Arizona Solar Strategic Plan Update

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Developed by the Arizona Energy Consortium

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Methodology

This Strategic Plan proposes a series of recommended actions for specific initiatives that, if implemented successfully, could allow for the realization of Arizona's vision of not just participating in, but *owning* the solar industry nationally. The Strategic Plan will be continuously updated in response to changing solar industry conditions within Arizona.

The Arizona Energy Consortium (AEC), a committee of the Arizona Technology Council, is currently comprised of over 300 members across diversified sectors within the Arizona energy industry, and seeks to develop a credible, member-driven voice for Arizona's growing energy industry. A primary goal of the AEC is to provide meaningful input toward the development of long-term strategic plans for statewide industry growth. In accordance with this goal, the AEC seeks to strongly promote both economic development initiatives and continued technological innovation across the state, including the solar energy sector.

Through the AEC's *Energy Roadmap subcommittee,* the AEC is working with the stakeholders in the industry to shepherd the plan and ensure its implementation. The principal focus of the AEC's Energy Roadmap subcommittee is to ensure a balanced energy mix that includes solar energy. The AEC continues to support the many successes that have already been achieved in Arizona's solar energy sector by the Arizona Corporation Commission, Arizona Legislature, Governor's Office, Arizona Commerce Authority, Greater Phoenix Economic Council, local governments, the utilities and other business groups but believes that more still needs to be done.

As this industry continues its rapid growth, the AEC has been working to support, expand and help coordinate the many positive efforts already underway in our state. The AEC has also created subcommittees to focus on Workforce Development, Technology & Innovation, Project Development & Energy Infrastructure, and Energy Efficiency to tackle other difficult issues facing Arizona's energy industry. Through real collaboration uniting the efforts of the diverse businesses and agencies that make up the energy sector, a sustained economic development for Arizona resulting from increased jobs, tax revenues, and a vital new source of economy will be realized.

Vision

With a dedicated long-term commitment, as well as collaboration from State leaders across the different energy sectors, Arizona has the potential to realize the following vision within the next five years:

> ***Arizona will capitalize on its competitive advantage—the sun—through collaboration across the finance and economic development, industry and infrastructure, and policy and regulatory sectors. The successful integration of generation, technology***

innovation and manufacturing will culminate with Arizona positioning itself to own the solar industry nationally.

Arizona's definition of its solar industry must include the sub-sectors of generation, technology innovation and manufacturing in order for the State to own the solar industry at large. If Arizona can successfully become a leader in at least one of the sectors identified, that position will create opportunities within the other sectors. A series of recommended actions for specific and *achievable* initiatives will be suggested in the course of this Strategic Plan in order to allow the above outlined State's solar industry vision to come to fruition. While the recommended actions may not be groundbreaking ideas, it is their *implementation* that will be the key to the Plan's success.

Arizona's Solar Industry Mission

Increasing focus has been placed on viewing Arizona's growing solar industry not only as an environmental opportunity, but as an enticing economic opportunity for the State. Potential economic benefits resulting from a fully developed Arizona solar industry include the following:

- Enhanced job creation and higher-waged jobs within Arizona
- Enhanced export potential
- An increase in State economic revenue
- Heightened energy self-sufficiency and national security

Requirements for developing Arizona's solar industry to the degree that would allow its vision to be realized include the following:

- The development of a cohesive narrative for defining Arizona's solar industry.
- A long-term commitment by investors, developers, policy makers and the Arizona public for developing the State's solar industry through a comprehensive solar energy plan.
- Collaborative efforts by members across the finance and economic development, industry and infrastructure, policy and regulatory sectors that constitute the State's broader energy industry.
- Strategic focus on specific and *achievable* initiatives for Arizona's solar industry development.
- A heightened emphasis on the importance of public-private partnerships in an effort to reduce the financial risks associated with solar project development to investors, as well as to increase funding opportunities for such projects within the State.
- Supportive collaboration between federal, state and local government levels.

