Greater Phoenix Economic Council

Greater Phoenix Solar Ecosystem

NOVEMBER 2023

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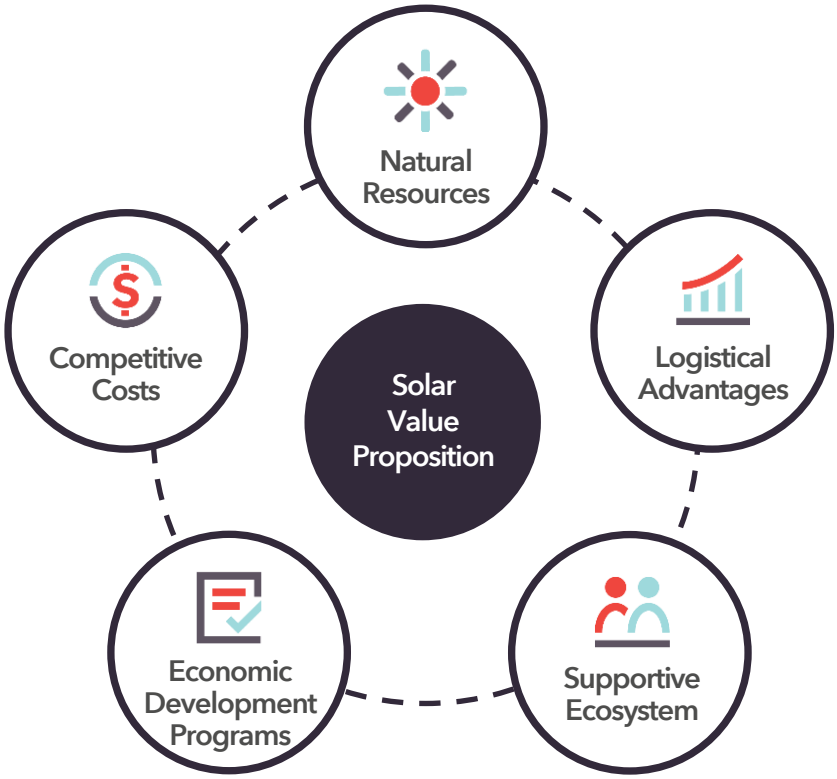
Value Proposition



Natural Resources	Logistical Advantages	Supportive Ecosystem	Economic Development Programs	Competitive Costs
• Low risk of natural disasters leading to fewer days with significant weather interruptions • More than 300 days of sunshine annually • Second-best in the nation for solar energy potential	• Second-most reliable grid in the nation • Well-planned highways provide easy access to all major regional submarkets • 35 million consumers across seven states can be reached within a one-day truck haul • Seamless access to both California and Texas markets due to Interstates 8 and 40	• Specialized programs at universities and institutional alignment produce strong talent and cutting-edge R&D • Major employers have ESG goals that support climate tech advancement • Greater Phoenix communities are developing aggressive environmental goals • Utility providers are entering into large-scale clean energy PPAs to achieve their sustainability goals	• Up to $20,000/job in refundable tax credit • $9,000/job in corporate income tax credits • Reduced property tax through favorable depreciation schedules • Sales tax abatement on electricity and natural gas • Sale tax exemptions for manufacturing machinery and equipment	• Operating costs up to 28% lower than competing markets • Cheaper real estate and benefit costs compared to peer markets • Substantially lower corporate income tax rate in Arizona compared to California • One of the lowest individual income tax rates in the U.S. at a 2.5% flat rate

Local Companies

The table below shows the top solar companies by venture capital funding that are headquartered in Greater Phoenix.

