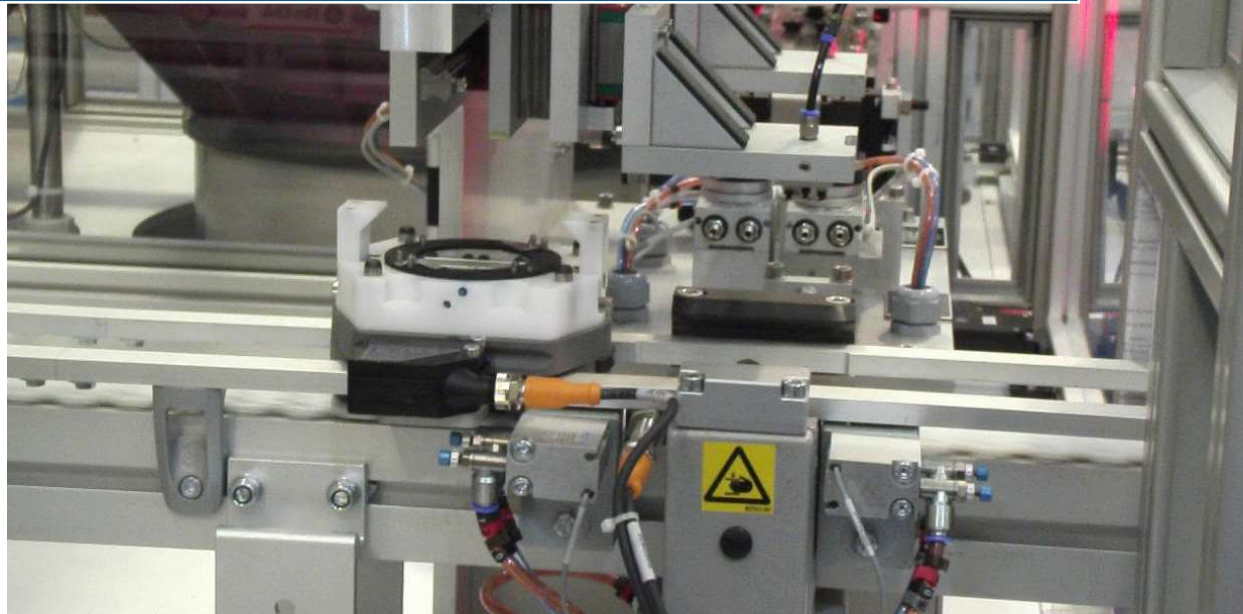


May 2024

Comparative Operating Costs for Advanced Manufacturing



Prepared for:

City of Yuma, AZ
Office of Economic Development



APPLIED ECONOMICS

11209 N. Tatum Blvd, Suite 225
Phoenix, AZ 85028

EXECUTIVE SUMMARY

The City of Yuma retained Applied Economics to prepare a comparative operating cost analysis for a 100-employee advanced manufacturing facility that would be representative of a typical manufacturing operation for advanced batteries, solar panels, medical equipment, or other electronic equipment. The analysis compares a location in Yuma, Arizona to alternative locations in Casa Grande, Arizona and Buckeye, Arizona, both of which are within the Phoenix Metropolitan Area. Estimated operating costs in each location include wages, payroll taxes and benefits, real estate, sales and property taxes and utilities.