Arizona's Competitive Advantages

Arizona already has some competitive advantages that encourage further solar industry development including:

- **An abundance of exportable solar generation.** Arizona has been labeled the "sun corridor" for the United States in that it receives the highest quantity of sunlight per year in the nation.[1]

- **A facilitated permitting process** when compared to other states. Some jurisdictions in Arizona have elevated the bar for compressing and streamlining the permitting processes through the use of *Solar Field Overlay Zones* (SFOZs) for solar project development. Such permitting procedures consist of 1) a citizen review process, 2) planning and zoning meetings, 3) publication in a newspaper, and 4) planning and zoning commission review. The use of SFOZs has shown to reduce the land use entitlement permitting process from a period of years to weeks. A positive side effect of the overlay zone was greater certainty from a financing perspective, encouraging investors and developers to pursue projects that would otherwise have been viewed as being higher risk.

- **A high intellectual capacity** compared to its other competitor states.[1] To date, Arizona's solar industry and universities have invested heavily in sustainable research efforts. Some examples of this include the country's first School of Sustainability at the Arizona State University, as well as its Professional Science Master's Solar Energy Engineering & Commercialization Program.

- **Fewer environmental regulations and more available environmental legal counseling.** A reduction or consolidation in environmental regulations related to project development greatly reduces project application time and facilitates greenfield development within Arizona.

- **More available land at lower purchasing costs.** Arizona is equipped with more flat available land suitable for solar project development at far lower costs than witnessed in some of its neighboring states.

- **A facilitated line-siting committee procedure.** Arizona's line-siting committee process is relatively streamlined compared to its competitor states. This procedure takes less than one year in Arizona while allowing for full due process to still occur, a far shorter timeframe than recorded in other regions. In addition, Arizona's

streamlined line-siting committee process allows for collaborative transmission planning, construction, and operation by the State's utilities.

- **Proximity to major solar markets, such as California.** California's 33% renewable portfolio standard (RPS) positions Arizona with an increased potential to become a large-scale exporter of solar generation to California to meet its high renewable energy demands.

- **A strong emphasis on public-private partnerships.**[1] Arizona's focus on the use of public-private partnerships across various industries increases investment opportunities for solar project development.

- **Positive tax policies**. Arizona has supported the use of tax benefit programs as a means to encourage the growth of various promising state industries. Such positive tax policies could better attract company headquarters, investors for solar project development and manufacturing facilities.

The above strengths serve to illuminate Arizona's competitive advantage in the development of its future solar industry. However, there are a series of barriers in Arizona that if not addressed, could thwart its efforts towards future solar industry growth.

Barriers to Arizona's Solar Industry Development

A number of current barriers exist that curtail the development of Arizona's solar industry. The following barriers need to be addressed in order for Arizona to achieve its designated solar vision:

- **Energy – Water nexus.** Arizona is one of the most arid regions in the United States and needs to protect its precious water reserves. A balancing act is required when looking to develop solar generation and manufacturing in a desert environment. This is continuing to become a barrier to development and must be addressed through less water intensive processes.

- **Challenging permitting processes.** While Arizona has a more facilitated permitting process in relation to its neighbors, the lack of standardization of such procedures still deters the completion of solar projects within this state. There is often a duplication of permitting processes for varying regulatory districts.[2] Lacking standardization, Arizona permitting procedures often involve multiple go-between entities for processing, thereby proving lengthy. In addition, Arizona's current overall permitting processes are considered costly for developers of solar projects.[2]

- **Challenging transmission processes.** The lack in standardization among current Arizona transmission processes signifies a prominent restraint for solar project development within the state. [2] Transmission lines are costly and require a significant length of time to construct. The unavailability of transmission infrastructure is closely tied to permitting risks associated with solar project development. It is imperative that the State invest and display true leadership in the coordinated development of transmission to allow the solar industry to prosper. A regulatory climate that provides certainty will facilitate the influx of private capital into this area of need. The export potential cannot be realized until this constraint is adequately addressed.

