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February 19, 2026

Cochise County Board of Supervisors
1415 Melody Lane
Bisbee, AZ 85603

RE: Utility Scale Solar Work Study Sessions

Dear Supervisors and Staff,

The Arizona Solar Energy Industries Association (AriSEIA) appreciates the opportunity to provide information regarding the economic and water resource benefits associated with utility-scale solar development. While AriSEIA does not currently have a standalone economic impact study for Cochise County, extensive analysis conducted across southern Arizona counties demonstrates consistent and measurable benefits for rural communities with similar land use patterns and economic conditions.

About AriSEIA
AriSEIA is Arizona's statewide trade association representing the solar and energy storage industry. Our members work across both rural and urban communities throughout Arizona. AriSEIA works with counties, utilities, state agencies, and local stakeholders to support responsible energy development that strengthens local economies, protects ratepayers, and respects community priorities. Our role is to provide accurate information and technical expertise so that local decision-makers can evaluate projects based on objective data.

Economic Development and Local Investment
Solar energy development represents one of the largest forms of private infrastructure investment currently occurring in rural Arizona. Independent economic analyses prepared by Elliott D. Pollack & Company show that a typical 200-megawatt solar facility with battery storage represents approximately $528 million in capital investment, generating substantial local economic activity and tax revenue over decades of operation.

• A representative project in Yuma County generated approximately 299 construction-related jobs, more than $213 million in total economic activity, and an estimated $25.8 million in tax revenues over the life of the project benefiting counties, special districts, and local schools.

• A similar project analyzed in Pinal County created approximately 265 construction jobs, produced nearly $199 million in lifetime economic output, and generated about $27.3 million in total tax revenue.

These impacts are particularly meaningful for rural counties because solar facilities:
• Provide significant temporary construction employment and local spending during development;
• Generate long-term property tax revenue without creating service demands comparable to residential growth;

• Provide stable revenue streams supporting fire districts, libraries, flood control districts, and school districts; and
• Create ongoing annual economic activity through operations, maintenance, and worker spending.

Solar projects are centrally assessed under Arizona law and pay personal property taxes on equipment over multi-decade operating lives, providing predictable revenue for local jurisdictions.

Water Conservation Benefits
Water use is often a central concern in land-use decisions across southern Arizona. Independent analysis comparing water consumption across land uses shows that solar energy is among the lowest water-consuming forms of development available.

Solar facilities use approximately 0.03 acre-feet of water per acre annually, compared to an average of approximately 3.4 acre-feet per acre across other evaluated land uses. Irrigated agriculture averages about 4.1 acre-feet per acre, while data centers average approximately 6.3 acre-feet per acre. In practical terms, solar uses roughly 100 times less water than typical alternative land uses considered for rural development.

Because solar generation requires minimal ongoing water consumption, it allows productive economic use of land while preserving scarce groundwater resources. Unlike residential or agricultural expansion, solar development does not create permanent long-term water demand growth.

Power Supply for Future Data Center Development

Across Arizona and other western states, large-load facilities such as data centers are increasingly being paired with "bring your own power" energy strategies, where new electricity demand is matched with new generation resources rather than relying solely on existing grid capacity. Utility-scale solar and battery storage projects are uniquely suited to support this model because they can be developed quickly, located near load growth, and provide predictable long-term energy pricing.

In several regions, local governments and utilities have encouraged pairing large industrial or data center development with dedicated renewable generation to reduce strain on existing infrastructure, limit cost impacts to existing customers, and improve grid reliability. This approach allows economic development to proceed while ensuring that new electricity demand does not require costly transmission upgrades or shift system costs onto residents and small businesses.

For rural counties such as Cochise County, locally sited solar generation can position the region competitively for future economic development opportunities while maintaining local control over land use and resource planning. When paired thoughtfully, solar development can serve as enabling infrastructure that attracts investment while protecting water resources and maintaining grid stability.

Long-Term Community Stability
In addition to direct fiscal benefits, solar development provides broader community advantages:

• Stable long-term lease income for landowners;
• Energy price stability supported by fuel-free generation;
• Diversification of local economies traditionally dependent on agriculture or resource extraction; and
• Infrastructure investment without population growth pressures on housing, roads, or schools.

For rural counties balancing economic development with water conservation and fiscal responsibility, solar projects uniquely align these priorities.

Conclusion
Experience across southern Arizona demonstrates that utility-scale solar development delivers measurable economic investment, reliable long-term tax revenues, and substantial water savings compared to alternative land uses. These benefits make solar an effective tool for supporting Cochise County's economic development goals while protecting limited water resources.

On a personal note, this letter carries special meaning for me. My father is from Bisbee, and my great-grandfather, Jack Howard, served as Sheriff of Cochise County in the 1950s. Cochise County is part of my family's history, and I deeply respect the community's strong traditions of independence, stewardship of land, and thoughtful local decision-making. AriSEIA's goal is to ensure that energy development contributes positively to that legacy.

AriSEIA appreciates the County's consideration and welcomes continued collaboration to ensure that future energy development reflects local priorities and community values.

Respectfully,
/s/ Autumn T. Johnson
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Pinal County Solar (Example Project)
Economic Impact and Tax Revenue Analysis

Prepared for:

Arizona Solar Energy Industries Association (AriSEIA)

July 2024

Prepared by:

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Summary of Impacts

There is a common misconception that solar projects do not contribute to the economy nor generate tax revenues for local governments. However, solar projects across all counties in Arizona are subject to personal property taxes on equipment and, thus, generate significant revenue for local taxing jurisdictions as outlined in this report. In addition, solar projects can contribute to increased real property taxes as well as generate use taxes levied on non-exempt equipment for the State (but these additional State taxes are not included in this analysis).

This report estimates the impacts of a typical solar project to be located in Pinal County. This example solar power generating facility would sit on an estimated 1,200 acres and produce up to 200 MW of power and includes the addition of 200 MW (4 hours) of battery storage. A facility of this size is generally in range with recent power purchase contracts announced by Arizona Public Service and Salt River Project, two of the state's largest electric utilities.

The taxable original cost of a project of this size is estimated at $528.0 million. The taxable original cost is subject to personal property tax using a 30-year straight-line depreciation with a 10% floor for solar and 15-year straight-line depreciation with a 10% floor for battery storage. The full cash value of renewable energy equipment is 20% of the depreciated cost of the equipment per ARS 42-14155. This full cash value is subject to Arizona personal property taxes over the life of the project (40 years for the solar facility and 20 years for battery storage).

Impact Summary

During construction, an estimated $672,400 in tax revenues and 265 jobs would be created in the local economy from this example project. In addition, over the life of the project, more than $25.9 million in tax revenue would be generated by personal property tax on equipment. These taxes would directly benefit the county, its special districts (such as county fire, flood and library districts), and local school districts. Furthermore, employees working on the project generate an estimated $664,000 in tax revenues.

In total, this example Pinal County Solar Project would generate an estimated $27.3 million in tax revenues during the life of the project. The total economic output of the project over the life of the project is estimated at $199.3 million.

Pinal County Solar Project Summary Impact

Construction related jobs	265
Taxes generated during construction	$672,400
Personal property tax generated during life of project	
Pinal County and special districts	$12.5 million
Local school districts	$13.5 million
Tax revenues generated by employees	$664,000
Grand total of taxes generated during life of Project	**$27.3 million**
Total economic activity during life of project	**$199.3 million**

Economic Impact and Tax Revenue Analysis

Economic Impacts

- Development would provide an immediate $38.2 million in direct construction impact in the County, generating a direct, indirect and induced total of $45.5 million in total economic impact from construction activity. This investment would create 265 construction and related jobs and $15.8 million in wages over the projected construction schedule.

- Once operating, an estimated $3.8 million in annual economic activity would occur within the County's economy each year.

- All totaled, the example solar project would create over $199.3 million in economic activity within Pinal County during construction and 40 years of operations for solar and 20 years of operations of the battery storage.

Economic Impact Summary
Pinal County Solar Project
(2024 dollars)

Construction

Impact Type	Jobs	Wages	Economic Output
Direct	225	$13,880,000	$38,200,000
Indirect	21	$1,134,000	$3,555,000
Induced	19	$771,000	$3,699,000
Total	**265**	**$15,785,000**	**$45,454,000**

Ongoing Annual Operations

Impact Type	Annual Jobs	Total Wages	Economic Output
Direct	4	$448,000	$2,953,200
Indirect	2	$107,400	$753,900
Induced	1	$29,100	$139,100
Total	**6**	**$584,500**	**$3,846,200**

Total economic output during construction and 40 years of operations:	**$199,302,000**

Source: Elliott D. Pollack & Company; IMPLAN

Tax Revenues Generated

Construction and operations of the solar project would create significant tax revenue for Pinal County and other entities. While the project would be exempt from prime contracting transaction privilege tax (under ARS 42-5075(b)(7) and ARS 42-5061), there is still substantial value from solar equipment that would increase the personal property revenues for the County. Revenues would also be generated from secondary sources of employee generated revenue.

- Pinal County would receive an estimated $672,400 in cumulative tax revenue from construction related impacts. These impacts are generated by the share of employees that would spend within Pinal County during the construction phase.

Tax Revenues during Construction
Pinal County Solar Project
(2024 dollars)

	Secondary Revenues			
Impact Type	Employee Spending Sales Tax	Resident Property Tax	State Shared Revenues	**Total Revenues**
Direct	$88,100	$482,000	$2,410	**$572,510**
Indirect	$7,700	$44,900	$220	**$52,820**
Induced	$6,200	$40,700	$200	**$47,100**
Total	**$102,000**	**$567,600**	**$2,800**	**$672,400**

1/ The figures are intended only as a general guideline as to how the taxing jurisdictions could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona, county and other taxing jurisdictions.

Source: EDPCo; IMPLAN; ADOR; ATRA

Operations of the example solar project would create tax revenue for the County and local school districts.

- Pinal County property taxes include taxing jurisdictions such as Pinal County the fire district assistant tax, county flood and library, community college district and the special health district. These jurisdictions would receive an average of $311,900 per year in personal property taxes. The school districts would receive an average of $336,500 in tax revenue each year.

- Average annual taxes generated for the County from employees total an estimated $16,600 each year.

In total, the combined annual taxes generated for the County average an estimated $665,000 each year.

Pinal County Solar Project (2024 dollars)	
Average Annual Operating Taxes Generated	
Personal property tax	
County and Special Districts	$311,900
Local School Districts	$336,500
Tax revenues generated by employees	$16,600
Total Operations Related Revenue	**$665,000**

1/ The figures are intended only as a general guideline as to how the county could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona and county.

Source: Elliott D. Pollack & Co.; IMPLAN; AZDOR; AriSEA; ATRA

- Over the life of the project, the County and its school districts would receive an estimated $27.3 million in total from construction and ongoing annual tax collections generated by the Pinal Solar Project.

- If the site is located within an incorporated area, the property taxes for that area would be collected in addition to the County and School Districts. That is, if the site is located within Eloy incorporated area, for example, an additional $2.2 million would be collected in personal property taxes. The following table also provides the projected taxes for each of those jurisdictions.

Tax Revenues: Life of Project Pinal County Solar Project (2024 dollars)	
Construction related tax revenues	$672,400
Operations Impact	
Personal property tax	
County and Special Districts	$12,477,900
Local School Districts	$13,461,000
Tax revenues generated by employees	$664,000
GRAND TOTAL FISCAL IMPACT	**$27,275,300**
Personal property tax for incorporated areas*	
Casa Grande	$2,883,000
Coolidge	$4,099,000
Eloy	$2,218,000
Florence	$2,081,000
Kearny	$5,096,000
Mammoth	$3,979,000
Maricopa	$9,703,000
Queen Creek	$3,608,000
Superior	$11,123,000

*Collected if the site is located within the respective incorporated area.

1/ The figures are based on a 40-year life and intended as a general guideline as to how the local governments could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona and other taxing jurisdictions.