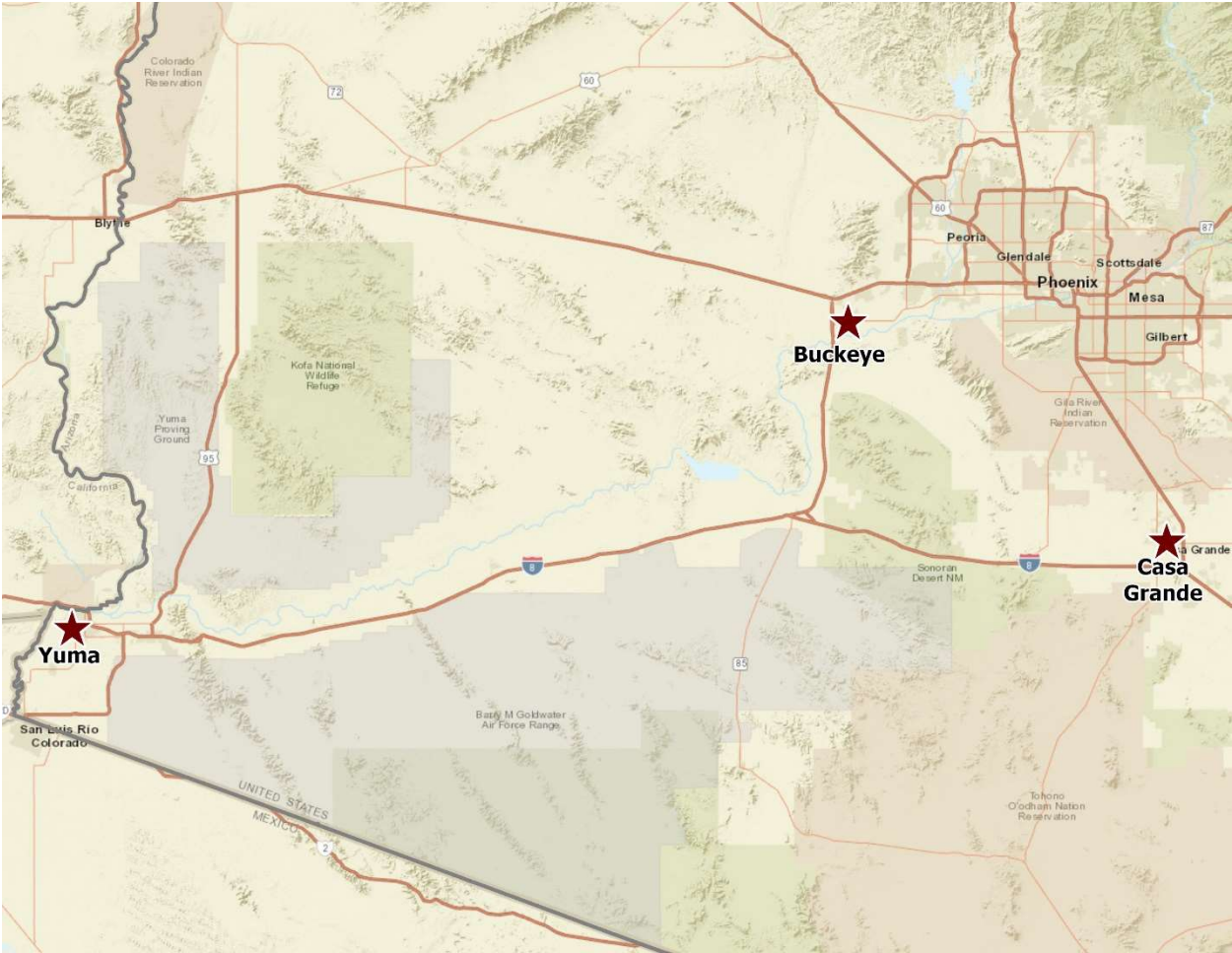
Project Description

- The pro-forma advanced manufacturing operation would employ 100 non-exempt workers for a single shift. They would employ a mix of assemblers, fabricators, inspectors, engineers, machine tool operators, and other production workers (**Figure 1**).
- The pro-forma includes an 80,000 square foot facility on 8 acres, and purchase \$31.0 million of manufacturing equipment.
- Electricity usage is estimated at 400,000 kWh per month with an 80 percent load factor. Electric rates reflect current tariffs for the primary electric provider in each location.

