environment.<sup>1</sup> **In this review the job class will be referred to as sustainability jobs to capture the economic and environmental benefits that can be realized with these jobs.** The following points highlight the key findings of this initial review.

- Historically, environmentally focused jobs have been equated solely with clean air and water. Today, these jobs more broadly contribute to a more sustainable and resilient economy, including many high-wage occupations such as advanced research and development, sustainability of resources, clean/renewable energy generation, and manufacturing, among others. These are all part of the new economy and the sustainability jobs sector.
- The U.S. Bureau of Labor Statistics (BLS) currently tracks as many as 330 occupations that are directly or indirectly considered to be in this category. Such occupations include materials engineers, environmental scientists, wind turbine technicians, electricians, manufacturing technicians, conservation scientists, just to name a few.
- In total, after adjusting the BLS data to 2019 statistics, 3.9M jobs exist across the U.S. within the BLS's defined "new economy or green occupations."
- **This means that 2.6% of all jobs across the country are jobs that make the economy and environment more sustainable and resilient. In Arizona, an estimated 59,600 jobs existed in 2019 in these same fields of study. This represents only 2.0% of all jobs in Arizona. The state should be a leader in these high-tech, innovation-based occupations, not trailing the nation as a whole.**
- Opportunities currently exist to advance the state's position in these industries, including the high-tech sectors. For example, Arizona has significant growth potential in clean/renewable energy generation, electric vehicle manufacturing, hydrogen fuel cells, as well as conducting research into sustainable mining technologies and enhancing energy efficiency.

<sup>1</sup> U.S. Bureau of Labor Statistics

- These innovation-driven sustainability jobs provide unique workforce benefits. The range of jobs includes high-tech occupations that require highly educated workers as well as high-paying jobs that have low levels of educational attainment.
- If the state develops a quality economic development plan related to growing new economy and sustainability jobs it will equate to significant economic gains.
- **If the state's ratio of sustainability jobs (2.0%) increases to the same ratio as the U.S. (2.6%) over the next decade, a total of 40,400 jobs (16,300 primary jobs and 24,100 secondary jobs) would be created in Arizona. This generates an additional \$243.6M in state and local tax collections each year.**
- **If the ratio in Arizona surpasses the U.S. ratio by another 0.6 percentage points over two decades to 3.2%, a total of 85,900 jobs would be created, and \$515.1M in annual state and local tax collections would be generated.**
- Under any reasonable scenario, the creation of sustainability jobs, as defined, will not only offset the cost of development but will also provide a positive return on investment for Arizona taxpayers.



# ADVANCING THE NEW ECONOMY WITH SUSTAINABILITY JOBS IN AZ

**Arizona is among the national leaders in employment, population, and income growth. The state has advanced more than any other since the Great Recession and is widely considered a best place to do business.**

A recent focus on economic development fundamentals has led to this status; however, for the state to maximize its economic potential, it is critical to focus not only on conventional economic growth but also on quality growth.

A crucial part of the quality growth focus will be the development of a highly-skilled, versatile, and dynamic workforce.

It is also important to overcome the perception that sustainability does not enhance economic resiliency.

Developing these jobs in Arizona will attract businesses that can make Arizona’s economy and communities even more sustainable and resilient to future business downturns and economic challenges.

Additionally, enhancing employment will add to the state’s economic base by generating high-skill and high-wage jobs while improving air quality, reducing impacts of heat, and creating more secure water supplies.

Historically, these industries have been equated solely with clean air and water efforts. The term can now be thought of as *new economy or sustainability* jobs and applied to technology firms, advanced research & development, clean/renewable energy production, as well as manufacturing.

## NEW ECONOMY- SUSTAINABILITY JOB CATEGORIES



**Clean /  
Renewable Energy**



**Enhancing  
Energy Efficiency**



**Pollution Reduction  
& Recycling**



**Natural Resource  
Conservation**



**Scientific Research  
& Development**

Source: U.S. Bureau of Labor Statistics

## The BLS has formally classified over 330 jobs that can be considered part of these new economy-sustainable industries.

These are defined as jobs that produce sustainable goods and services and utilize methods, procedures, and technologies to operate in one or more of the following categories:<sup>2</sup>



### Clean/Renewable Energy Generation

Energy generated from renewable sources (e.g., wind, biomass, geothermal, solar, hydropower, nuclear and landfill gas).