Source: Elliott D. Pollack & Co.; AriSEA; IMPLAN

About Elliott D. Pollack & Company

Elliott D. Pollack & Company has been in business for more than 30 years and is headed by one of Arizona's most noted economists. The firm is known for its expertise in two primary areas – real estate and economics, with its primary practice in the State of Arizona. The firm has been employed by public institutions, state, county, and local governments, private entities, and Native American Communities, in a variety of assignments that include economic impact analyses, real estate market studies, forecasting, and public speaking at events around the State.

Assumptions & Methodology

The typical 1,200-acre solar power generating facility would produce up to 200 MW of power and includes the addition of 200 MW (4 hours) of battery storage. The total value of the example project is estimated at $528.0 million including construction and equipment. A facility of this size is generally in range with recent power purchase contracts announced by Arizona Public Service and Salt River Project, two of the state's largest electric utilities.

Project Assumptions
Pinal County Solar Project
(2024 dollars)

Acres	1,200
Solar Facility (MW)	200
Battery Storage - 4 hours (MW)	200
Taxable Original Cost of Equipment*	
Solar Equipment	$207,000,000
Battery Storage Equipment	$321,000,000
Total value of project	$528,000,000

*Taxable Original Cost is subject to personal property tax per the ADOR

Source: AriSEA; Elliott D. Pollack & Company

The following table outlines the weighted average tax rates used in estimating the property tax impacts of the example Pinal County Solar Project. These rates are applied to every $100 of net assessed value. The rates are current as of this report and are used for the entire duration of the projected project life.

Average Property Tax Rates
Pinal County Solar Project

DISTRICT	RATE
Pinal County	3.441
Fire District Assistance Tax	0.055
County Flood	0.169
County Library	0.097
Community College	1.920
Other	0.119
Local School Districts	6.463
Grand Total	**12.454**

Source: County Assessor's Office

Additional taxes are applied if the property is located within an incorporated area. Following are municipal rates throughout Pinal County. These rates are current as of 2024.

Municipal Property Tax Rates Pinal County Solar Project	
City	**RATE**
Casa Grande	1.3840
Coolidge	1.9681
Eloy	1.0648
Florence	0.9990
Kearny	2.4466
Mammoth	1.9105
Maricopa	4.6586
Queen Creek	1.7321
Superior	5.3407
Source: County Assessor's Office	

Economic Impact Methodology

Economic impact analysis examines the economic implications of an activity in terms of output, earnings, and employment. For this study, the analysis focused on the construction impacts as well as the ongoing operations including direct expenditures by the residents.

The different types of economic impacts are known as direct, indirect, and induced, according to the manner in which the impacts are generated. For instance, direct employment consists of permanent jobs held by project employees. Indirect employment is those jobs created by businesses that provide goods and services essential to the operation or construction of the project. These businesses range from manufacturers (who make goods) to wholesalers (who deliver goods) to janitorial firms (who clean the buildings). Finally, the spending of the wages and salaries of direct and indirect employees on items such as food, housing, transportation and medical services creates induced employment in all sectors of the economy, throughout the region. These secondary effects are captured in the analysis conducted in this study.

Multipliers have been developed to estimate the indirect and induced impacts of various direct economic activities. IMPLAN developed the multipliers used in this study and were selected based on the land use type. The multipliers used for this project represent the construction of power and communication as well as electric power generation for ongoing operations.

The construction multipliers specific to Pinal County are used in this study. For the solar generation multiplier, an average of similar economies was used, as the current multiplier set for Pinal County does not exist.

The economic impact is categorized into three types of impacts:

(1) **Employment Impact** – the total wage and salary and self-employed jobs in a region. Jobs include both part time and full-time workers.

(2) **Earnings Impact** – the personal income, earnings or wages, of the direct, indirect and induced employees. Earnings include total wage and salary payments as well as benefits of health and life insurance, retirement payments and any other non-cash compensation.

(3) **Economic Output** – also referred to economic activity, relates to the gross receipts for goods or services generated by the company's operations.

Economic impacts are by their nature regional in character. Such impacts are best illustrated when not assigned to a specific municipality or locality, although clearly the primary impact of job creation would be in the municipality and county where the project is located. Indeed, many communities in the surrounding region would also benefit from the operations of the project.

Fiscal Impact Methodology

Fiscal impact analysis studies the public revenues associated with a particular economic activity. The primary revenue sources of local, county, and state governments (i.e., taxes) are analyzed to determine how an activity may affect the various jurisdictions. This section would evaluate the impact of the project on State, county and local school districts.

The fiscal impact figures cited in this report have been generated from information provided by a variety of sources including the U.S. Bureau of the Census; the U.S. Department of Labor; the Internal Revenue Service; the State of Arizona; the Arizona Tax Research Association; and the U.S. Consumer Expenditure Survey. Elliott D. Pollack & Company has relied upon the estimates of operating revenues outlined in this study.

Fiscal impacts are categorized by type in this study, similar to economic impact analysis. The major sources of revenue generation for governmental entities are calculated based on ongoing operations. Employees would spend part of their salaries on local goods and services and pay taxes on the homes they occupy. This spending would contribute to revenues collected by the State that are ultimately shared with local governments.

The project would be exempt from prime contracting transaction privilege tax (under ARS 42-5075(b)(7) and ARS 42-5061). However, there is still substantial value from solar equipment that would increase the personal property revenues for the County. Revenues would also be generated from secondary sources of employee generated revenue. The following is a description of the applicable revenue sources that would be considered for this analysis.

Primary Taxes Generated by Project

- Personal Property Tax

  Renewable energy projects are centrally assessed by the Arizona Department of Revenue. The total original cost is used to calculate the full cash value. The depreciation schedule is then based on straight-line depreciation over the useful life (currently 30 years capped at 90% of taxable original cost per ARS 42-14155). The full cash value factor for renewable energy is 20% and the assessment ratio of 15% is applied for a total taxable value each year.

Secondary Taxes Generated by Employees

The following tax rates are applied to the spending of direct, indirect and induced employees.

- Transaction Privilege Tax

  The State, counties, and local cities in Arizona charge sales tax on retail goods and utility usage. The sales tax rate for the State is 5.6%. Portions of this tax are redistributed through revenue sharing to counties and cities throughout Arizona based on population. The weighted average tax rate for local governments is 2.26%. Based on data from the U.S. Consumer Expenditure Survey, the projected extent of retail spending and resulting sales tax receipts was calculated.

- Property Tax

  Given that the location of the example project is unknown, the value of the land was not estimated and, thus, real property taxes for the land are not calculated in this report. However, the employees would be subject to residential property tax in Arizona with an assessment ratio of 10%. In order to estimate property taxes, the assessed full cash value of the occupied space along with the projected value of a typical housing unit has been calculated.

- State Shared Revenues

  Each municipality in Arizona receives a portion of State revenues from four different sources - State sales tax (see description above), State income tax, vehicle license tax and highway user tax. The formulas for allocating these revenues are primarily based on population. Counties also share in the revenue sources of the State, with the exception of income tax.

  State Income Tax

  The State of Arizona collects taxes on personal income. The tax rate used in the analysis averages about 1.6% for earnings. These percentages are based on the most recently available income tax data from the State and the projected wage levels of jobs created by the construction and operations impact. This tax is applied

to the wages and earnings of direct and indirect employment. Portions of this tax are redistributed through revenue sharing to cities throughout Arizona based on population.

HURF Taxes

The State of Arizona collects specific taxes for the Highway User Revenue Fund (HURF). Both the registration fees and the motor vehicle fuel tax (gas tax) are considered in this analysis. The motor vehicle fuel tax is $0.18 per gallon and is calculated based on a vehicle traveling the Arizona statewide average of 12,000 miles per year at 16.6 miles per gallon. Registration fees average $65 per employee in the State of Arizona. These factors are applied to the projected direct and indirect employee count. Portions of these taxes are distributed to cities and counties throughout Arizona based on a formula that includes population and the origin of gasoline sales.

Vehicle License Tax

The vehicle license tax is a personal property tax placed on vehicles at the time of annual registration. This factor is applied to the projected direct, indirect and induced employee count. The average tax used in this analysis is $343 and portions of the total collections are distributed to the Highway User Revenue Fund. The remaining funds are shared between cities and counties in accordance with population-based formulas.

The above tax categories represent the largest sources of revenues that would be generated to the various jurisdictions. The revenue impacts do not include certain revenue sources such as corporate income taxes. All tax collections represented in this analysis are gross collections and do not take into consideration any incentives or development agreements that may occur.

APPENDIX 1: Annual Personal Property Tax Estimates by Jurisdiction

Personal Property Tax Impact from Operations
Pinal County Solar Project
(2024 dollars)

	Construction	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Total taxable value	$15,840,000	$14,991,000	$14,142,000	$13,293,000	$12,444,000	$12,423,000	$11,518,800	$10,614,600	$9,710,400	$8,806,200	$9,144,000	$8,157,000	$7,170,000	$6,183,000
Pinal County	$545,070	$515,855	$486,640	$457,425	$428,210	$427,488	$396,373	$365,259	$334,145	$303,030	$314,654	$280,691	$246,727	$212,763
CAWCD	$22,176	$20,987	$19,799	$18,610	$17,422	$17,392	$16,126	$14,860	$13,595	$12,329	$12,802	$11,420	$10,038	$8,656
Fire District Assistance Tax	$8,744	$8,275	$7,806	$7,338	$6,869	$6,857	$6,358	$5,859	$5,360	$4,861	$5,047	$4,503	$3,958	$3,413
County Flood	$26,817	$25,380	$23,942	$22,505	$21,068	$21,032	$19,501	$17,971	$16,440	$14,909	$15,481	$13,810	$12,139	$10,468
County Library	$15,286	$14,466	$13,647	$12,828	$12,008	$11,988	$11,116	$10,243	$9,371	$8,498	$8,824	$7,872	$6,919	$5,967
Community College	$304,128	$287,827	$271,526	$255,226	$238,925	$238,522	$221,161	$203,800	$186,440	$169,079	$175,565	$156,614	$137,664	$118,714
Other	$18,834	$17,824	$16,815	$15,805	$14,796	$14,771	$13,696	$12,621	$11,546	$10,471	$10,872	$9,699	$8,525	$7,352
CAVIT	$7,920	$7,496	$7,071	$6,647	$6,222	$6,212	$5,759	$5,307	$4,855	$4,403	$4,572	$4,079	$3,585	$3,092
Pinal County	**$948,974**	**$898,111**	**$847,247**	**$796,384**	**$745,520**	**$744,262**	**$690,091**	**$635,921**	**$581,750**	**$527,579**	**$547,817**	**$488,686**	**$429,555**	**$370,424**
Local School Districts	$1,023,738	$968,867	$913,996	$859,126	$804,255	$802,898	$744,459	$686,021	$627,582	$569,144	$590,976	$527,186	$463,397	$399,607
School Districts	**$1,023,738**	**$968,867**	**$913,996**	**$859,126**	**$804,255**	**$802,898**	**$744,459**	**$686,021**	**$627,582**	**$569,144**	**$590,976**	**$527,186**	**$463,397**	**$399,607**
Grand Total	**$1,972,712**	**$1,866,978**	**$1,761,244**	**$1,655,509**	**$1,549,775**	**$1,547,160**	**$1,434,551**	**$1,321,942**	**$1,209,333**	**$1,096,723**	**$1,138,793**	**$1,015,872**	**$892,951**	**$770,030**