FIGURE 1
ADVANCED MANUFACTURING PRO-FORMA

Labor and Payroll	
Total Employees	100
Annual Payroll	
Yuma, AZ	\$5,018,354
Casa Grande, AZ	\$6,331,876
Buckeye, AZ	\$5,722,219
Capital Expenditures	
Manufacturing Equipment	\$31,000,000
Land and Building Cost (80,000 SF on 8 acres)	
Yuma, AZ	\$1,649,017
Casa Grande, AZ	\$1,714,664
Buckeye, AZ	\$1,754,341
Utilities	
Electricity (80% Load Factor)	400,000 KWh/680 KW demand

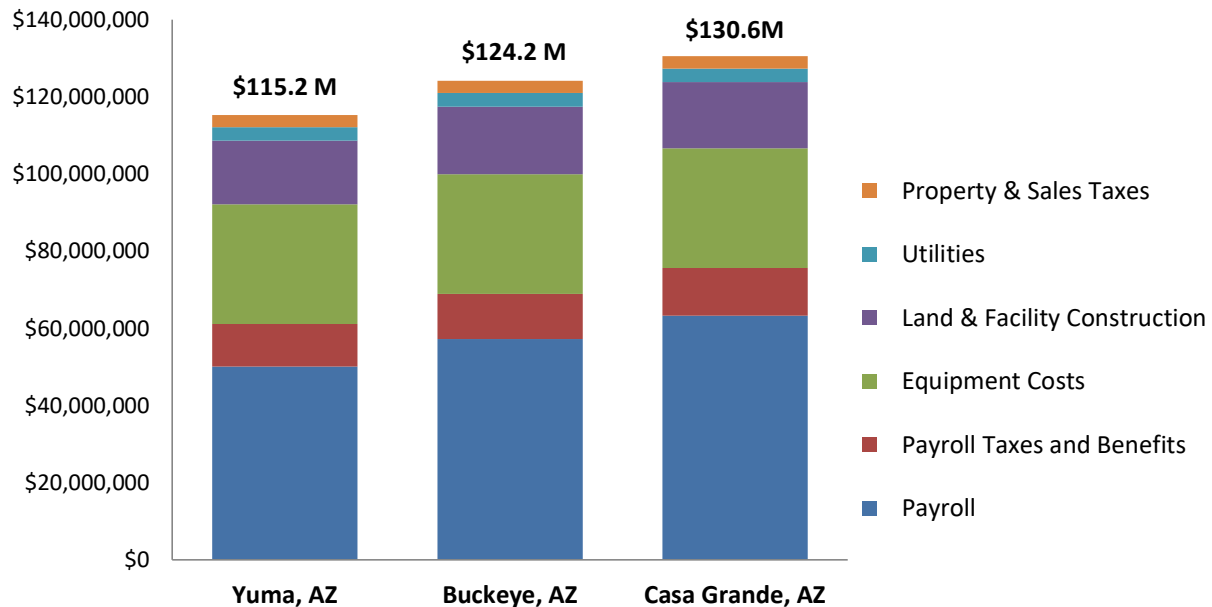
FIGURE 2
MAP OF COMPARATIVE LOCATIONS



Comparative Operating Costs

- Total operating costs are 8 to 13 percent lower in Yuma at \$115.2 million over 10 years, compared to \$124.2 million in Buckeye and \$130.6 million in Casa Grande.
- The most significant differences between the three locations on a percentage basis are payroll and benefit costs. The payroll and benefit costs in Casa Grande and Buckeye are 14% to 26% higher than those in Yuma, based on the pro-forma used in this analysis.

COMPARATIVE 10 YEAR OPERATING COSTS



- Based on average wages from the Arizona Office of Economic Opportunity for typical occupations in advanced manufacturing, payroll costs are estimated at \$50.2 million in Yuma over ten years versus \$57.2 million in Buckeye and \$63.3 million in Casa Grande. This is significant because wages make up close to half of total operating costs. There has been a significant amount of industrial development in Casa Grande in recent years, creating a very tight labor market for production occupations.
- Payroll taxes and benefit costs vary significantly between the locations, primarily due to differences in total payroll. Unemployment, worker's compensation, health insurance, Social Security and Medicare costs combined are 7 percent higher in Buckeye and 12 percent higher in Casa Grande at approximately \$11.7 million to \$12.4 million over ten years, versus \$11.0 million in Yuma. Some of these costs are a percentage of payroll like worker's compensation, while other costs like health insurance are based on the number of employees.
- There are also differences in real estate costs between the locations. Land and construction costs are 4 to 6 percent higher in both Casa Grande and Buckeye.
- In addition to these cost-related factors, water has also become a site selection issue in Arizona and other western states. In Arizona, water availability is community-specific, and while it is a finite resource, it is not a constraint for most communities. There are different sources of water available

to communities in Arizona including groundwater, surface water including the Colorado River (and its provision of water to the Central Arizona Project), in-state rivers, and converted water.