### Enhancing Energy Efficiency

Products and technologies that improve the efficiency of energy storage and distribution.



### Pollution Reduction, Greenhouse Gas Mitigation, Recycling and Reuse

Technologies that reduce the release of pollutants and improve air and water quality by recycling waste and eliminating the release of toxic compounds.



### Natural Resource Conservation

Products and technologies related to sustainable agriculture, forestry, and water management.



### Scientific Research and Development

Research into new technologies and the development of new processes that are scalable, cost-efficient and reduce the release of hazardous waste and toxic pollutants.

**Jobs in the new economy and sustainability sector require a workforce with an array of skills. These include high-tech engineers and scientists as well as high-skilled construction workers, technicians, and specialists. These types of high-paying jobs generate significant economic benefits throughout the economy.**



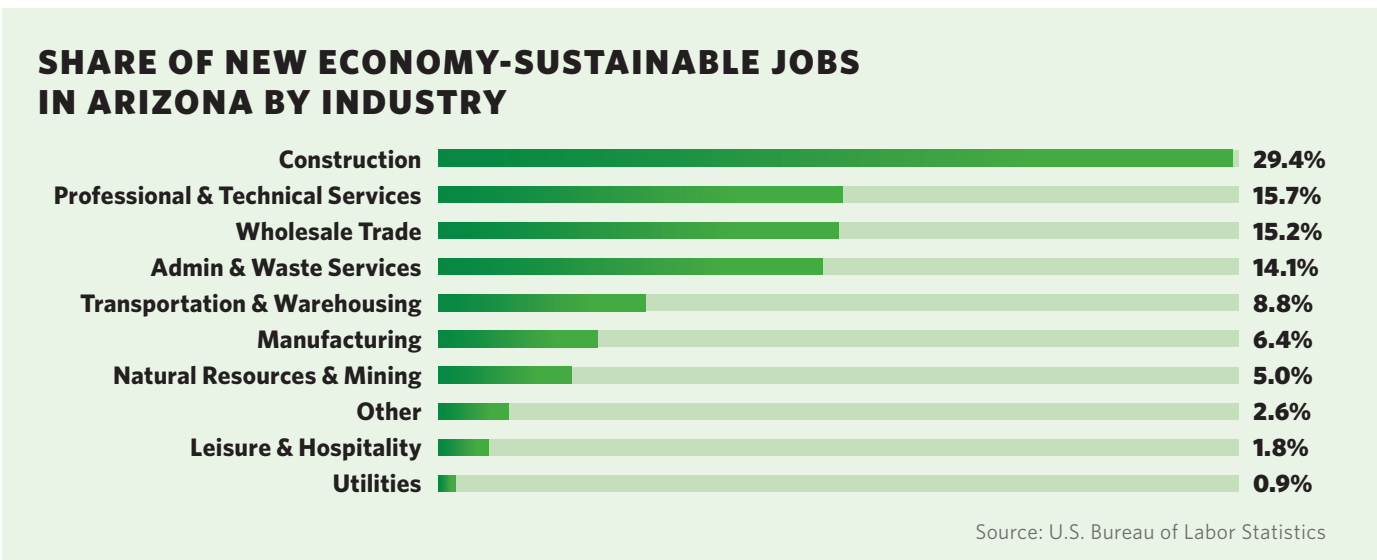
<sup>2</sup> U.S. Bureau of Labor Statistics



Opportunities also exist for career advancement. Across the U.S., approximately 53.0% of the workers focused on enhancing energy efficiencies obtained only a high school degree.<sup>3</sup> However, the median hourly wage for these jobs was 31.0% higher than the national median wage of those with similar educational attainment.<sup>4</sup> New economy jobs clearly offer paths of advancement for workers that were not previously available.

Arizona has an estimated 59,600 employees working in the new economy and sustainability jobs as of 2019, according to estimates from the BLS. This is only 2.0% of Arizona’s jobs base. Nationwide, there are 3.9M workers in these industries, representing 2.6% of the U.S. employment base.

The largest share (29.4%) sustainability jobs in Arizona is in the construction industry, followed by professional and technical services (15.7%) and wholesale trade (15.2%). The figure below displays how these new economy and sustainability jobs impact nearly every sector of Arizona’s economy.