	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27
Total taxable value	$5,517,000	$6,414,000	$5,986,200	$5,558,400	$5,130,600	$4,730,400	$4,357,800	$1,863,000	$1,656,000	$1,449,000	$1,242,000	$1,035,000	$828,000	$621,000
Pinal County	$189,845	$220,712	$205,991	$191,270	$176,549	$162,778	$149,956	$64,108	$56,985	$49,862	$42,738	$35,615	$28,492	$21,369
CAWCD	$7,724	$8,980	$8,381	$7,782	$7,183	$6,623	$6,101	$2,608	$2,318	$2,029	$1,739	$1,449	$1,159	$869
Fire District Assistance Tax	$3,045	$3,541	$3,304	$3,068	$2,832	$2,611	$2,406	$1,028	$914	$800	$686	$571	$457	$343
County Flood	$9,340	$10,859	$10,135	$9,410	$8,686	$8,009	$7,378	$3,154	$2,804	$2,453	$2,103	$1,752	$1,402	$1,051
County Library	$5,324	$6,190	$5,777	$5,364	$4,951	$4,565	$4,205	$1,798	$1,598	$1,398	$1,199	$999	$799	$599
Community College	$105,926	$123,149	$114,935	$106,721	$98,508	$90,824	$83,670	$35,770	$31,795	$27,821	$23,846	$19,872	$15,898	$11,923
Other	$6,560	$7,626	$7,118	$6,609	$6,100	$5,624	$5,181	$2,215	$1,969	$1,723	$1,477	$1,231	$984	$738
CAVIT	$2,759	$3,207	$2,993	$2,779	$2,565	$2,365	$2,179	$932	$828	$725	$621	$518	$414	$311
Pinal County	**$330,523**	**$384,263**	**$358,633**	**$333,004**	**$307,374**	**$283,398**	**$261,076**	**$111,612**	**$99,211**	**$86,810**	**$74,408**	**$62,007**	**$49,605**	**$37,204**
Local School Districts	$356,563	$414,536	$386,888	$359,239	$331,590	$305,725	$281,644	$120,406	$107,027	$93,649	$80,270	$66,892	$53,514	$40,135
School Districts	**$356,563**	**$414,536**	**$386,888**	**$359,239**	**$331,590**	**$305,725**	**$281,644**	**$120,406**	**$107,027**	**$93,649**	**$80,270**	**$66,892**	**$53,514**	**$40,135**
Grand Total	**$687,087**	**$798,799**	**$745,521**	**$692,243**	**$638,965**	**$589,124**	**$542,720**	**$232,018**	**$206,238**	**$180,458**	**$154,679**	**$128,899**	**$103,119**	**$77,339**

	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Total
Total taxable value	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	
Pinal County	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$21,369	$7,167,000
CAWCD	$869	$869	$869	$869	$869	$869	$869	$869	$869	$869	$869	$869	$291,600
Fire District Assistance Tax	$343	$343	$343	$343	$343	$343	$343	$343	$343	$343	$343	$343	$115,000
County Flood	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$352,600
County Library	$599	$599	$599	$599	$599	$599	$599	$599	$599	$599	$599	$599	$201,000
Community College	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$11,923	$3,998,900
Other	$738	$738	$738	$738	$738	$738	$738	$738	$738	$738	$738	$738	$247,600
CAVIT	$311	$311	$311	$311	$311	$311	$311	$311	$311	$311	$311	$311	$104,100
Pinal County	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$37,204**	**$12,477,900**
Local School Districts	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	$40,135	**$13,461,000**
School Districts	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$40,135**	**$13,461,000**
Grand Total	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$77,339**	**$25,938,900**

NOTES

1 Depreciation used to value "renewable energy equipment" is based on "straight-line depreciation over the useful life, as adopted by the department" per ARS 42-14155.
2 Depreciation uses a 30 year straight line depreciation for solar and 15 year for battery storage in this analysis as advised by the Arizona Department of Revenue.
3 Through 12/31/40 the full cash value of "renewable energy equipment" is 20% of the depreciated cost of the equipment per ARS 42-14155. This report assumes the statute will be extended to cover the life of the project.
4 The total may not equal the sum of the impacts due to rounding. All dollar figures are in constant dollars. Inflation has not been included in these figures.
5 The figures for the County as a whole are based on the current tax rates and assume the Project would not impact these rates.
6 The forecasts are subject to uncertainty and variation. Accordingly, we do not represent them as results that will be achieved. Changes in rates would alter the findings of this analysis.

Source: Elliott D. Pollack & Company; IMPLAN; Arizona Department of Revenue; Arizona Tax Research Association; AriSEA

The Benefits of Solar Energy Projects in Arizona

Prepared for:

Arizona Solar Energy Industries Association (AriSEIA)

December 2024

Prepared by:

Elliott D. Pollack & Company
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SUMMARY: Benefits of the Solar Industry in Arizona

As of 2024, Arizona ranked sixth in the nation in terms of solar capacity and third in battery storage, with over 90 utility-scale solar projects installed in the past decade. These projects contribute to energy independence, environmental sustainability, and economic growth, providing numerous benefits to the state, local communities, and school districts.

Energy Independence: Solar power reduces reliance on fossil fuels, enhancing Arizona's energy security. With 7,800MW of solar capacity and an additional 2,860MW in battery storage (as of 2024), Arizona has diversified its energy portfolio. Localized solar installations help improve grid resilience, reduce transmission losses, and offer protection from volatile fossil fuel prices as solar technology advances.

Environmental Benefits: Solar energy significantly reduces greenhouse gas emissions, contributing to Arizona's climate goals. Compared to other power generation methods, solar projects use very little water, an important factor in Arizona's arid climate. A study revealed solar uses 0.3 acre-feet of water per acre, far lower than other land uses, making it an environmentally favorable option for energy production.

Economic Stimulus: Solar development brings substantial investments to Arizona, creating jobs in construction, maintenance, and related industries. For instance, a 200MW solar project with battery storage generates 225 direct jobs during peak construction. Moreover, solar energy stabilizes long-term energy prices, lowers electricity bills through net metering, and supports technological advancements, positioning Arizona as a leader in renewable energy.

Tax Revenues: Despite misconceptions, solar projects generate considerable tax revenues. A 200MW example project would generate an average of $565,200 annually in personal property taxes levied on solar equipment, or $22.6 million over the life of the project. Additionally, solar projects increase land value, leading to higher real property tax revenues for local jurisdictions.

In summary, Arizona's solar industry drives energy independence, supports environmental sustainability, stimulates economic growth, and generates significant tax revenues.

About Elliott D. Pollack & Company

Elliott D. Pollack & Company has been in business for more than 30 years and is headed by one of Arizona's most noted economists. The firm is known for its expertise in two primary areas – real estate and economics, with its primary practice in the State of Arizona. The firm has been employed by public institutions, state, county, and local governments, private entities, and Native American Communities, in a variety of assignments that include economic impact analyses, real estate market studies, forecasting, and public speaking at events around the State.

INTRODUCTION

Arizona has one of the highest solar potentials in the U.S., with an average of over 300 sunny days per year, making it ideal for solar energy production. Indeed, as of 2024, Arizona ranked 6th in the nation in terms of solar capacity and 3rd when considering battery storage.[1] And the solar energy industry in Arizona continues to grow. According to the Solar Energy Industries Association (SEIA), over the last 10 years alone, there have been more than 90 utility scale solar projects and battery storage facilities installed throughout Arizona, increasing the total nameplate capacity by an estimated 356%. By the end of 2024, the utility scale nameplate capacity in Arizona will reach an estimated 7,800 megawatts (MW) with an additional 2,860MW in battery storage. In addition, there are 16 known projects currently under development that will total nearly 3,400MW of capacity.

The benefits of this recent growth are important to the State, counties, local communities, and taxing jurisdictions - such as special districts and local school districts. These new utility scale solar projects not only bring energy independence to communities but offer environmental benefits, stimulate economic growth, and increase tax revenues.

There has been much misinformation regarding the solar industry circulating throughout the State in policy forums by both the public and elected policymakers. This report, prepared by Elliott D. Pollack & Company, presents comprehensive data and analysis on the solar energy industry, highlighting its growth, economic impact, and environmental benefits.

[1] Based on data provided by the Solar Energy Industries Association (SEIA).

ENERGY INDEPENDENCE

Many communities in Arizona recognize the value of renewable energy and have embraced the development of utility-scale solar projects. Data from the Solar Energy Industries Association (SEIA) provides the volume of solar nameplate capacity by County.

As of year-end 2024, the State's solar projects registered with SEIA will total over 7,823MW with an additional 2,860MW in battery storage. These totals include the aggregate of 165 projects.

Arizona Utility Scale Solar Capacity
by County
2024

County	Project Count	AC Nameplate Capacity (MW)	Battery Storage Capacity (MW)
Apache	3	13	
Cochise	9	189	20
Gila	2	22	8
La Paz	3	633	
Maricopa	65	3,389	1,408
Mohave	8	117	60
Navajo	2	55	
Pima	31	350	65
Pinal	17	1,440	704
Santa Cruz	1	6	
Yavapai	4	48	
Yuma	20	1,561	595
	165	7,823	2,860

Source: SEIA projects larger than 1MW

SEIA data lists 16 additional projects, located in six counties, currently in various stages of development but all expected to begin operations within the next three years (by year-end 2027). These projects total nearly 3,400 MW of additional nameplate capacity, or an average of 210MW per project.

Arizona Utility Scale Solar Capacity Under Development by County		
County	**Project Count**	**AC Nameplate Capacity (MW)**
Coconino	2	700
La Paz	1	200
Maricopa	10	1,907
Pima	2	384
Yuma	1	185
	16	3,376

Source: SEIA projects larger than 1MW

As the State and local communities add capacity of solar energy, it can help diversify and, thus, reduce reliance on fossil fuels and improve energy security and self-sufficiency. Distributed solar installations can enhance the resilience of the electrical grid by not only reducing demand on the main power grid, but also providing local sources of power and reducing transmission losses. That is, by producing energy locally, communities become less vulnerable to supply chain disruptions affecting fossil fuels.

Furthermore, solar energy provides a hedge against volatile fossil fuel prices, as sunlight is free, and the cost of solar technology continues to decrease. Advances in solar technology and storage solutions continue to improve efficiency and reliability, further supporting energy independence goals.

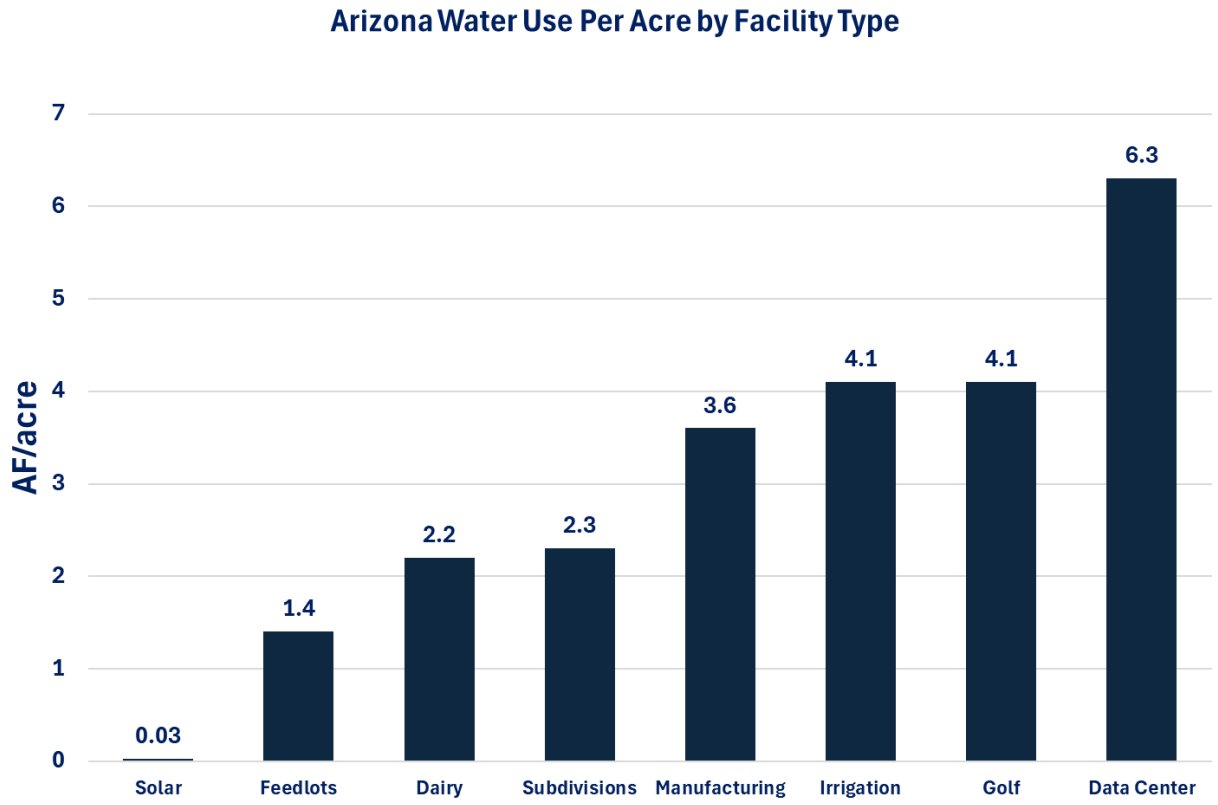
ENVIRONMENTAL BENEFITS

Beyond the importance of energy independence, many communities throughout Arizona are committed to a sustainable future. As part of this movement, demand for the production of carbon-neutral electricity has increased. Solar energy reduces greenhouse gas emissions and overall air emissions (even beyond greenhouse gas emissions), contributing to a cleaner environment.