- The city of Yuma is well-positioned with regard to water and has adequate resources for long term sustainability. The city has a 50,000 acre-foot priority 1 and 2 Colorado River Water entitlement, and is currently using 14,500 acre-feet annually. Through a water conversion process, Yuma has secured an additional 17,000 acre-feet of priority 1 Colorado River water to further supplement its entitlement. The city also has supplementary groundwater resources , if needed, that can produce 10,000 acre-feet per year. All total, raw water resources total approximately 87,000 acre-feet, including converted water. There is also available wastewater treatment and distribution capacity to meet future demands and support business development.
- Groundwater regulation in Arizona is predicated on whether or not a given location is situated within an Active Management Area (AMA). There are five AMAs in Arizona. Yuma is not located in an AMA while both Buckeye and Casa Grande are, and are subject to more restrictions regarding water resources for new development.

OPERATING COST DETAIL

Land and Construction

This analysis assumes that the company would purchase an 8-acre site and build an 80,000 square foot concrete tilt-up building. Land costs were obtained from listings data for industrial land in each location. An average cost per acre was computed based on the available properties. Typical industrial land costs used in this analysis are higher in Casa Grande at \$180,000 per acre, and \$167,000 per acre in Buckeye, compared to \$131,000 per acre in Yuma (**Figure 3**). Land costs are based on current listings for industrial parcels in each city.

Building construction costs are based on the 2024 average cost per square foot for a single-story manufacturing facility from Gordian, Square Foot Cost Data adjusted by the city cost index for each location. Construction costs for an 80,000 square foot building are estimated at \$12.5 million in Yuma, versus \$12.6 million in Casa Grande and \$13.1 million in Buckeye. Note that the total annual cost listed for each city in Figure 3 represents the estimated annual loan payment on a 10-year commercial loan at 8.5 percent interest with a 20 percent down payment.

**FIGURE 3
REAL ESTATE COSTS**

Assumptions: 80,000 SF manufacturing facility on an 8 acre parcel. Construction costs of \$179 per square foot, adjusted for local labor and materials cost indices.

Yuma, AZ	
Land	\$1,045,440
Building	\$12,479,280
Total Annual Cost ¹	\$1,649,017
Casa Grande, AZ	
Land	\$1,440,415
Building	\$12,622,720
Total Annual Cost ¹	\$1,714,664
Buckeye, AZ	
Land	\$1,335,510
Building	\$13,053,040
Total Annual Cost ¹	\$1,754,341

Sources: Loopnet and Crexi industrial land listings, April; Gordian 2024 Building Construction Cost and Square Foot Cost Data with R.S. Means data.
¹ Total annual cost for new construction represents the annual payment on a commercial real estate loan for 10 years, at 8.5 percent interest, on 80 percent of the land and building cost.

Payroll and Benefits

The manufacturer in this cost comparison would employ 100 people. Payroll estimates are based on occupational wages for key occupations that are representative of the workforce mix for advanced manufacturing. These occupations include electronic assemblers, fabricators, inspectors, supervisors, various engineers and engineering technicians, machine tool operators and setters, laborers, machinists, shipping clerks, sales representatives, and maintenance and repair workers. In total, annual wages in Yuma are about 21 percent lower than those in Casa Grande and 12 percent lower than Buckeye. The most significant differences are for assemblers and fabricators, electronic equipment assemblers, machine operators, electrical engineers and industrial production managers. Annual payroll is estimated at \$5.0 million in Yuma, versus \$6.3 million in Casa Grande and \$5.7 million in Buckeye (**Figure 4**). This is significant since payroll makes up close to half of total annual operating costs.