Company	Address	City	Employees
First Solar	350 W. Washington St	Tempe	215
SunStream Technology	340 E. Germann Rd	Gilbert	194
DEPCOM Power	9185 E. Pima Center Pkwy	Scottsdale	154
Veregy	3312 E. Broadway Rd	Phoenix	54
Kayo Energy	1809 W. 4th St	Tempe	40
Erthos	740 S. Mill Ave	Tempe	30
WattLogic	4505 E. Broadway Rd	Phoenix	30
We Recycle Solar	4742 N. 24th St	Phoenix	27
Suntria	16807 N. Cave Creek Rd	Phoenix	20
Icon Power	3006 S. Priest Dr	Tempe	16
Fusion Power	6150 W. Chandler Blvd	Chandler	11
Titan Solar Power	525 W. Baseline Rd	Mesa	10
NanoFlex Power	8950 E. Raintree Dr	Scottsdale	7
Solestial	7700 S. River Pkwy	Tempe	6
SinglePoint	3104 E. Camelback Rd	Phoenix	-

Source: Crunchbase 2023, MAG 2022 Employer Database

Local Innovation

Greater Phoenix is home to many companies in the solar and renewable energy industry.

Array Technologies (Chandler)

- Array Technologies delivers renewable energy solutions for customers seeking clean energy adoption around the globe. It provides utility-scale solar tracker technology and software to maximize energy production, accelerating the adoption of cost-effective and sustainable energy.

Arevon (Scottsdale)

- Arevon is a renewable energy company providing commercial, financial, performance asset management and construction services to nearly 10 GWac of utility-scale wind, solar and energy storage assets delivering clean energy to utilities and corporations.

First Solar (Tempe)

- First Solar's worldwide HQ is in Tempe, where it produces solar panels near Arizona State University (ASU) campus. Its advanced thin film photovoltaic (PV) modules represent the next generation of solar technologies, providing a competitive, high-performance, lower-carbon alternative to conventional crystalline silicon (c-Si) PV panels.

JA Solar (Phoenix)

- JA Solar's first U.S. manufacturing location in Phoenix will produce high-efficiency PV modules for commercial and residential rooftop applications and create more than 600 new jobs in the region.

Employment

The table below shows employment for the following solar related occupations in the selected metros.

Occupation	Phoenix	Albuquerque	Atlanta	Dallas	Las Vegas	Los Angeles	San Diego
General and Operations Managers	68,601	7,988	69,096	127,293	30,383	99,446	24,359
Software Developers	29,725	1,606	42,223	51,348	2,847	53,111	17,496
Miscellaneous Assemblers and Fabricators	17,155	1,450	23,669	36,263	3,535	41,524	9,705
Computer Systems Analysts	11,948	1,461	11,728	18,071	1,580	15,439	5,222
Inspectors, Testers, Sorters, Samplers, and Weighers	7,655	835	9,926	16,033	2,442	21,275	5,545
Electronics Engineers, Except Computer	4,393	525	2,068	4,442	437	5,138	3,203
Mechanical Engineers	3,677	1,400	2,957	4,788	515	8,548	4,332
Electrical Engineers	3,173	1,224	2,938	5,005	673	8,629	2,823
Software Quality Assurance Analysts and Testers	2,911	248	3,900	8,291	520	6,519	2,566
Industrial Production Managers	2,390	232	2,143	5,439	494	8,391	2,373
Computer Numerically Controlled Tool Operators	1,793	94	842	3,408	86	6,699	1,512
Electrical and Electronic Engineering Technologists and Technicians	1,714	619	1,260	2,248	995	4,368	3,402
Industrial Engineering Technologists and Technicians	1,367	245	617	1,173	142	944	530
Solar Photovoltaic Installers	641	64	262	2,385	63	1,190	984
Total	**157,145**	**17,991**	**173,627**	**286,187**	**44,713**	**281,220**	**84,053**

Source: Lightcast 2023 Q4

Median Wage

The table below shows annual median wage for the following solar related occupations in the selected metros.