- **A low RPS relative to its solar competitor states.** Arizona's 15% by 2025 Renewable Energy Standard (RES) is far lower than the majority of its Southwestern neighboring states, including California (33% by 2020), Nevada (25% by 2025), Colorado (30% by 2020), and New Mexico (20% by 2020).[2] Such a low renewable energy requirement places Arizona at an initial disadvantage with regard to encouraging solar industry development.

- **Limited access to available capital.** The solar industry in Arizona has been predominantly funded from out of state investors. Potential investors are plagued by fears of financial risks associated with the specific uncertainties in the Arizona market, such as potential regulation of commercial solar providers in distributed generation projects and other regulatory and permitting issues. The solar industry represents an unfamiliar territory for many investors who have not yet been adequately educated on development processes and timelines, and how to properly manage the risks associated with project development. It is essential that local/regional investors understand the potential of the solar industry. With the success of the solar industry will come growth in other sectors; many of which the Arizona market is familiar. The expiration of the 1603 Treasury Grant Program at the end of 2011 is an example of the uncertainty in the solar space.[3] The expiration of the program resulted in a significant reduction in capital available for the development of future solar projects in Arizona and beyond.

- **Lack of narrative.** To date, no cohesive narrative exists for defining Arizona's solar industry. Without a consistent message it is difficult for affected stakeholders to support an industry that has not been able to effectively define itself.

Arizona's Opportunities for Solar Industry Expansion

Arizona is adequately equipped with a multitude of opportunities for expanding the state's solar industry development. In order to *own* the solar industry, Arizona must focus its efforts towards

the successful integration of the generation, technology innovation and manufacturing industry sub-sectors.

- **Generation Opportunities.** Arizona has a significant opportunity in the form of solar generation development due to the State's high level of solar insolation and its close proximity to California's extensive solar market.[1] Without significant investments in transmission and solar generation development, Arizona will not be able to maximize this advantage for internal use or export its abundant solar resource. Arizona's abundance of suitable land for solar project development stimulates the state's opportunity for an emphasis on its solar generation sub-sector. A multitude of progressive efforts have been made by the State to increase its future generation capability. As part of its *Western Renewable Energy Zone Program* (WREZ), the Sixth Biennial Transmission Assessment is currently seeking to identify "renewable energy zones that would facilitate high voltage transmission development."[2] In addition, WREZ assesses "Arizona areas with potential for large scale renewable resources development," as well as "screens out areas where development is prohibited or severely constrained."[2] Current renewable transmission projects could allow for an increase in Arizona's "incremental export capability to Southern California by adding transmission within existing corridors, such as the Delaney to Colorado River and the North Gila to Imperial Valley corridors."[2]

  Update: The Western Governors' Association (WGA) has defined "WREZ hubs" as renewable energy zone areas of "greatest interest to utilities."[4] Recognized 'WREZ hubs' resulted from the WGA conducting a "series of interviews with 25 Western utilities, 11 public utility commissions and two provincial energy ministries."[4] Four Arizona WREZ hubs (AZ_NW, AZ_NE, AZ_WE, and AZ_SO) were recognized by utilities for their high renewable resource potentials.[5] Based on its four identified hubs, Arizona was found to have a total solar thermal generating capacity of approximately 19,780 MW, an equivalent of approximately 47,188 GWh/yr. The AZ_WE hub was recognized to have the highest solar thermal potential generating capacity at approximately 9,322 MW, or 22,702 GWh/yr.[5] Quantifications for solar resources utilized in the above GWh/yr calculations "represent the state's minimum direct normal insolation level and higher."[5] Furthermore, the AZ_NE and AZ_NW hubs were recognized by interviewed utilities for their potential to serve multiple jurisdictions.[6] Pacific Gas & Electric (PG&E), Arizona Public Service (APS), and Salt River Project (SRP) expressed interest in the AZ_NE hub for its potential to serve both Arizona and California. In addition, PG&E, APS, and Tucson Electric Power noted interest in the AZ_NW hub for its potential to serve the above states.[6]