While the share of these jobs in Arizona is relatively low, Arizona has significant opportunities to advance the development of these jobs due to the growth of other high-tech, new-economy businesses that are currently operating and creating sustainability jobs throughout the state.

For example, the solar industry in Arizona is the 5th largest in the nation, with nearly 5,200 megawatts (MW) of solar installed, enough to power over 800,000 homes. In 2020, over \$850M was invested in Arizona’s solar industry, which is expected to grow by 61.7% over the next five years.<sup>5</sup>

The Palo Verde Generating Station (Palo Verde) is the nation’s largest nuclear power producer, generating 32M megawatt-hours of clean, carbon-free energy. This is enough power for more than 4M people. Additionally, Palo Verde employs 2,500 people and has an annual economic impact of more than \$2.0B. The plant is currently testing the use of robotics and artificial intelligence to inspect the equipment, diagnose problems and increase efficiency.<sup>6</sup>

<sup>3</sup> Brookings Institute, Advancing inclusion through clean energy jobs 2019.

<sup>4</sup> U.S. Census Bureau

<sup>5</sup> Solar Energy Industries Association

<sup>6</sup> Arizona Public Service



The U.S. electric vehicle (EV) market is estimated to grow at an annual rate of 27.5% per year from 2020–2027 and reach \$357.8B in value, and Arizona is well-positioned to be a national leader in the development and production of electric vehicles.<sup>7</sup> The following is a short list of companies that have committed to manufacture electric vehicles in Arizona.



**Lucid Motors** has begun constructing a manufacturing facility in Casa Grande, Arizona. Upon completion, the facility will employ 2,000 people and produce 130,000 electric vehicles per year when operating at full capacity.



**Nikola Motors** has committed to invest \$600M to build a 1M-square-foot manufacturing plant in Coolidge, Arizona. The plant will be the primary facility building the company’s fleet of hydrogen-electric semi-trucks. At capacity, this facility will employ 2,000 people, and the activity of the facility is estimated to support an additional 20,000 jobs in the supply chain and other sectors.



**TuSimple**, an electric semi-truck manufacturer, has expanded from a 6,800-square-foot warehouse to a 50,000-square-foot manufacturing facility in Tucson, Arizona, as part of an expansion effort to increase the size of its U.S. fleet from 50 to 200 trucks. The company estimates that the expansion will create 500 new jobs in Tucson and provide a total economic impact for the region of \$1.1B through 2023.



**Electra Meccanica** is investing \$33M for a 235,000-square-foot electric vehicle manufacturing facility in Mesa, Arizona. The facility is estimated to support 500 manufacturing jobs at full capacity.

As these EV manufacturing operations reach full capacity, additional supplier businesses are likely to locate in Arizona. For example, United Energies Development Corporation developed the world’s first Photovoltaic Electrolyzer facility in Arizona. This facility focuses on developing new and innovative methods of creating renewable hydrogen fuel cells.<sup>8</sup>

Scientists from the University of Arizona College of Engineering, in partnership with Auxilium Technology Group and Tech Launch Arizona, are researching and implementing technologies that reduce waste from large-scale mining operations. One such technology improves the process of extracting gold from ore. The new technology has been shown to improve extraction efficiency to 98% while reducing toxic waste.<sup>9</sup>

These innovative technologies are examples of how high-tech research and development is connected to the new economy and sustainable industries, from general high tech to sustainable. Rural Arizona also benefits from these innovations as many large mining operations are in rural areas.

<sup>7</sup> Allied Market Research

<sup>8</sup> PR Newswire (<https://www.prnewswire.com/news-releases/arizona-company-uses-the-sun-and-zero-point-energy-to-reduce-the-cost-of-making-green-hydrogen-from-water-301220014.html>)

<sup>9</sup> AZ Big Media (<https://azbigmedia.com/business/startup-auxilium-licenses-sustainability-technology-for-mining-industry/>)

Through enhanced economic development efforts, the ratio of new economy jobs in Arizona could eventually reach the U.S. level of 2.6%. This would increase the number of these jobs in Arizona from 59,600 to 75,900.