Occupation	Phoenix	Albuquerque	Atlanta	Dallas	Las Vegas	Los Angeles	San Diego
General and Operations Managers	$86,732	$97,100	$97,184	$93,309	$80,434	$113,797	$111,964
Software Developers	$111,874	$101,660	$122,543	$122,111	$111,571	$135,945	$138,133
Miscellaneous Assemblers and Fabricators	$37,524	$34,652	$35,014	$35,765	$35,568	$37,282	$36,525
Computer Systems Analysts	$105,141	$87,281	$103,949	$106,187	$88,067	$111,344	$107,765
Inspectors, Testers, Sorters, Samplers, and Weighers	$47,408	$44,481	$39,132	$39,782	$42,702	$45,614	$49,213
Electronics Engineers, Except Computer	$127,564	$130,296	$123,760	$126,906	$122,886	$127,140	$134,056
Mechanical Engineers	$92,333	$127,077	$92,343	$99,337	$77,064	$104,621	$95,326
Electrical Engineers	$97,384	$130,632	$115,182	$98,465	$82,118	$129,407	$122,824
Software Quality Assurance Analysts and Testers	$86,244	$83,619	$101,876	$96,826	$53,643	$106,088	$105,539
Industrial Production Managers	$116,845	$97,067	$122,299	$119,622	$86,299	$109,443	$126,589
Computer Numerically Controlled Tool Operators	$45,268	$37,804	$39,028	$45,308	$45,989	$46,986	$47,424
Electrical and Electronic Engineering Technologists and Technicians	$76,620	$79,908	$78,933	$62,567	$64,002	$69,757	$65,250
Industrial Engineering Technologists and Technicians	$62,926	$77,775	$59,090	$59,148	$59,342	$78,201	$60,902
Solar Photovoltaic Installers	$47,804	$39,182	$45,560	$36,863	$45,787	$45,887	$49,234

Source: Lightcast 2023 Q4

Operating Cost Analysis

The Annual Business Operating Cost Analysis has been prepared using the following parameters as an estimate for an advanced manufacturing operation in competitor markets. Component and custom analyses to match your company's operations can be provided upon request.