**FIGURE 4
WORKFORCE ASSUMPTIONS AND TYPICAL WAGES
ADVANCED MANUFACTURING**

SOC Code	Occupation Title	Jobs	Annual Wages		
			Yuma, AZ	Casa Grande, AZ	Buckeye, AZ
51-2028	Electrical and electronic equipment assemblers	32	\$42,617	\$54,895	\$48,243
51-2090	Miscellaneous assemblers and fabricators	18	\$36,628	\$59,106	\$41,936
51-9061	Inspectors, testers, sorters, samplers, and weighers	7	\$51,394	\$58,119	\$52,870
51-1011	First-line supervisors of production workers	6	\$66,248	\$77,881	\$72,262
17-2112	Industrial engineers	4	\$93,979	\$111,251	\$109,099
51-4081	Multiple machine tool setters, operators	4	\$36,908	\$47,542	\$41,034
53-7062	Laborers and freight, stock, and material movers	4	\$33,907	\$39,010	\$41,486
51-4041	Machinists	4	\$54,287	\$62,045	\$55,578
43-5071	Shipping, receiving, and traffic clerks	3	\$41,302	\$44,671	\$42,829
41-4012	Sales representatives, wholesale and mfg	3	\$67,022	\$76,654	\$80,255
51-4021	Extruding and drawing machine setters, operators	3	\$41,813	\$53,860	\$46,496
17-2071	Electrical engineers	3	\$90,281	\$111,752	\$116,365
49-9071	Maintenance and repair workers, general	3	\$41,406	\$48,861	\$50,136
11-3051	Industrial production managers	2	\$101,781	\$127,191	\$133,274
17-3023	Electrical and electronic engineering technicians	2	\$70,419	\$69,996	\$76,395
17-2141	Mechanical engineers	2	\$85,929	\$98,026	\$101,782
Total Annual Payroll		100	\$5,018,354	\$6,331,876	\$5,722,219

Source: Arizona Office of Economic Opportunity, 2023 Occupational Employment and Wage Estimates.

The differences in wage rates not only impact payroll costs, but also have an impact on benefit costs. Total annual benefit costs are estimated at \$1.1 million per year in Yuma, or 21 percent of payroll versus \$1.2 million per year in Casa Grande and Buckeye (**Figure 5**).

Benefits shown here include Social Security and Medicare, which are estimated at 7.65 percent of payroll in all locations. Health insurance costs represent state averages for the employer portion of the annual premium for employees enrolled in employer-based health plans at \$5,661 per employee for all three comparative locations. Health insurance costs per employee are based on data from the Kaiser Foundation.

Benefits also include unemployment insurance. In Arizona, unemployment insurance applies to the first \$8,000 of payroll per employee. Rates vary depending on individual employer experience. For this analysis, a new employer rate of 2.0 percent is applied in Arizona, based on state-specific rates published by the U.S. Department of Labor. Since all employees would earn more than \$8,000 per year, the unemployment insurance cost is the same in all three locations.

Worker’s compensation rates vary by occupation and by insurance carrier, but an average machinery manufacturing rate of 2.69 percent of payroll is applied for all locations in Arizona. These rates are based on survey information collected by the Oregon Department of Consumer and Business Services.

**FIGURE 5
PAYROLL TAXES AND BENEFITS**

Assumptions: Unemployment insurance is based on the new employer rate: Arizona 2% of first \$8,000 of wages. Workers compensation is calculated as a percent of payroll: Arizona 1.86%.

Yuma, AZ	\$1,100,998
Social Security and Medicare	\$383,904
Health Insurance ¹	\$566,100
Unemployment Insurance	\$16,000
Worker's Compensation	\$134,994
Casa Grande, AZ	\$1,236,816
Social Security and Medicare	\$484,389
Health Insurance ¹	\$566,100
Unemployment Insurance	\$16,000
Worker's Compensation	\$170,327
Buckeye, AZ	\$1,173,777
Social Security and Medicare	\$437,750
Health Insurance ¹	\$566,100
Unemployment Insurance	\$16,000
Worker's Compensation	\$153,928

Source: Kaiser Foundation State Health Facts, 2022 data; U.S. Department of Labor, Significant Provisions of State Unemployment Insurance Laws, January 2024; Oregon Department of Consumer and Business Services, Worker's Compensation Premium Rate Ranking Study, 2022 - typical premium rates for machinists and machinery repair workers.