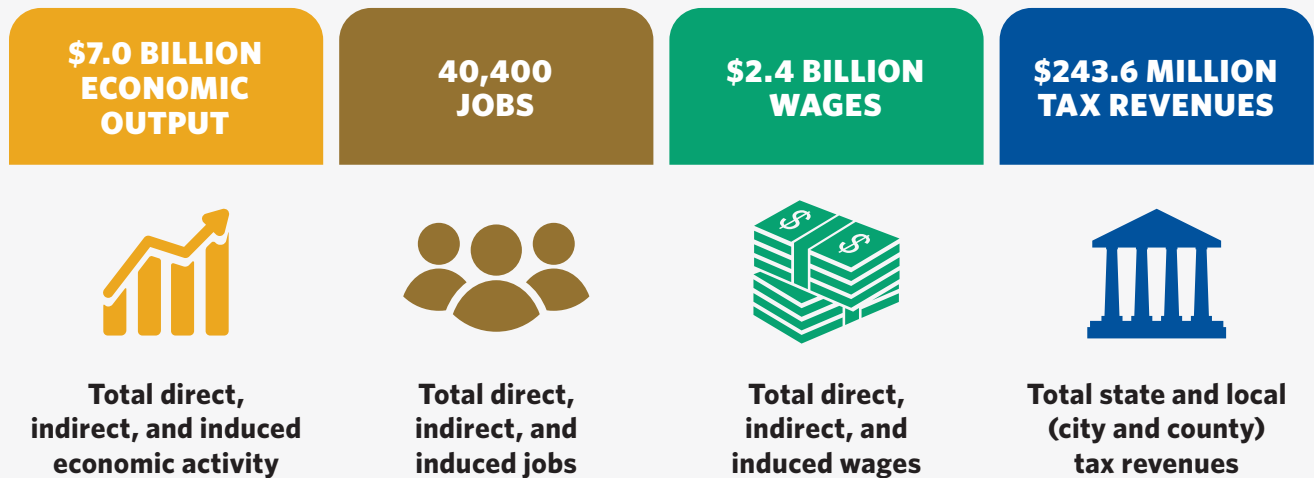
The 16,300 increase in jobs would generate \$3.6B in direct economic output and \$120.9M in tax revenues each year. However, the creation of these jobs also supports an additional 24,100 secondary jobs through increases in the demand of supplier businesses and other tangential industries.

**Investment in clean and renewable projects generates high long-run multipliers by driving an efficient, innovative, and productive economy...**

Oxford Review of Economic Policy.  
May 2020

In total, raising Arizona's ratio of new economy, sustainable industry employment to 2.6% (adding 16,300 jobs) would create a total of 40,400 jobs, paying a total of \$2.4B in wages and generating \$7.0B in economic output each year. The increased economic activity will generate \$243.6M in annual state and local tax revenues.

### GROWING ARIZONA'S NEW ECONOMY AND SUSTAINABILITY JOBS FROM 2.0% TO 2.6%



Note: In 2021 dollars. May not sum to totals due to rounding. Source: Rounds Consulting Group, Inc.

If Arizona increased its ratio of new economy and sustainability jobs to 3.2%, the employment number would increase to 94,200. The 34,600 new jobs would support an additional 51,300 secondary jobs through supplier businesses and other tangential industries, paying a total of \$5.2B in wages.

In total, increasing the ratio of new economy and sustainability jobs in Arizona to 3.2% would produce an additional 85,900 jobs and generate \$14.9B in economic activity annually. State and local governments would collect an additional \$515.1M in tax revenues each year.



Arizona has a favorable regulatory environment and a business culture that supports innovation and the growth of high-tech new development industries. As such, Arizona is in a unique position to be a national leader in developing a resilient, innovative, and sustainable economy by supporting policies focused on bringing these new economy jobs to the state.

**CONCLUSION:** THE DEVELOPMENT OF JOBS THAT MAKE ARIZONA'S ECONOMY AND COMMUNITY MORE SUSTAINABLE AND RESILIENT THROUGH THOUGHTFUL PLANNING WILL RESULT IN SIGNIFICANT ECONOMIC AND FISCAL GAINS.

This will benefit Arizona residents through higher incomes, more job opportunities, and a more robust tax base that will allow for a combination of better government services and lower overall tax rates.