Assumptions

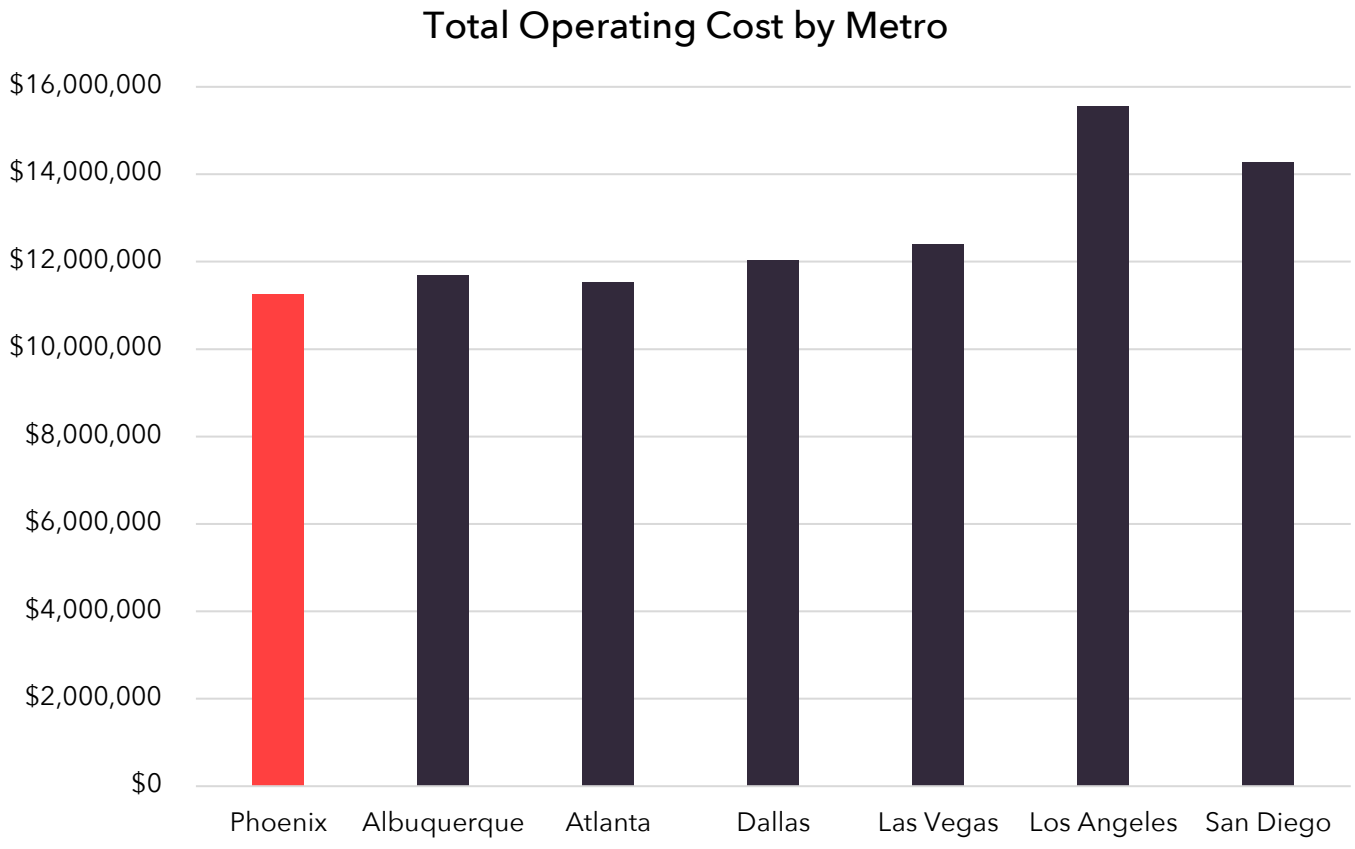
- $25,000,000 personal property investment
- 200,000 square foot Industrial Manufacturing, Lease
- Utilities (per month):
    - Electricity: 75KW, 30,000KWh
    - Water/Wastewater: 3,000cf, 5/8meter
- 100 jobs (Bureau of Labor Statistics equivalent occupations)

Occupations	Employment
Mechanical Engineer	15
Electrical Engineers	15
Team Assemblers	11
Electrical and Electronics Engineering Tech	10
Helpers -- Production Workers	10
Inspectors, Testers, Samplers and Weighers	10
Machinists	10
Electrical and Electronic Equip Assemblers	10
Computer-Controlled Machine Operators	5
First-Line Supervisors of Production Workers	2
General and Operations Managers	1
Industrial Production Managers	1
Total	**100**

Operating Cost Analysis (Cont.)

Annual Operating Cost

Metro	Employee Payroll	Benefits	Utilities	Real Estate	Property Tax	Total Operating Cost	Index
Phoenix	$7,328,378	$1,699,455	$45,259	$2,160,000	$11,496	$11,244,588	**100.0%**
Albuquerque	$7,487,326	$1,796,023	$45,758	$1,900,000	$452,530	$11,681,636	**103.9%**
Atlanta	$7,577,158	$1,798,878	$40,085	$1,722,000	$399,700	$11,537,822	**102.6%**
Dallas	$7,917,110	$1,828,065	$51,290	$1,678,000	$566,145	$12,040,610	**107.1%**
Las Vegas	$7,627,987	$1,854,434	$50,348	$2,592,000	$274,076	$12,398,845	**110.3%**
Los Angeles	$8,458,990	$2,381,820	$85,107	$4,344,000	$292,250	$15,562,167	**138.4%**
San Diego	$8,200,318	$2,306,414	$146,005	$3,336,000	$293,500	$14,282,237	**127.0%**



Source: Applied Economics Metrocomp Tool 2023

Operating Cost Analysis (Cont.)