¹ Average annual single premium (employer portion) per enrolled employee for employer-based health insurance.

Utilities

The advanced manufacturing facility in this analysis is assumed to have monthly electricity consumption of 400,000 kWh and an 80 percent load factor, or 680 kW demand per month. This high load factor is typical of battery and electrical equipment manufacturing. Total electricity costs are estimated at \$347,512 in all three locations, all of which are with the Arizona Public Service Company (APS) service area (**Figure 6**). These rates reflect time-of-use discounts.

**FIGURE 6
ANNUAL UTILITY COSTS**

<i>Assumptions: 400,000 kWh/month, 680 kW (80% Load Factor)</i>	
Yuma, AZ (APS)	\$347,512
Casa Grande, AZ (APS)	\$347,512
Buckeye, AZ (APS)	\$347,512

Source: Arizona Public Service Rate Schedule E-32 TOU L.

Sales Taxes

Sales taxes can potentially apply to the purchase of machinery, utilities and construction materials. In Arizona, manufacturing equipment is exempt from sales tax, which saves the company an estimated \$2.1 million to \$2.9 million on a \$31.0 million equipment purchase. In the comparison below, construction sales taxes apply to 65% of construction costs in the first year. On-going sales taxes represent taxes on utilities.

The total state and local sales tax rate is 8.412 percent in Yuma, and 8.7 percent in Casa Grande and 9.3 percent in Buckeye. However, Casa Grande has a higher city sales tax rate on construction, resulting in a 10.7 percent combined construction sales tax rate. Total sales taxes over 10 years are estimated at \$975,000 in Yuma versus \$1.2 million in Casa Grande and \$1.1 million in Buckeye (**Figure 7**). The differences are due to different city and county sales tax rates in each location. It is also notable that the City of Yuma does not have a use tax, so companies purchasing non-manufacturing equipment outside the city would not pay local sales tax on that equipment. Casa Grande and Buckeye both impose a use tax on non-local purchases.

**FIGURE 7
LOCAL SALES TAX COMPARISON**

Assumptions: Sales and use tax calculation includes purchases of machinery, utilities and construction materials. Exemptions and tax rates vary by state. Analysis assumes 65% of construction cost is materials. Construction costs vary by location. Note that manufacturing equipment is exempt from all sales tax in Arizona.

Yuma, AZ		8.412% effective state & local tax rate										
	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
no abatement	\$3,055,389	\$2,763,062	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233
Mfg Exemption	(\$2,080,720)	(\$2,080,720)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Tax Due	\$974,669	\$682,342	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233	\$29,233
Casa Grande, AZ		10.700% effective state & local tax rate on construction 8.70% effective state & local tax rate on utilities										
	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
no abatement	\$3,877,246	\$3,574,910	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234
Mfg Exemption	(\$2,697,000)	(\$2,697,000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Tax Due	\$1,180,246	\$877,910	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234	\$30,234
Buckeye, AZ		9.300% effective state & local tax rate										
	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
no abatement	\$3,969,230	\$3,646,043	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319
Mfg Exemption	(\$2,883,000)	(\$2,883,000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Tax Due	\$1,086,230	\$763,043	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319	\$32,319

Property Taxes

Property taxes apply to real and personal property. In this analysis, the value of the land and building are multiplied by 70 percent to approximate limited property value, which is the basis for property taxes in Arizona and is generally less than market value. The property tax estimates incorporate the commercial/industrial assessment ratio for Arizona that is scheduled to decline from a current rate of 16.5 in 2024 percent to 15 percent by 2027 based on recent legislative changes. This assessment ratio applies to both real and personal property in Arizona.

Arizona also has a 2.5% flat depreciation schedule for commercial and industrial property initially classified in Arizona after 2022, resulting in a negligible amount of personal property tax. In most other states that impose personal property taxes on equipment, depreciation schedules for manufacturing equipment range from 90 percent to 10 percent of original cost over 10 to 12 years.