According to the Arizona Department of Environmental Quality, there are currently seven counties in Arizona with communities with air quality pollutants above the National Air Quality Standard (NAAQS) that are outlined in the Clean Air Act. Nonattainment areas are classified by the Environmental Protection Agency (EPA) to offer air quality monitoring data.

When considering a solar project in a local community, many policymakers have expressed concern regarding the use of water. In reality, solar power generation uses minimal water compared to traditional power plants, which is crucial in arid regions like Arizona.

Furthermore, analysis conducted by WestWater Research, LLC concluded that Solar projects in Arizona use significantly less water than other land uses that local communities may consider as an alternative to solar. The study, "Arizona Water Demand Analysis by Land Use Category," illustrates that the average water use across the sectors analyzed is 3.4-acre feet per acre. When compared to solar (0.3-acre feet per acre), this is more than 100 times the water usage. The chart below provides the results of their analysis by land use type analyzed.



Overall, solar energy helps Arizona meet state and national climate goals and renewable energy requirements, contributing to a more sustainable future.

ECONOMIC STIMULUS

Solar energy development brings significant investment into Arizona. This new development creates jobs and stimulates economic activity. Arizona's investment in solar technology can lead to job creation in installation, maintenance, and manufacturing sectors.

Based on information from local solar developers, the construction of a new 200MW solar facility with 200MW of battery storage would generate 225 direct jobs at peak construction. While there is no guarantee these construction workers are based locally, especially in some of the smaller rural areas, they are still onsite and spending money locally during the construction phase. In addition, suppliers and manufacturers are impacted, generating additional indirect and induced jobs.

Beyond the jobs and spending, the solar industry provides additional benefits not quantified in this analysis:

- Solar energy generation provides a stable energy source with low operational costs, offering long-term economic benefits, and energy price stability.
- Solar energy can lower electricity b ills for homeowners and businesses through reduced reliance on grid power and the potential for net metering.
- Investing in solar energy encourages technological advancements and can position Arizona as a leader in renewable energy technologies and practices.
- Solar projects can provide economic opportunities in rural areas, offering additional revenue streams and infrastructure development.

TAX REVENUES

There is a common misconception that solar projects do not generate tax revenues for local governments in Arizona. However, solar projects across all counties in Arizona are subject to personal property taxes on equipment and, thus, generate significant revenue for local taxing jurisdictions as outlined in this report. In addition, solar projects can contribute to increased real property taxes as well as generate use taxes levied on non-exempt equipment for the State.

Personal Property Tax

Per Arizona Revised Statute 42-14155, the full cash value of renewable energy equipment is subject to Arizona personal property taxes over the life of the project using a 30-year straight-line depreciation with a 10% floor for solar and a 15-year straight-line depreciation with a 10% floor for battery storage. This full cash value is 20% of the depreciated cost of the equipment.

In order to illustrate the potential impacts on personal property taxes for local governments, the following project was considered. This example project would produce 200MW of power and includes the addition of 200MW (4 hours) of battery storage. A facility of this size is generally in range with recent power purchase contracts announced by Arizona Public Service and Salt River Project, two of the state's largest electric utilities. The taxable original cost of a project of this size is estimated at $528.0 million.

Using the formula described in ARS 42-14155, the following personal property taxes would be collected by each jurisdiction. Weighted average tax rates were used for each of the taxing jurisdictions based on population.

In the early years, the tax collections would be higher and decrease each year until depreciation reaches the 10% floor. Therefore, the annual average over the life of the project is provided in

the following table. An average of $565,200 would be collected each year by all jurisdictions. This equates to $22.6 million over the life of the project.

Personal Property Taxes
Arizona Solar Project (200MW Solar & 200MW BESS)
(2024 dollars)

	Rate	Average Annual	Life of Project
County	1.8698	$97,400	$3,896,000
Water District	0.1400	$7,300	$292,000
Fire District	0.0203	$1,100	$44,000
County Flood	0.2011	$10,500	$420,000
County Library	0.1629	$8,500	$340,000
Community College	1.2333	$64,200	$2,568,000
Special Health District	0.3277	$17,100	$684,000
Vocational District	0.0745	$3,900	$156,000
School Districts	6.8210	$355,200	$14,208,000
Total Personal Property Tax Collection	**10.8505**	**$565,200**	**$22,608,000**

--Through 12/31/40 the full cash value of "renewable energy equipment" is 20% of the depreciated cost of the equipment per ARS 42-14155. This report assumes the statute will be extended to cover the life of the project.

--The figures are intended only as a general guideline as to how the various counties could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona and counties.

Source: Elliott D. Pollack & Co.; ATRA; ARS 42-14155

Real Property Tax

Site selection for solar facilities is an important step in development. Factors such as accessibility, climate, grid capacity, and social and environmental impacts are considered. In addition, developers must consider zoning ordinances and regulatory and permitting requirements.

Typically, solar projects are situated on undeveloped land outside the immediate urban area where land is more abundant and often more affordable. The existing land uses can range from agricultural to industrial zones or brownfield / underutilized sites. In many cases, this land is far enough outside of the immediate development that it likely will not be developed for many years. In the meantime, the community can experience not only the personal property taxes described above, but also increased land value and, thus, increased property tax collection.

Research conducted by Elliott D. Pollack & Company regarding the assessed value of solar facilities showed that real property values increased an average of over 250% once solar was installed on the site. That directly correlates to increased real property tax collections for local jurisdictions.

The life of a solar project is typically 30 years at which point the panels can be removed with very little land disturbance. Not to mention, these solar developments are not taking the “last piece of land” available. Thus, local governments have much to gain from approving solar developments.

Yuma County Solar (Example Project)
Economic Impact and Tax Revenue Analysis

Prepared for:

Arizona Solar Energy Industries Association (AriSEIA)

July 2024

Prepared by:

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Summary of Impacts

There is a common misconception that solar projects do not contribute to the economy nor generate tax revenues for local governments. However, solar projects across all counties in Arizona are subject to personal property taxes on equipment and, thus, generate significant revenue for local taxing jurisdictions as outlined in this report. In addition, solar projects can contribute to increased real property taxes as well as generate use taxes levied on non-exempt equipment for the State (but these additional State taxes are not included in this analysis).

This report estimates the impacts of a typical solar project to be located in Yuma County. This example solar power generating facility would sit on an estimated 1,200 acres and produce up to 200 MW of power and includes the addition of 200 MW (4 hours) of battery storage. A facility of this size is generally in range with recent power purchase contracts announced by Arizona Public Service and Salt River Project, two of the state's largest electric utilities.

The taxable original cost of a project of this size is estimated at $528.0 million. The taxable original cost is subject to personal property tax using a 30-year straight-line depreciation with a 10% floor for solar and 15-year straight-line depreciation with a 10% floor for battery storage. The full cash value of renewable energy equipment is 20% of the depreciated cost of the equipment per ARS 42-14155. This full cash value is subject to Arizona personal property taxes over the life of the project (40 years for the solar facility and 20 years for battery storage).

Impact Summary

During construction, an estimated $822,400 in tax revenues and 299 jobs would be created in the local economy from this example project. In addition, over the life of the project, more than $24.0 million in tax revenue would be generated by personal property tax on equipment. These taxes would directly benefit the county, its special districts (such as county fire, flood and library districts), and local school districts. Furthermore, employees working on the project generate an estimated $932,000 in tax revenues.

In total, this example Yuma County Solar Project would generate an estimated $25.8 million in tax revenues during the life of the project. The total economic output of the project over the life of the project is estimated at $213.4 million.

Yuma County Solar Project Summary Impact

Construction related jobs	299
Taxes generated during construction	$822,400
Personal property tax generated during life of project	
Yuma County and special districts	$13.0 million
Local school districts	$11.0 million
Tax revenues generated by employees	$932,000
Grand total of taxes generated during life of project	**$25.8 million**
Total economic activity during life of project	**$213.4 million**

Economic Impact and Tax Revenue Analysis

Economic Impacts

- Development would provide an immediate $35.5 million in direct construction impact in the County, generating a direct, indirect and induced total of $49.8 million in total economic impact from construction activity. This investment would create 299 construction and related jobs and $16.1 million in wages over the projected construction schedule.

- Once operating, an estimated $4.1 million in annual economic activity would occur within the County's economy each year.

- All totaled, the example solar project would create over $213.4 million in economic activity within Yuma County during construction and 40 years of operations for solar and 20 years of operations of the battery storage.

Economic Impact Summary
Yuma County Solar Project
(2024 dollars)

Construction

Impact Type	Jobs	Wages	Economic Output
Direct	225	$11,516,000	$35,500,000
Indirect	32	$2,255,000	$6,554,000
Induced	42	$2,301,000	$7,712,000
Total	**299**	**$16,072,000**	**$49,766,000**

Ongoing Annual Operations

Impact Type	Annual Jobs	Total Wages	Economic Output
Direct	4	$448,000	$2,836,100
Indirect	2	$129,100	$908,700
Induced	2	$76,100	$346,600
Total	**8**	**$653,200**	**$4,091,400**

Total economic output during construction and 40 years of operations:	**$213,422,000**

Source: Elliott D. Pollack & Company; IMPLAN

Tax Revenues Generated

Construction and operations of the solar project would create significant tax revenue for Yuma County and other entities. While the project would be exempt from prime contracting transaction privilege tax (under ARS 42-5075(b)(7) and ARS 42-5061), there is still substantial value from solar equipment that would increase the personal property revenues for the County. Revenues would also be generated from secondary sources of employee generated revenue.

- Yuma County would receive an estimated $822,400 in cumulative tax revenue from construction related impacts. These impacts are generated by the share of employees that would spend within Yuma County during the construction phase.

Tax Revenues during Construction
Yuma County Solar Project
(2024 dollars)

	Secondary Revenues			
Impact Type	Employee Spending Sales Tax	Resident Property Tax	State Shared Revenues	**Total Revenues**
Direct	$110,700	$503,000	$1,710	**$615,410**
Indirect	$18,500	$72,000	$250	**$90,750**
Induced	$21,400	$94,500	$320	**$116,220**
Total	**$150,600**	**$669,500**	**$2,300**	**$822,400**

1/ The figures are intended only as a general guideline as to how the taxing jurisdictions could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona, county and other taxing jurisdictions.

Source: EDPCo; IMPLAN; ADOR; ATRA

Operations of the example solar project would create tax revenue for the County and local school districts.

- Yuma County property taxes include taxing jurisdictions such as Yuma County the fire district assistant tax, county flood and library, community college district and the vocational district. These jurisdictions would receive an average of $325,600 per year in personal property taxes. The school districts would receive an average of $275,800 in tax revenue each year.

- Average annual taxes generated for the County from employees total an estimated $23,300 each year.

In total, the combined annual taxes generated for the County average an estimated $624,700 each year.

Average Annual Tax Revenues Yuma County Solar Project (2024 dollars)	
Average Annual Operating Taxes Generated	
Personal property tax	
County and Special Districts	$325,600
Local School Districts	$275,800
Tax revenues generated by employees	$23,300
Total Operations Related Revenue	**$624,700**

1/ The figures are intended only as a general guideline as to how the county could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona and county.

Source: Elliott D. Pollack & Co.; IMPLAN; AZDOR; AriSEA; ATRA

- Over the life of the project, the County and its school districts would receive an estimated $25.8 million in total from construction and ongoing annual tax collections generated by the Yuma Solar Project.