Real Estate

Metro	Lease Rate	Square Feet	Total Annual Cost	Index
Phoenix	$10.80	200,000	$2,160,000	**100.0%**
Albuquerque	$9.50	200,000	$1,900,000	**88.0%**
Atlanta	$8.61	200,000	$1,722,000	**79.7%**
Dallas	$8.39	200,000	$1,678,000	**77.7%**
Las Vegas	$12.96	200,000	$2,592,000	**120.0%**
Los Angeles	$21.72	200,000	$4,344,000	**201.1%**
San Diego	$16.68	200,000	$3,336,000	**154.4%**

Utilities

Metro	Electricity	Water	Wastewater	Natural Gas	Total Annual Cost	Index
Phoenix	$43,220	$1,239	$799	$0	$45,259	**100.0%**
Albuquerque	$44,251	$858	$649	$0	$45,758	**101.1%**
Atlanta	$36,380	$2,138	$1,567	$0	$40,085	**88.6%**
Dallas	$48,686	$1,318	$1,286	$0	$51,290	**113.3%**
Las Vegas	$47,268	$1,309	$1,770	$0	$50,348	**111.2%**
Los Angeles	$83,004	$1,272	$832	$0	$85,107	**188.0%**
San Diego	$142,018	$2,616	$1,371	$0	$146,005	**322.6%**

Property Taxes

Metro	Effective Personal Tax Rate	Taxable Personal Property	Total Annual Cost	Index
Phoenix	0.05%	$25,000,000	$11,496	**100.0%**
Albuquerque	1.81%	$25,000,000	$452,530	**3,936.3%**
Atlanta	1.60%	$25,000,000	$399,700	**3,476.8%**
Dallas	2.26%	$25,000,000	$566,145	**4,924.6%**
Las Vegas	1.10%	$25,000,000	$274,076	**2,384.0%**
Los Angeles	1.17%	$25,000,000	$292,250	**2,542.1%**
San Diego	1.17%	$25,000,000	$293,500	**2,553.0%**