The total effective property tax rate is approximately 1.88 percent in Yuma, 1.95 percent in Casa Grande and 1.93 percent in Buckeye. Real and personal property taxes are lowest in Yuma at \$2.086 million over 10 years, versus \$2.095 million in Casa Grande and \$2.118 million in Buckeye, due the differences in real property values and tax rates (**Figure 8**).

**FIGURE 8
PROPERTY TAX COMPARISON**

Assumptions: Value of New Machinery: \$31.0 million; facility value varies by location. Machinery and equipment is depreciated to 2.5% of value in all years. Real property has not been depreciated in this example. No replacement equipment purchases are assumed. Effective Tax Rates: Yuma 1.8765%, El Cajon 1.20%, San Bernardino 1.26%.

Yuma, AZ											
	Total	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Real Property	\$1,939,300	\$227,215	\$220,115	\$213,014	\$213,014	\$177,657	\$177,657	\$177,657	\$177,657	\$177,657	\$177,657
Personal Property	\$146,885	\$15,513	\$15,028	\$14,543	\$14,543	\$14,543	\$14,543	\$14,543	\$14,543	\$14,543	\$14,543
Total	\$2,086,185	\$242,728	\$235,143	\$227,557	\$227,557	\$192,200	\$192,200	\$192,200	\$192,200	\$192,200	\$192,200

Casa Grande, AZ											
	Total	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Real Property	\$1,941,737	\$205,068	\$198,660	\$192,251	\$192,251	\$192,251	\$192,251	\$192,251	\$192,251	\$192,251	\$192,251
Personal Property	\$152,866	\$16,144	\$15,640	\$15,135	\$15,135	\$15,135	\$15,135	\$15,135	\$15,135	\$15,135	\$15,135
Total	\$2,094,604	\$221,212	\$214,299	\$207,387	\$207,387	\$207,387	\$207,387	\$207,387	\$207,387	\$207,387	\$207,387

Buckeye, AZ											
	Total	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Real Property	\$1,966,709	\$207,705	\$201,214	\$194,724	\$194,724	\$194,724	\$194,724	\$194,724	\$194,724	\$194,724	\$194,724
Personal Property	\$151,331	\$15,982	\$15,483	\$14,983	\$14,983	\$14,983	\$14,983	\$14,983	\$14,983	\$14,983	\$14,983
Total	\$2,118,040	\$223,687	\$216,697	\$209,707	\$209,707	\$209,707	\$209,707	\$209,707	\$209,707	\$209,707	\$209,707

SUMMARY OF RESULTS

Yuma offers a significantly lower cost location for advanced manufacturing than competitive locations in the Phoenix metropolitan area. Over a ten-year period, the cost of a location in Yuma would be about \$15.4 million less than a location in Casa Grande and \$9.0 million less than a location in Buckeye (**Figure 9**). Payroll accounts for 44 to 48 percent of total operating costs in all three locations and the occupational wages for advanced manufacturing in Yuma average 14 to 26 percent less than those in Casa Grande or Buckeye. The combination of a lower wage base and lower payroll tax rates also results in payroll taxes and benefits that are 7 to 12 percent less in Yuma. There are also advantages to a location in Yuma based on real estate costs due to both lower land costs and lower construction costs.

FIGURE 9
SUMMARY OF COMPARATIVE OPERATING COSTS FOR ADVANCED MANUFACTURING

	Yuma, AZ	Buckeye, AZ	% Difference vs Yuma	Casa Grande, AZ	% Difference vs Yuma
Operating Costs - 10 Year Total	\$115,219,661	\$124,182,761	8%	\$130,583,533	13%
Payroll	\$50,183,538	\$57,222,190	14%	\$63,318,763	26%
Payroll Taxes and Benefits	\$11,009,978	\$11,737,774	7%	\$12,368,160	12%
Equipment Costs	\$31,000,000	\$31,000,000	0%	\$31,000,000	0%
Land and Facility Construction*	\$16,490,172	\$17,543,408	6%	\$17,146,641	4%
Electric Utilities	\$3,475,119	\$3,475,119	0%	\$3,475,119	0%
Property & Sales Taxes	\$3,060,854	\$3,204,270	5%	\$3,274,849	7%

*Facility cost represents 10 years of annual payments on commercial real estate loan.