- If the site is located within an incorporated area, the property taxes for that area would be collected in addition to the County and School Districts. The following table also provides the projected taxes for each of those jurisdictions.

Tax Revenues: Life of Project Yuma County Solar Project (2024 dollars)	
Construction related tax revenues	$822,400
Operations Impact	
Personal property tax	
County and Special Districts	$13,023,000
Local School Districts	$11,032,300
Tax revenues generated by employees	$932,000
GRAND TOTAL FISCAL IMPACT	**$25,809,700**
Personal property tax for incorporated areas*	
Somerton	$3,273,000
Yuma	$4,441,000

*Collected if the site is located within the respective incorporated area.

1/ The figures are based on a 40-year life and intended as a general guideline as to how the local governments could be impacted by the project. The above figures are based on the current economic structure and tax rates of the State of Arizona and other taxing jurisdictions.

Source: Elliott D. Pollack & Co.; AriSEA; IMPLAN

About Elliott D. Pollack & Company

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Assumptions & Methodology

The typical 1,200-acre solar power generating facility would produce up to 200 MW of power and includes the addition of 200 MW (4 hours) of battery storage. The total value of the example project is estimated at $528.0 million including construction and equipment. A facility of this size is generally in range with recent power purchase contracts announced by Arizona Public Service and Salt River Project, two of the state's largest electric utilities.

Project Assumptions
Yuma County Solar Project
(2024 dollars)

Acres	1,200
Solar Facility (MW)	200
Battery Storage - 4 hours (MW)	200
Taxable Original Cost of Equipment*	
Solar Equipment	$207,000,000
Battery Storage Equipment	$321,000,000
Total value of project	$528,000,000

*Taxable Original Cost is subject to personal property tax per the ADOR

Source: AriSEA; Elliott D. Pollack & Company

The following table outlines the weighted average tax rates used in estimating the property tax impacts of the example Yuma County Solar Project. These rates are applied to every $100 of net assessed value. The rates are current as of this report and are used for the entire duration of the estimated project life.

Average Property Tax Rates
Yuma County Solar Project

DISTRICT	RATE
Yuma County	2.421
Fire District Assistance Tax	0.004
County Flood	0.249
County Library	0.882
Community College	2.346
Other	0.302
Local School Districts	5.297
Grand Total	**11.550**

Municipal Property Tax Rates	RATE
Somerton	1.5713
Yuma	2.1321

Source: County Assessor's Office

Economic Impact Methodology

Economic impact analysis examines the economic implications of an activity in terms of output, earnings, and employment. For this study, the analysis focused on the construction impacts as well as the ongoing operations including direct expenditures by the residents.

The different types of economic impacts are known as direct, indirect, and induced, according to the manner in which the impacts are generated. For instance, direct employment consists of permanent jobs held by project employees. Indirect employment is those jobs created by businesses that provide goods and services essential to the operation or construction of the project. These businesses range from manufacturers (who make goods) to wholesalers (who deliver goods) to janitorial firms (who clean the buildings). Finally, the spending of the wages and salaries of direct and indirect employees on items such as food, housing, transportation and medical services creates induced employment in all sectors of the economy, throughout the region. These secondary effects are captured in the analysis conducted in this study.

Multipliers have been developed to estimate the indirect and induced impacts of various direct economic activities. IMPLAN developed the multipliers used in this study and were selected based on the land use type. The multipliers used for this project represent the construction of power and communication as well as electric power generation for ongoing operations.

The construction multipliers specific to Yuma County are used in this study. For the solar generation multiplier, an average of similar economies was used, as the current multiplier set for Yuma County does not exist.

The economic impact is categorized into three types of impacts:

(1) **Employment Impact** – the total wage and salary and self-employed jobs in a region. Jobs include both part time and full-time workers.

(2) **Earnings Impact** – the personal income, earnings or wages, of the direct, indirect and induced employees. Earnings include total wage and salary payments as well as benefits of health and life insurance, retirement payments and any other non-cash compensation.

(3) **Economic Output** – also referred to economic activity, relates to the gross receipts for goods or services generated by the company's operations.

Economic impacts are by their nature regional in character. Such impacts are best illustrated when not assigned to a specific municipality or locality, although clearly the primary impact of

job creation would be in the municipality and county where the project is located. Indeed, many communities in the surrounding region would also benefit from the operations of the project.

Fiscal Impact Methodology

Fiscal impact analysis studies the public revenues associated with a particular economic activity. The primary revenue sources of local, county, and state governments (i.e., taxes) are analyzed to determine how an activity may affect the various jurisdictions. This section would evaluate the impact of the project on State, county and local school districts.

The fiscal impact figures cited in this report have been generated from information provided by a variety of sources including the U.S. Bureau of the Census; the U.S. Department of Labor; the Internal Revenue Service; the State of Arizona; the Arizona Tax Research Association; and the U.S. Consumer Expenditure Survey. Elliott D. Pollack & Company has relied upon the estimates of operating revenues outlined in this study.

Fiscal impacts are categorized by type in this study, similar to economic impact analysis. The major sources of revenue generation for governmental entities are calculated based on ongoing operations. Employees would spend part of their salaries on local goods and services and pay taxes on the homes they occupy. This spending would contribute to revenues collected by the State that are ultimately shared with local governments.

The project would be exempt from prime contracting transaction privilege tax (under ARS 42-5075(b)(7) and ARS 42-5061). However, there is still substantial value from solar equipment that would increase the personal property revenues for the County. Revenues would also be generated from secondary sources of employee generated revenue. The following is a description of the applicable revenue sources that would be considered for this analysis.

Primary Taxes Generated by Project

- Personal Property Tax

  Renewable energy projects are centrally assessed by the Arizona Department of Revenue. The total original cost is used to calculate the full cash value. The depreciation schedule is then based on straight-line depreciation over the useful life (currently 30 years capped at 90% of taxable original cost per ARS 42-14155). The full cash value factor for renewable energy is 20% and the assessment ratio of 15% is applied for a total taxable value each year.

Secondary Taxes Generated by Employees

The following tax rates are applied to the spending of direct, indirect and induced employees.

- Transaction Privilege Tax

  The State, counties, and local cities in Arizona charge sales tax on retail goods and utility usage. The sales tax rate for the State is 5.6%. Portions of this tax are redistributed through revenue sharing to counties and cities throughout Arizona based on population. The weighted average tax rate for local governments is 2.43%. Based on data from the U.S. Consumer Expenditure Survey, the projected extent of retail spending and resulting sales tax receipts was calculated.

- Property Tax

  Given that the location of the example project is unknown, the value of the land was not estimated and, thus, real property taxes for the land are not calculated in this report. However, the employees would be subject to residential property tax in Arizona with an assessment ratio of 10%. In order to estimate property taxes, the assessed full cash value of the occupied space along with the projected value of a typical housing unit has been calculated.

- State Shared Revenues

  Each municipality in Arizona receives a portion of State revenues from four different sources - State sales tax (see description above), State income tax, vehicle license tax and highway user tax. The formulas for allocating these revenues are primarily based on population. Counties also share in the revenue sources of the State, with the exception of income tax.

  State Income Tax

  The State of Arizona collects taxes on personal income. The tax rate used in the analysis averages about 1.6% for earnings. These percentages are based on the most recently available income tax data from the State and the projected wage levels of jobs created by the construction and operations impact. This tax is applied to the wages and earnings of direct and indirect employment. Portions of this tax are redistributed through revenue sharing to cities throughout Arizona based on population.

  HURF Taxes

  The State of Arizona collects specific taxes for the Highway User Revenue Fund (HURF). Both the registration fees and the motor vehicle fuel tax (gas tax) are considered in this analysis. The motor vehicle fuel tax is $0.18 per gallon and is calculated based on a vehicle traveling the Arizona statewide average of 12,000 miles per year at 16.6 miles per gallon. Registration fees average $65 per employee in the State of Arizona. These factors are applied to the projected direct and indirect employee count. Portions of these taxes are distributed to cities and

counties throughout Arizona based on a formula that includes population and the origin of gasoline sales.

Vehicle License Tax

The vehicle license tax is a personal property tax placed on vehicles at the time of annual registration. This factor is applied to the projected direct, indirect and induced employee count. The average tax used in this analysis is $343 and portions of the total collections are distributed to the Highway User Revenue Fund. The remaining funds are shared between cities and counties in accordance with population-based formulas.

The above tax categories represent the largest sources of revenues that would be generated to the various jurisdictions. The revenue impacts do not include certain revenue sources such as corporate income taxes. All tax collections represented in this analysis are gross collections and do not take into consideration any incentives or development agreements that may occur.

APPENDIX 1: Annual Personal Property Tax Estimates by Jurisdiction

Personal Property Tax Impact from Operations
Yuma County Solar Project
(2024 dollars)

	Construction	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Total taxable value	$15,840,000	$14,991,000	$14,142,000	$13,293,000	$12,444,000	$12,423,000	$11,518,800	$10,614,600	$9,710,400	$8,806,200	$9,144,000	$8,157,000	$7,170,000	$6,183,000
Yuma County	$383,423	$362,872	$342,321	$321,770	$301,219	$300,711	$278,824	$256,937	$235,050	$213,163	$221,340	$197,448	$173,557	$149,666
Fire District Assistance Tax	$665	$630	$594	$558	$523	$522	$484	$446	$408	$370	$384	$343	$301	$260
County Flood	$39,394	$37,283	$35,171	$33,060	$30,948	$30,896	$28,647	$26,399	$24,150	$21,901	$22,741	$20,286	$17,832	$15,377
County Library	$139,630	$132,146	$124,662	$117,178	$109,694	$109,509	$101,538	$93,568	$85,597	$77,627	$80,604	$71,904	$63,204	$54,503
Community College	$371,575	$351,659	$331,743	$311,827	$291,911	$291,419	$270,208	$248,997	$227,787	$206,576	$214,500	$191,347	$168,194	$145,041
Other	$47,821	$45,258	$42,695	$40,132	$37,568	$37,505	$34,775	$32,045	$29,316	$26,586	$27,606	$24,626	$21,646	$18,666
STEDY	$7,920	$7,496	$7,071	$6,647	$6,222	$6,212	$5,759	$5,307	$4,855	$4,403	$4,572	$4,079	$3,585	$3,092
Yuma County	**$990,428**	**$937,342**	**$884,257**	**$831,171**	**$778,086**	**$776,773**	**$720,236**	**$663,699**	**$607,162**	**$550,625**	**$571,747**	**$510,033**	**$448,319**	**$386,604**
Local School Districts	$839,031	$794,061	$749,090	$704,119	$659,148	$658,036	$610,141	$562,246	$514,352	$466,457	$484,350	$432,069	$379,789	$327,508
School Districts	**$839,031**	**$794,061**	**$749,090**	**$704,119**	**$659,148**	**$658,036**	**$610,141**	**$562,246**	**$514,352**	**$466,457**	**$484,350**	**$432,069**	**$379,789**	**$327,508**
Grand Total	**$1,829,459**	**$1,731,403**	**$1,633,347**	**$1,535,290**	**$1,437,234**	**$1,434,809**	**$1,330,377**	**$1,225,945**	**$1,121,514**	**$1,017,082**	**$1,056,097**	**$942,102**	**$828,107**	**$714,113**