Source: Applied Economics Metrocomp Tool 2023

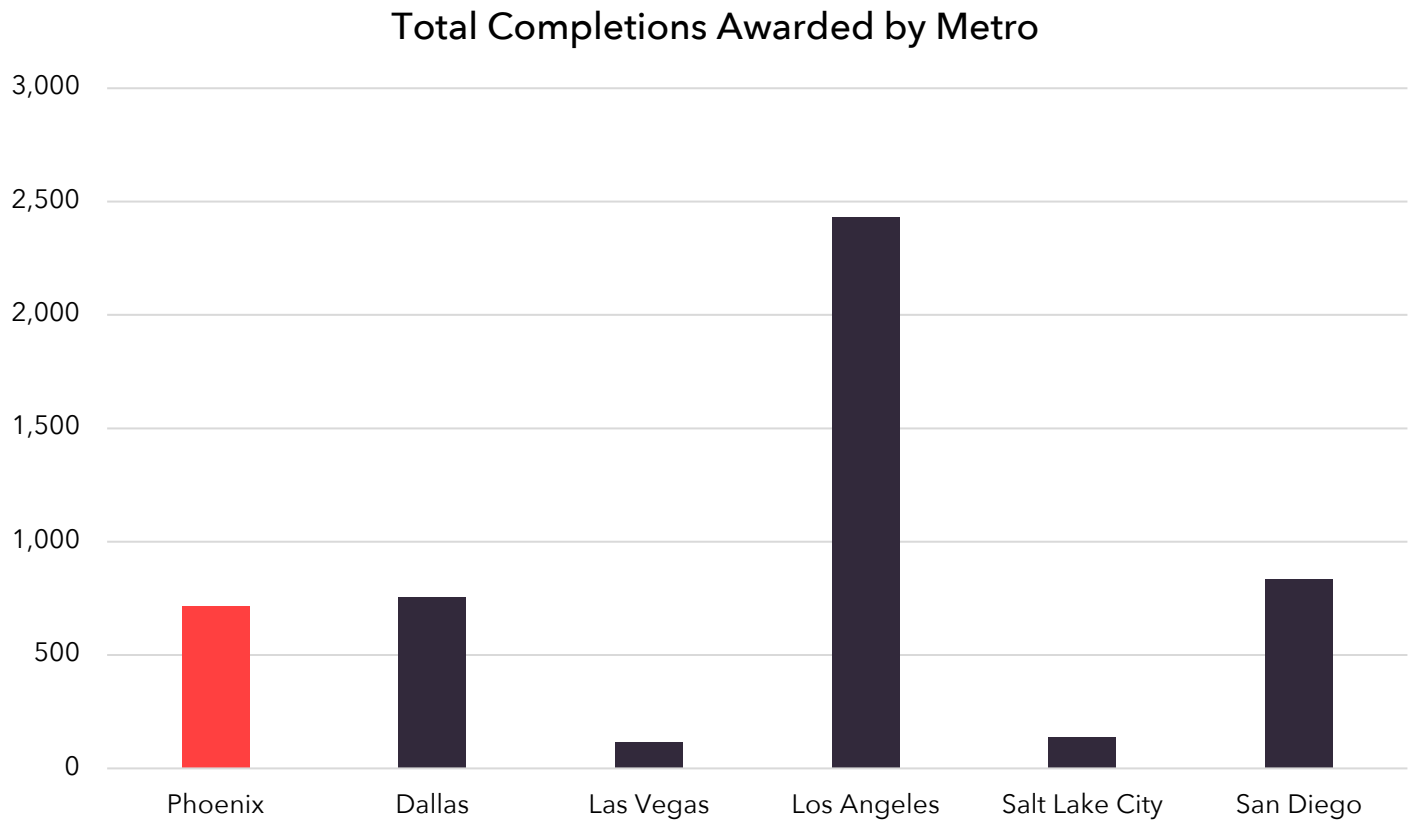
Talent Pipeline

Below are total numbers of non-distance program completions at colleges and universities in Greater Phoenix with degree programs relevant to the solar industry. The region produced over 700 graduates in these fields during the 2021-22 school year. The region's universities are committed to supplying the workforce needed to enable companies to scale in the region. Comparison data for peer markets has been provided below.

Greater Phoenix Talent Pipeline

Certificates	Associate	Bachelor	Master	Doctor
70	16	402	170	59

Competitor Markets' Talent Pipeline



Source: Lightcast 2023 Q4

Higher Education

Higher education institutions are committed to solar developments and renewable energy projects around Arizona.

Arizona State University (ASU)

- Arizona State University is a national leader in solar power production, with a significant program encompassing over 53 MW_{dc} of generating capacity across its campuses, including the installations at ASU Research Park and on its West Valley campus.
- The Red Rock Solar Project produces about 53 MW of solar and solar thermal energy with the help of its collaborative project with Arizona Public Service (APS).
- ASU collaborates with the National Renewable Energy Laboratory on projects spanning from solar to advanced manufacturing and grid technology.

University of Arizona (UArizona)

- The University of Arizona is advancing solar technology through a hybrid solar converter project and an educational program for solar technicians and engineers, aiming to diversify the field.
- UArizona is on track to meet its renewable energy goal with its 2.8 MW solar farm and agrivoltaics research.
- The university has partnered with Tucson Electric Power to offset greenhouse gas emissions entirely with clean energy.

Northern Arizona University (NAU)

- NAU installed a solar thermal system and is preparing to add solar panels to its parking garage.
- It is in close proximity to the CO Bar Solar project, built on 2,400 acres with plans for a 161-megawatt wind energy farm and a 60-megawatt solar field.
- The university's Clean Energy Research & Education program and Energy and Computational Modeling Laboratory, foster innovation and practical applications in renewable energy.

Source: ASU, UA, NAU

Utilities

The sections below describe plans and goals to increase solar energy use in Arizona.

Arizona Public Service

APS, the state's largest electricity utility provider, announced its goal to generate 100% of its electricity from zero-carbon emission sources including solar by 2050. The company also aims to generate 65% of its electricity through zero-carbon sources by 2030. This includes the closing of all coal-powered power plants across the state by 2031.

Salt River Project

SRP aims to reduce carbon intensity by 65% by 2035 and 90% by 2050 and reduce generation-related water use intensity by 20%. Currently, about 30% of SRP's energy generation is sourced from carbon-free resources, with 9.3% sourced from renewable sources such as solar, wind, and geothermal. As part of this process, several coal fired generating plants will be retired between 2027 and 2032. SRP is among the first utility providers in the country to begin shifting from an Integrated Resources Plan (IRP) to an Integrated System Plan (ISP), which will reach triple SRP's current solar portfolio by adding 6,000 MW of new solar resources by 2035.

Tucson Electric Power

TEP, which serves the Tucson area in south Arizona, announced plans to provide more than 70% of its power from renewable energy sources by 2035. To do so, it will close the coal-fired Springerville Generating Station in 2032 and transition to alternative energy sources. This shift is estimated to reduce water usage from 2020 levels by 70% and carbon dioxide emissions by 80%.

Source: APS, SRP, TEP

Inflation Reduction Act

The sections below describes programs and grants that may be available to solar manufacturers as part of the Inflation Reduction Act.

Advanced Energy Project Credit (48C ITC)

The Advanced Energy Project Credit provides tax credits equal to 30% of the qualified investment to companies that:

- Establish an industrial or manufacturing facility that produces or recycles energy from renewable resources;
- Manufacture electric vehicles and their associated technology, including batteries;
- Or manufacture any technology equipment designed to reduce greenhouse gas emissions by at least 20 percent.

Advanced Manufacturing Production Credit (45X MPTC)

The Advanced Manufacturing Production Credit offers federal corporate income tax credit for clean energy components manufactured domestically such as those used in photovoltaic modules, inverters, and batteries. The amount of credit offered depends on the type of component and the quantity produced.

- Companies that receive the Advanced Energy Project Tax Credit are not eligible for the Advanced Manufacturing Production Credit.

Innovative Energy and Innovative Supply Chain Programs

The Innovative Clean Energy and Innovative Supply Chain Programs offered by the Department of Energy provide loan guarantees to projects that utilize innovative technology to reduce greenhouse gas emissions or use innovative technology in the manufacturing process for qualifying clean energy technology.

- The applicant must demonstrate the use of new or improved technology compared to other current commercial technology. Eligible projects must address a specific technology including but not limited to renewable energy systems, energy storge and efficient electrical generation.

Source: US Department of Energy

Arizona Statutory Incentives

The incentives below are available to projects locating in Arizona. Please note that this is not a comprehensive list of all incentives available within the State of Arizona. It should additionally be noted that this document is only a guide for potential incentives. Actual incentives will depend on project parameters, and varying program qualifications and requirements as determined by the Arizona Commerce Authority.

Qualified Facility Tax Credit

The Qualified Facility Tax Credit was established to encourage new or expanding businesses to create high quality employment opportunities for Arizona's citizens in positions related to corporate headquarters, commercial research, and manufacturing. The program incentivizes businesses by offering a refundable tax credit to taxpayers who are expanding or locating a Qualified Facility in Arizona. In order to be eligible for the program, a company must meet each of the following requirements:

- Make a Capital Investment of at least $250,000 to establish or expand a Qualified Facility that devotes at least 80% of the property and payroll to qualified manufacturing, manufacturing-related research & development, or headquarters.
- Create net new full-time employment positions for the project, of which at least 51% are paid at least 125% of the state's annual median production wage if located in an urban area or 100% of the state's annual median production wage if located in a rural area.
- Offer to pay at least 65% of the health insurance premiums for all net new full-time employment positions.