	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27
Total taxable value	$5,517,000	$6,414,000	$5,986,200	$5,558,400	$5,130,600	$4,730,400	$4,357,800	$1,863,000	$1,656,000	$1,449,000	$1,242,000	$1,035,000	$828,000	$621,000
Yuma County	$133,545	$155,257	$144,902	$134,547	$124,191	$114,504	$105,485	$45,096	$40,085	$35,074	$30,064	$25,053	$20,043	$15,032
Fire District Assistance Tax	$232	$269	$251	$233	$215	$199	$183	$78	$70	$61	$52	$43	$35	$26
County Flood	$13,721	$15,952	$14,888	$13,824	$12,760	$11,765	$10,838	$4,633	$4,118	$3,604	$3,089	$2,574	$2,059	$1,544
County Library	$48,632	$56,539	$52,768	$48,997	$45,226	$41,698	$38,414	$16,422	$14,598	$12,773	$10,948	$9,124	$7,299	$5,474
Community College	$129,418	$150,460	$140,424	$130,389	$120,354	$110,966	$102,225	$43,702	$38,846	$33,991	$29,135	$24,279	$19,423	$14,567
Other	$16,656	$19,364	$18,072	$16,781	$15,489	$14,281	$13,156	$5,624	$4,999	$4,375	$3,750	$3,125	$2,500	$1,875
STEDY	$2,759	$3,207	$2,993	$2,779	$2,565	$2,365	$2,179	$932	$828	$725	$621	$518	$414	$311
Yuma County	**$344,961**	**$401,048**	**$374,299**	**$347,550**	**$320,801**	**$295,778**	**$272,480**	**$116,488**	**$103,545**	**$90,602**	**$77,659**	**$64,715**	**$51,772**	**$38,829**
Local School Districts	$292,231	$339,744	$317,084	$294,424	$271,764	$250,565	$230,829	$98,682	$87,717	$76,752	$65,788	$54,823	$43,858	$32,894
School Districts	**$292,231**	**$339,744**	**$317,084**	**$294,424**	**$271,764**	**$250,565**	**$230,829**	**$98,682**	**$87,717**	**$76,752**	**$65,788**	**$54,823**	**$43,858**	**$32,894**
Grand Total	**$637,192**	**$740,792**	**$691,383**	**$641,974**	**$592,565**	**$546,343**	**$503,309**	**$215,169**	**$191,262**	**$167,354**	**$143,446**	**$119,539**	**$95,631**	**$71,723**

	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Total
Total taxable value	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	$621,000	
Yuma County	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$15,032	$5,041,600
Fire District Assistance Tax	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$26	$8,700
County Flood	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$1,544	$518,000
County Library	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$5,474	$1,836,000
Community College	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$14,567	$4,885,800
Other	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$1,875	$628,800
STEDY	$311	$311	$311	$311	$311	$311	$311	$311	$311	$311	$311	$311	$104,100
Yuma County	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$38,829**	**$13,023,000**
Local School Districts	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	$32,894	**$11,032,300**
School Districts	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$32,894**	**$11,032,300**
Grand Total	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$71,723**	**$24,055,200**

NOTES

1 Depreciation used to value "renewable energy equipment" is based on "straight-line depreciation over the useful life, as adopted by the department" per ARS 42-14155.
2 Depreciation uses a 30 year straight line depreciation for solar and 15 year for battery storage in this analysis as advised by the Arizona Department of Revenue.
3 Through 12/31/40 the full cash value of "renewable energy equipment" is 20% of the depreciated cost of the equipment per ARS 42-14155. This report assumes the statute will be extended to cover the life of the project.
4 The total may not equal the sum of the impacts due to rounding. All dollar figures are in constant dollars. Inflation has not been included in these figures.
5 The figures for the County as a whole are based on the current tax rates and assume the Project would not impact these rates.
6 The forecasts are subject to uncertainty and variation. Accordingly, we do not represent them as results that will be achieved. Changes in rates would alter the findings of this analysis.

Source: Elliott D. Pollack & Company; IMPLAN; Arizona Department of Revenue; Arizona Tax Research Association; AriSEA

Arizona Water Demand Analysis by Land Use Category

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Executive Summary

This report provides an analysis of water consumption of various land uses in Arizona, offering insight into how land use decisions impact water resource commitments in the arid Southwest. Understanding these differences is crucial for decision making in areas facing water scarcity and where efficient resource allocation is essential. The objectives of this analysis were to develop proxy water use estimates for land use types that might be considered alternative to the development of solar projects in Arizona, to highlight the differences in the water demands of each land use type and by power generation facility type, and to clarify the disparities in water demand to enable decision-makers to promote efficient water use and sustainable land development across the region.

In particular, this report summarizes the water demands of various land use categories in Arizona in comparison to the relatively low water demands of solar projects. Alternative land uses including irrigated agriculture, subdivision development, industrial, and commercial are found to consistently require larger volumes of water than solar. From a water conservation perspective, solar is a preferred land use in the arid Southwest because of its modest water footprint. To demonstrate the benefits of solar, this analysis quantifies the water demands of alternative land uses based on data from Arizona Department of Water Resources (ADWR or "the Department") and other publicly available sources.

The results of the analysis clearly demonstrate that water use by solar facilities is significantly lower than that of potential alternative land uses in Arizona. Average water use across all sectors analyzed in this effort is 3.4 acre-feet[1] per acre (AF/acre), which is 100 times the use of solar (0.03 AF/acre). In particular, data centers were found to use 6.3 AF/acre on average, which is 200 times the amount used by solar. Metro Phoenix is the second-largest data center market in the nation in large part because of the availability of power and land[2]. In conclusion, compared to other land use categories evaluated, water use by solar is negligible. When compared to water requirements of natural gas and nuclear power generation facilities, these power sources require 25-100 times the water requirements of solar facilities to produce one megawatt (MW) (4.3 AF/MW for natural gas and 18.7 AF/MW for nuclear compared to 0.16 AF/MW for solar).

[1] One acre-foot equals 325,851 gallons.

[2] H2 2023 North American Data Center Report. August 27, 2024. JLL. https://www.us.jll.com/en/trends-and-insights/research/na-data-center-report?utm_source=public-relations&utm_medium=ol&utm_campaign=am-us-industries-data-centers-outlook&utm_content=byline

Appendix A of this report summarizes the data and methodology to estimate water demands of the various sectors analyzed and details the findings of the data analysis.

Summary of Findings

Water use in Arizona is categorized under three main sectors: municipal, industrial, and agricultural. According to ADWR, 74%[3] of the state's total annual water use is irrigated agriculture followed by municipal use at 20%[4]. Industrial water use accounts for only 6% of the state's total water use. Industrial use of land across Arizona is also minimal relative to other uses. In Maricopa and Pinal counties, industrial uses account for only 0.47% of total land use[5]. Solar generation projects are a type of industrial use that require a minimal volume of water[6]. Such low water requirements may be a reason there is no ADWR conservation program for solar facilities, programs that seek to regulate water use for a variety of facilities and water use types[7]. This analysis provides context on solar water use as compared to other water uses in Arizona.

WestWater compiled sector-level water use data reported to ADWR and from other sources within the state's Active Management Areas (AMAs) to develop and analyze proxy water demand estimates of annual average water use by relevant alternative land uses. Alternative land uses include agriculture, residential (subdivisions), manufacturing, data centers, and industrial uses. Industrial uses include large turf facilities, primarily golf courses, dairy operations, cattle feedlot operations, and power generation facilities.

Estimated water use for each sector by acre and MW (as applicable) is summarized in **Table 1**. The highest estimated water use across all AMAs during the 2019-2023 analysis period was attributed to data centers at 6.3 AF/acre, followed by turf and agricultural irrigation at 4.1 AF/acre, and manufacturing at 3.6 AF/acre. Natural gas and nuclear power facilities, for which water use data were reported to ADWR, require 4.3 AF/MW and 18.7 AF/MW, respectively. Solar facility water use is extremely low in terms of both a per acre and per MW

[3] Agriculture, Conservation. Arizona Department of Water Resources https://www.azwater.gov/conservation/agriculture#:~:text=Irrigated%20agriculture%20is%20the%20largest,of%20the%20available%20water%20supply

[4] Conservation. Arizona Department of Water Resources. https://www.azwater.gov/conservation/public-resources#:~:text=About%2020%20percent%20of%20the,most%20of%20this%20is%20residential.

[5] Land Use Explorer (2022). Maricopa Association of Governments. https://geo.azmag.gov/maps/landuse/

[6] Water Impacts of High Solar PV Electricity Penetration. National Renewable Energy Laboratory. September 2015.

[7] Active Management Areas Management Plans (2023) https://www.azwater.gov/ama/ama-management-plans

comparison. Solar water use is estimated to be 0.03 AF/acre and 0.16 AF/MW. **Figure 1** and **Figure 2** provide additional summaries of water use from this analysis.

Table 1: Summary of Water Use in Arizona by Sector

Sector	Average Use
AF/acre	
Solar	**0.03**
Feedlots	1.4
Dairy	2.2
Subdivisions	2.3
Manufacturing	3.6
Irrigation	4.1
Golf Course	4.1
Data Centers	6.3
AF/MW	
Solar	**0.16**
Power (Natural Gas)	4.3
Power (Nuclear)	18.7

Figure 1: Arizona Water Use per Acre by Facility Type

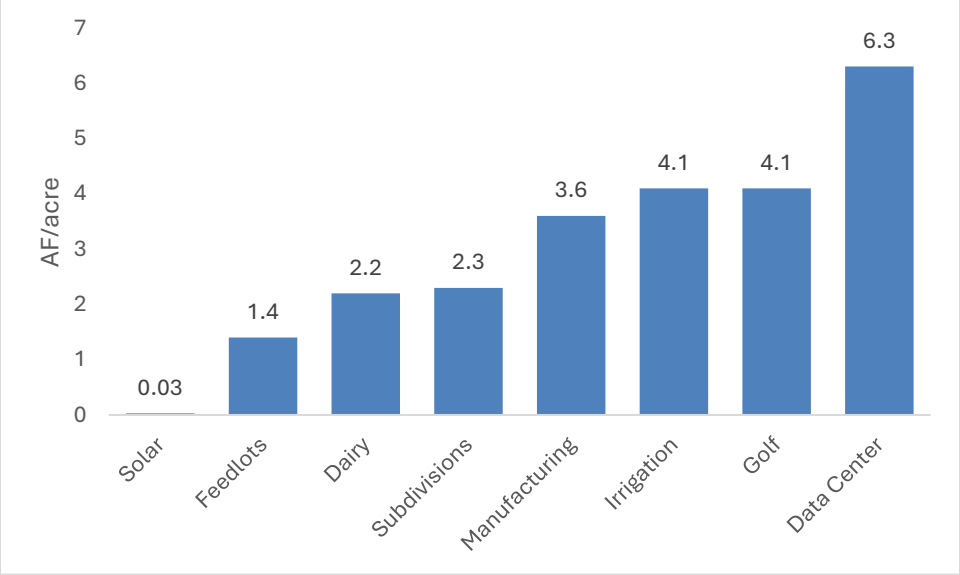
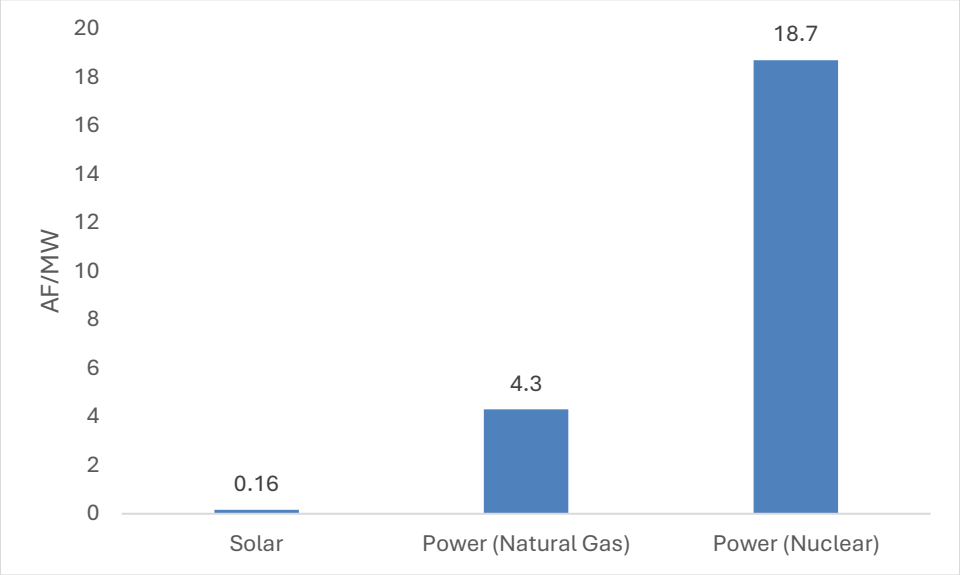