Incentive Value

The exact value of the refundable income tax credit will vary from business to business, but will always result in the **lesser** of:

- 10% of the qualifying capital investment or
- $20,000 per net new job at the facility or
- $30,000,000 per taxpayer per year.
- Companies investing $2B or more will qualify for $30,000 per job

The tax credit is claimed in five equal installments over five consecutive taxable years.

R&D Tax Credit Program

The Research and Development (R&D) incentive provides an Arizona income tax credit for increased research and development activities conducted in this state, including research conducted at a state university and funded by the company. The goal is to encourage Arizona businesses to continue investing in research and development activities.

- Refundable and nonrefundable corporate income tax credits for qualified research and development done in Arizona.
- Credit amount is 24% of first $2.5 million in qualifying expenses plus 15% of the qualifying expenses in excess of $2.5 million.
- $30,000,000 per taxpayer per year. Qualifying small companies (less than 150 FTE) can apply to make their credit refundable (75% of nonrefundable credit value). A company can receive up to $2M in refundable credits per year
- Additional non-refundable credit equal to 10% of the amount of basic research payments above base amount paid to state universities.

Arizona Statutory Incentives (Cont.)

The incentives below are available to projects locating in Arizona. Please note that this is not a comprehensive list of all incentives available within the State of Arizona. It should additionally be noted that this document is only a guide for potential incentives. Actual incentives will depend on project parameters, and varying program qualifications and requirements as determined by the Arizona Commerce Authority.

Quality Jobs Tax Credit

Quality Jobs provides tax credits to employers creating a minimum number of net new quality jobs and making a minimum capital investment in Arizona. The Quality Jobs Tax Credit offers up to $9,000 of Arizona income or premium tax credits over a three-year period for each net new quality job. The tax credit is equal to $3,000 per qualified employment position, employed for each full taxable year of continuous employment for three years. If the allowable tax credit exceeds the income or premium tax liability, any unused amount may be carried forward for up to five consecutive taxable years. Employers must cover 65% of employee health insurance premium costs and exceed county median wage.

Foreign Trade Zone

Arizona is one of two that have additional benefits for companies located within a Foreign Trade Zone. A Foreign Trade Zone (FTZ) is an area that is considered to be in international commerce for U.S. Customs purposes. Any foreign or domestic material can be moved into a FTZ without being subject to U.S. Customs duties. Eligibility includes companies that would receive an economic benefit from the deferral, reduction, or elimination on duties from imported products. Benefits of an FTZ include duty elimination, duty deferral, duty reduction, logistical benefits, and lower state and county property taxes.

HB2822 Summary

In 2022 Arizona enacted HB2822, which sets the full cash value of business personal property initially classified during or after Tax Year 2022 to 2.5% of the property's acquisition cost. Properties that benefit from the new legislation include shopping centers, golf courses, manufacturers, and other personal property devoted to commercial or industrial use that is not classified elsewhere, agricultural property, and property in a foreign trade zone or military reuse zone.

Additional Tax Incentives

Arizona currently offers competitive operating cost advantages, and as a right-to-work state, its unionization rates are among the lowest in the nation. Arizona is free from corporate franchise tax, business inventory tax, income tax on dividends from out-of-state subsidiaries and worldwide unitary tax.

Other tax incentives and exemptions include:

- Manufacturing machinery and equipment up to $225,572 is exempt from property tax.
- 100% of net operating loss may be carried forward 20 years.
- Electricity and natural gas utilities used for manufacturing are exempt from state and county sales tax.
- Labor and equipment used in the construction of manufacturing buildings is subject to 65% gross receipts tax as opposed to regular sales tax.
- The assessment ratio applied to commercial property values is expected to reduce by 0.5% annually over the next five years. This is the expected reduction schedule: 17.0% in 2023, 16.5% in 2024, 16.0% in 2025, 15.5% in 2026 and 15.0% by 2027.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