Figure 2: Arizona Water Use per MW – Solar, Natural Gas, and Nuclear

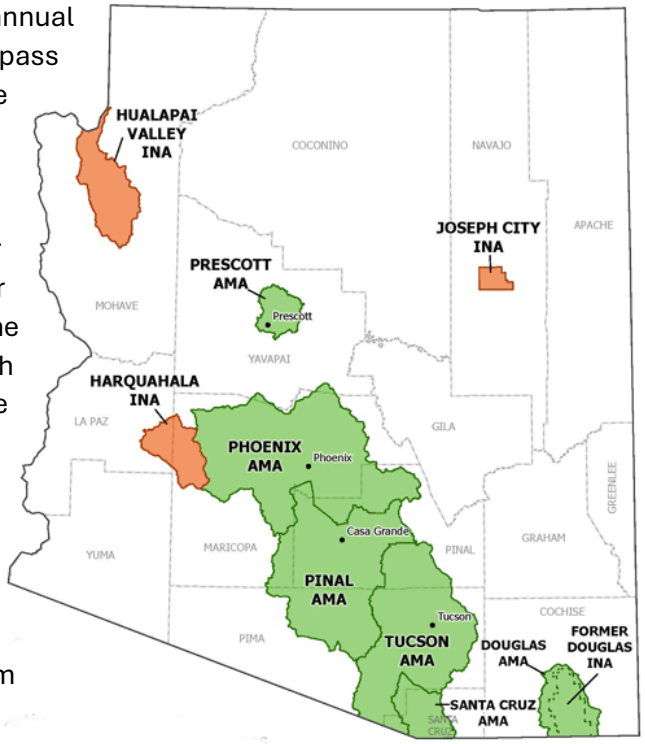


Conclusions

The results of this analysis clearly demonstrate that water use by solar facilities is significantly lower than that of potential alternative land uses. In fact, solar water use is virtually zero, which cannot be said of any other alternative land use. Other land uses utilized water at significantly higher rates than solar facilities. Average water use across the sectors analyzed for this effort is 3.4 AF/acre, which is 100 times the use of solar facilities (0.03 AF/acre). In particular, data centers were found to use 6.3 AF/acre on average, which is 200 times the amount used by solar. Nuclear power was found to use 18.7 AF/MW, which is 100 times the amount used by solar (0.16 AF/MW). As compared to the other water use estimates, solar facility water use is negligible.

Appendix A: Data and Methodology

This analysis primarily utilizes AMA annual report data from ADWR. AMAs encompass the most populated areas of the state and account for approximately 80% of statewide water use[8]. Within the AMAs, water use exceeding a certain volume is highly regulated and therefore water may only be utilized pursuant to a water right. For these reasons, AMAs are the only areas of the state for which comprehensive, up-to-date water use data are available. In addition, the management plans detail several mandatory conservation programs for various water use types. Water users within AMAs are required to annually report the water use, and facilities that fall into a required conservation program must report supplemental use information.



ADWR data include total use by irrigation rights and various industrial subsectors including golf courses, feedlots, dairy, and power. Supplemental data were also provided including, as applicable, associated irrigation acres, acres of landscaped area, number of animals, volume of product produced, and amount of power generated. Although ADWR data are only available for the AMAs, as it is the most robust water use dataset within Arizona, these values are used as a proxy for other water use in the same sectors in Arizona.

In addition, data from the Central Arizona Groundwater Replenishment District (CAGRD) and Census Bureau (CB) were used to develop water use estimates for subdivisions[9]. This included 2018-2022 CAGRD data on the number of new CAGRD member land lots and their projected water demand. Lot size data from the CB Survey of Construction in 2021 were also used[10]. In addition to these sources, this analysis also utilized the ADWR Supply and Demand

[8] Arizona Department of Water Resources, "Active Management Areas," Fact Sheet, (March 2016).

[9] CAGRD Reports and Information (2011-2022). Central Arizona Groundwater Replenishment District. https://cagrd.com/operations/cagrd-reports-and-information/

[10] Characteristics of New Housing (2021). Unites States Census Bureau. https://www.census.gov/construction/chars/sold.html

Assessments methods appendix [11] to develop water use sector demand estimates. Governmental reports and other publicly available information were referenced to develop manufacturing and data center water demands.

WestWater developed estimates of annual water use for the following sectors and subsectors: Irrigation, Golf Course, Feedlots, Dairy, Subdivisions, Manufacturing, Data Center, and Power. Solar water use can be captured in two ways: 1) volume by acre and 2) volume per amount of power produced. To develop water use estimates that are comparable to solar use, WestWater used two common units. For water use that is associated with the size of the land, water estimates are developed per acre. For the power sector, water use is not directly related to the size of the land where the facility is sited. Instead, the volume of water is expressed as AF/MW.

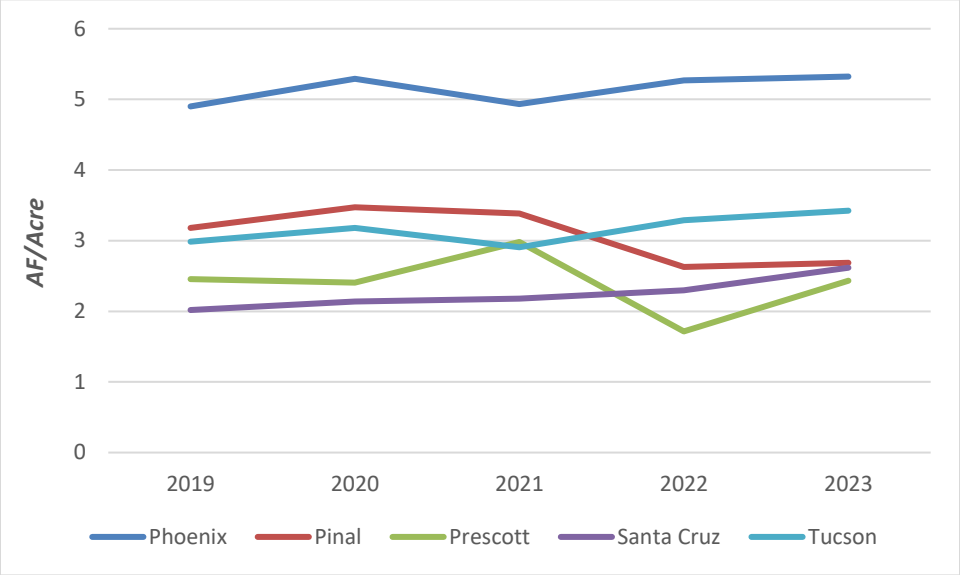
Irrigation

To develop estimates for irrigation water, ADWR annual report data were filtered to irrigation rights or rights that fall under the base or best management plans' conservation programs. Once the data were filtered, the total reported annual use in AF was divided by the number of acres associated with each right. Although some annual reports include irrigated acres, it is not required by the Department. As a result, this estimate does not necessarily represent water use per irrigated acre, although it may be representative of agricultural land.

Irrigation water use varies by AMA as summarized in **Figure 3**. The Phoenix AMA had the highest water use, averaging 5.1 AF/acre over the 5 years of reported data. The Santa Cruz and Prescott AMAs had the lowest use, with an average of 2.3 AF/acre and 2.4 AF/acre respectively. Overall, the average irrigation use across all years and AMAs was **4.1 AF/acre**.

[11] Supply and Demand Methods Appendix (2023). Arizona Department of Water Resources. https://www.azwater.gov/sites/default/files/2023-12/2023_MethodsAppendix_1.pdf

Figure 3: Irrigation Average Water Use by AMA, 2019-2023 (AF/Acre)

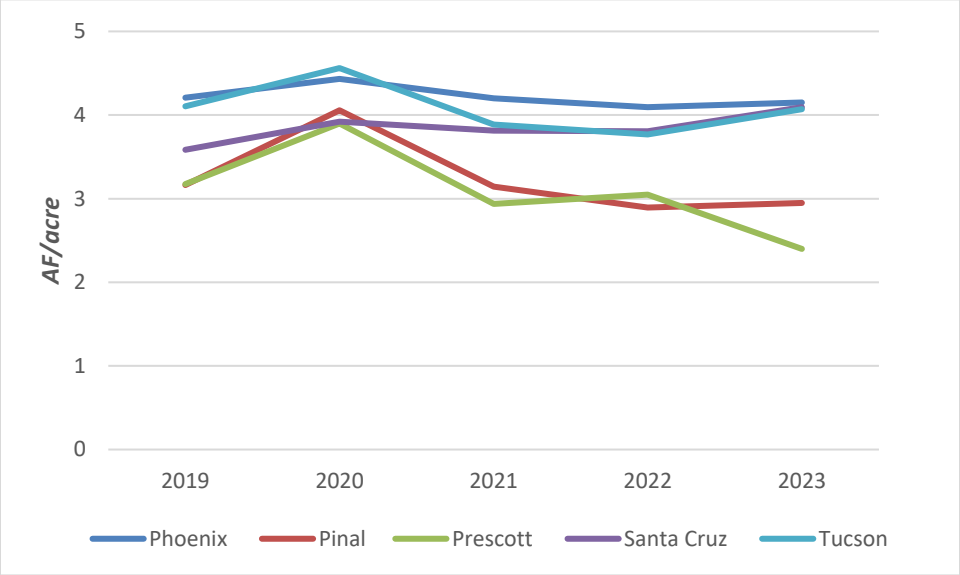


Golf Course

The industrial water use sector consists of various turf subsectors including golf. Turf related facilities are required to report up-to-date data on the number of turfed, low water use, and water surface acres present. These acres were summed to determine total acreage for golf. The total reported annual water use was then divided by the total number of acres for golf for an AF/acre estimate by facility.

Water use by golf courses is typically related to the amount of high intensity water use (turf and water features) and the efficiency of irrigation infrastructure. The 5-year average water use for golf courses ranges from 3.2 AF/acre to 4.2 AF/acre across the AMAs. Overall, golf course water use averages **4.1 AF/acre**. Golf water use is lower on courses in the Prescott AMA, where precipitation tends to be higher. Water use by turf for golf courses is summarized in **Figure 4**.

Figure 4: Golf Course Water Use by AMA, 2019-2023 (AF/Acre)



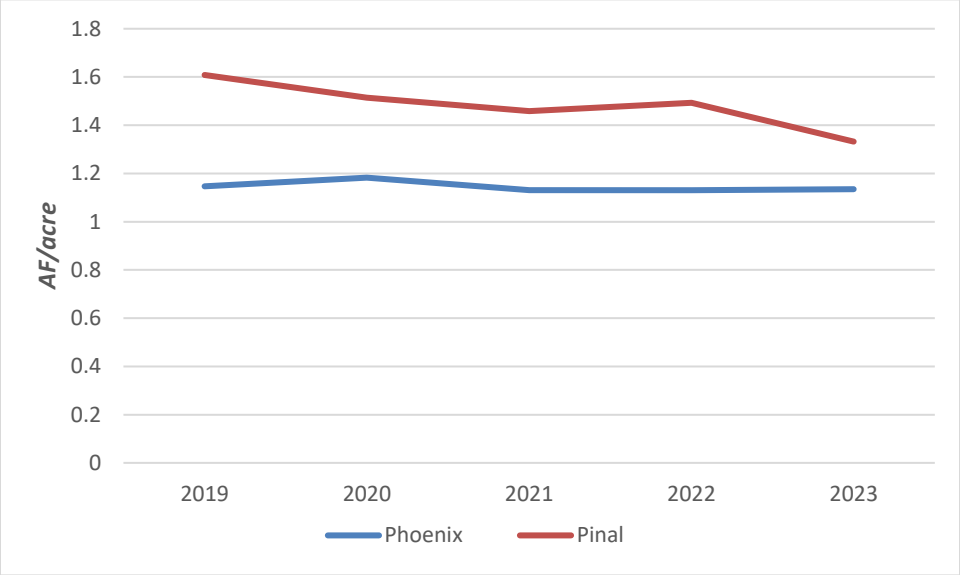
Feedlots/Dairy

ADWR annual reports for feedlots include data on the number of animals at each facility by month. These data were summed to develop an annual number of animals per facility. The total reported water use was then divided by the number of animals at each facility for an AF/animal estimate. Feedlot designs include one acre of land per 100 heads of cattle, which includes space for pens, alleys and feed roads[12]. To determine a per-acre estimate for feedlots, the volume of AF per animal was multiplied by the number of animals per acre. ADWR data for feedlots were reported in the Phoenix and Pinal AMAs.

Feedlots use slightly more water in the Pinal AMA and average 1.5 AF/Acre, as compared to 1.1 AF/acre in the Phoenix AMA, as summarized in **Figure 5**. Across all facilities and all years, the average feedlot use is **1.4 AF/acre**.

[12] Planning and Designing Cattle Feedlots (2021). Kansas State University Agricultural Experiment Station and Cooperative Extension Service. https://bookstore.ksre.ksu.edu/download/planning-and-designing-cattle-feedlots_MF2316

Figure 5: Feedlot Average Water Use, 2019-2023 (AF/Acre)



Dairy use was estimated based on ADWR's Supply and Demand Assessments (SDA) methods. The ADWR SDA estimates a range of water use per type of cow, including water use for consumption, dust suppression, and other facility uses. The estimates range from 0.02 to 0.04 AF/animal/year, with lower water use representing calves and the highest water use reflecting use by lactating cows. The average water use among all animal types was 0.03 AF/animal/year. Dairy facilities require one acre per 75 heads of cattle[13]. Using the ADWR SDA method and assuming 75 animals per acre results in an estimated water use of **2.2 AF/acre**.

Subdivisions

CAGRD Annual Operations Reports from 2018-2022 were used as the basis for developing subdivision water use estimates. These reports include estimates of projected annual demand for new member lands, including the number of new subdivisions and lots by region (East Phoenix, West Pheonix, Pinal, and Tucson). The number of lots per subdivision varies widely and was not used to develop a per acre estimate. Average lot size is also variable, however, data from the CAGRD and CB were used to estimate average lot sizes in Arizona. CAGRD estimates average lot sizes of approximately 9,000 square feet (sq ft) and 12,000 sq ft in the Phoenix and Tucson areas respectively[14]. The CB conducts a Survey of Construction,

[13] Relocation And Expansion Planning for Dairy Producers (1999). Kansas State University Agricultural Experiment Station and Cooperative Extension Service. https://krex.k-state.edu/server/api/core/bitstreams/dd52978b-e561-41c5-95a4-19ab46eb0c63/content

[14] Central Arizona Groundwater Replenishment District Membership Water Demand Analysis (2020), Water Resource Consulting, Contract No. C85195

which includes data on lot size for new builds across several regions15. In the West region, new builds averaged approximately 10,000 sq ft. Given the range of average lot sizes, this analysis used a range of 9,000 to 12,000 sq ft. The annual water use per lot was divided by the average acres per lot to develop a subdivision per acre estimate.

Water use by subdivisions ranged from 1.5 AF/acre to 3.0 AF/acre. The highest water use was in east Phoenix. As the number of lots per acre decreased the water use per acre also decreased. Subdivision water use is estimated to range from 1.9AF/acre to 2.5 AF/acre and average **2.3 AF/acre**, as summarized in **Table 2**.

Table 2: Average Water Use by Lot Size (AF/Acre)

Average Lot Size (square feet)	East Phoenix	Pinal	Tucson	West Phoenix	Average
	AF/acre				
9,000	3	2	2.3	2.8	2.5
10,000	2.7	1.8	2	2.5	2.3
12,000	2.3	1.5	1.7	2.1	1.9

Manufacturing Facilities

Arizona is becoming a hub for manufacturing, in large part due to significant federal and state investment and favorable economic and geographic conditions. There are little to no annual water use report data on manufacturing facilities in publicly available datasets, such as those maintained by ADWR and relied upon in this analysis. Taiwan Semiconductor Manufacturing Company (TSMC) and Intel are two major companies with facilities in Arizona who have publicly provided estimates of their facility water usage. TSMC estimates using 4.75 million gallons per day (MGD) or 5,321 AF annually at its 1,100-acre facility, equivalent to 4.8 AF/acre. Intel estimates using 1.5 MGD or 1,680 AF annually at its 700-acre facility, equivalent to 2.4 AF/acre[16]. Together these facilities use an estimated **3.6 AF/acre** annually on average.

Data Centers

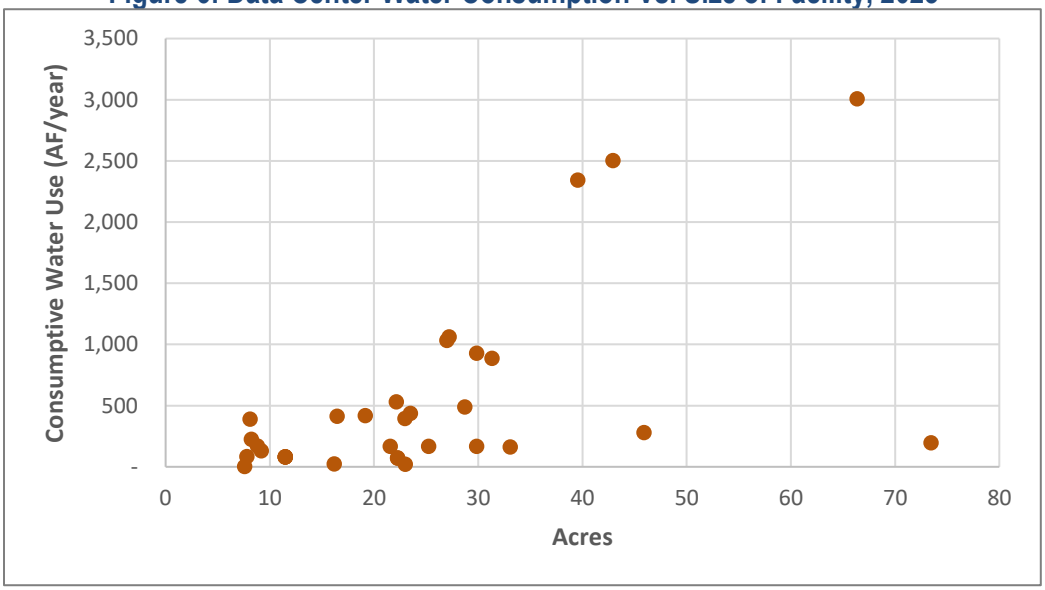
As data center facilities are relatively new in Arizona, ADWR does not collect annual reports from these water users. However, data can be collected from company sustainability reports, local water management plans, press releases, and news articles. Water use information for 30 facilities was collected by WestWater from across the United States. Of

[16] AZ Central Article: *How much water will TSMC Arizona use? Probably a lot less than you think.* Joanna Allhands. June 12, 2024. TSMC Arizona is on track to use a lot less water than you think (azcentral.com)

this dataset, two facilities are in Arizona. Data center water use is influenced primarily by size of the facility and the amount of power used at the facility. To develop a comparable water use estimate to other land uses, total water use for each facility was divided by size of the facility in acres.

Water use was correlated with total size at the facility as shown in **Figure 6**. Water use by size ranged from 0.5 AF/acre to 59.2 AF/acre, with an average of 18.6 AF/acre. The two facilities in Arizona had similar per acre water use, averaging **6.3 AF/acre**.

Figure 6: Data Center Water Consumption Vs. Size of Facility, 2023



Power

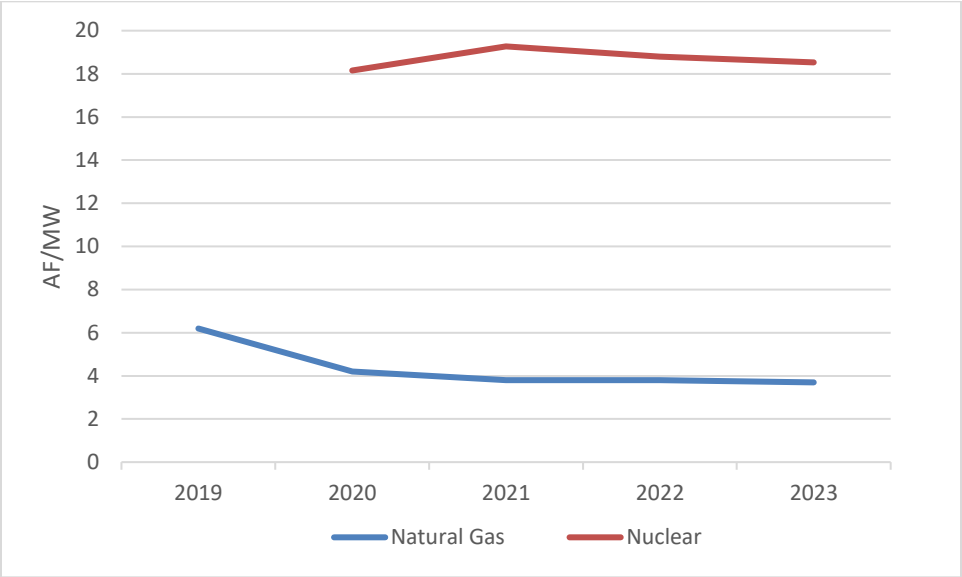
ADWR annual report data were used to estimate water use for the power subsector consisting of nuclear and natural gas. While there are other power generation facility types in Arizona outside the AMAs, this analysis only considers those AMA facilities whose water use is reported to ADWR. ADWR data also included information on power generated at each facility by month. However, these data were inconsistently reported and the units used were often unclear. To ensure a comparable unit, ADWR used publicly available information on each of the facilities to determine the MW capacity.[17] The total water use was divided by the generating capacity of each facility to estimate an AF/MW.

ADWR collects annual report data for eight power facilities in the AMAs, including one nuclear and seven natural gas facilities. Water use was filtered to the type of facility as the difference in reported use across facility type was vast. Over the five-year analysis period,

[17] SRP Power Generation Sources (2024). Salt River Project. https://www.srpnet.com/grid-water-management/grid-management/power-generation-stations

water use at Arizona natural gas power facilities ranged from 3.7 AF/MW to 6.2 AF/MW and averaged **4.3 AF/MW**. In contrast, the Arizona nuclear facility used more water, averaging **18.7 AF/MW**. Water use by power facilities is summarized in **Figure 7**.

Figure 7: Power Facility Average Water Use, 2019-2023 (AF/MW)



Solar

Because solar facilities use such a small amount of water, ADWR does not require annual water usage reporting and therefore data are limited. In general, ADWR-exempt uses account for less than 100 AF of water per year[18].

The National Renewable Energy Laboratory (NREL) completed a study on water supply and demand conditions impacting the solar industry, which includes estimates of solar water use[19]. The study includes water consumption estimates for photovoltaic (PV) solar. PV is a non-thermal renewable energy technology that does not require water but can use a relatively small amount of water primarily for washing panels. This technology is commonly used in solar facilities because it is a renewable, non-polluting, and inexhaustible energy source. The estimated median water use rate for solar is 25 gallons per megawatt hours (MWh) or 0.0001 AF/MWh, which represents the volume of water per unit of electricity generation. NREL demonstrates that solar uses water at a rate of virtually zero to produce electricity.

[18] Industrial Program | Arizona Department of Water Resources (azwater.gov)

[19] Water Impacts of High Solar PV Electricity Penetration. National Renewable Energy Laboratory. September 2015.

Most solar projects in the Southwest US are never washed during operation, however for this analysis, the NREL water use per MWh estimate was utilized to evaluate an example 200 MW solar project on 1,200 acres. A facility of this size is generally in the range with recent power purchase contracts announced by Arizona Public Service and Salt River Project, two of Arizona's largest electric utilities. According to FreeingEnergy, one MW of solar power produces 2,146 MWh of solar energy[20]. In this example, the total water use of the facility would be equivalent to 32.9 AF. Over a 200 MW, 1,200-acre facility, this equates to an annual water use estimated to total **0.16 AF/MW** and **0.03 AF/acre**.

[20] FreeingEnergy. How many MWh of solar energy comes from a MW of solar panels? https://www.freeingenergy.com/math/solar-pv-gwh-per-mw-power-energy-mwh-m147/#:~:text=On%20average%2C%20across%20the%20US,of%20solar%20energy%20per%20year.