- **Technology Innovation Opportunities.** Focus should be placed on elevating the state's intellectual capacity in the form of research and development (R&D), as well

as on educating and building its solar workforce. Substantial efforts made in the technology innovation sub-sector could lead to a heightened procurement of company headquarters within Arizona. Such efforts could include extending and increasing state R&D tax credits, as well as continuing support of university partnerships within Arizona's growing solar industry. A focused technological effort needs to be made to reduce water use in both manufacturing and generation.[2] Arizona cannot continue to assume it has an endless supply of water. In addition, our research sector needs to focus on storage potential that will in turn allow the intermittency issues that have plagued traditional solar to be addressed[2] and technologies that do not have the intermittency issues need to be promoted and further enhanced as the cost of storage is not required by these forms of power generation.

- **Manufacturing Opportunities.** A heightened solar manufacturing emphasis is necessary in order to stimulate job creation and attract capital for future solar development projects. If the State were to increase its investment in manufacturing, it would provide economic stimulus for other industries and result in enhanced export opportunities. Furthermore, an increase in Arizona's manufacturing efforts is vital for driving down solar component costs. Several requirements must be met in order for Arizona to increase the development of its solar manufacturing sub-sector. These include a focus on attracting company headquarters to metropolitan areas in Arizona, investing in training programs for the creation of a skilled solar workforce, and developing the state's solar supply-chain to build a robust manufacturing sub-sector[7], and most importantly emphasis on generation needs to become a focus; without generation the manufacturing sector cannot sustain itself.

Strengthening Arizona's Solar Industry

In order for Arizona to achieve its designated solar vision, the state must make collaborative and progressive efforts to eliminate barriers that thwart the industry's development. The following identifies a series of Arizona solar sub-sectors for advancement, as well as recommends specific actions for implementation to encourage Arizona's future solar industry development.

INDUSTRY & INFRASTRUCTURE

- **Technology Innovation Recommended Actions**:
    1. Provide a series of both monetary and non-monetary incentives and heightened support for Arizona companies with recognized promising solar technologies.
    2. Focus on business attraction and retention – encourage promising companies to locate and remain in Arizona rather than re-locating to other states.

- **Update:** Arizona is now home to plethora global solar companies, such as Abengoa Solar, Alpha Energies, Brightsource Energy, Centrosolar, EnviroMission, Faist, First Solar, Fluidic Energy, Gestamp, Kyocera, Power-One, Rioglass Solar, Saint Gobain, Schletter, Solon, and Suntech Power Holdings Co.[8]

3. Encourage more state support for desert-friendly solar technology development.
4. Utilize public/private partnerships to accelerate the development of innovative solar energy and energy storage technologies.
   - **Update:** "Solar Phoenix" represents one such successful public-private collaborative for solar development in Arizona.[9] Solar Phoenix represents a "$25 million public-private collaborative between the City of Phoenix, the National Bank of Arizona, APS, and SolarCity."[9] The program serves as a "residential solar financing program that allows qualifying homeowners to install solar systems with no upfront investment and a low monthly lease payment, resulting in lower overall utility costs."[9] Recently completed, "Phase I of the Solar Phoenix program fully enrolled 3 MW of solar instillations on "445 Valley residences. A public-private collaborate between the City of Phoenix, the National Bank of Arizona, and Paramount Solar, Phase II of Solar Phoenix is projected to "allow up to 1,800 Phoenix homeowners to adopt solar power by the end of 2012."[10]

- **Manufacturing Recommended Actions:**

1. Regional standardization of permitting processes.[11] Permitting should be streamlined across municipalities and the State in order to encourage site selection for company headquarters. The *Gila Bend Solar Field Overlay Zone* represents an ideal example for facilitated permitting procedures.
   - **Update:** Gila Bend's SFOZ permitting process takes approximately thirteen weeks for completion.[12] Gila Bend allows for "at risk submittals of plans," as well as "at risk grading and drainage approval."[12]
2. Establish a cohesive and detailed definition of the solar industry's supply chain to improve development of the solar industry cluster in Arizona.
3. Heighten investment efforts for the recruitment of company headquarters to Arizona's metropolitan areas.
   - **Updates:** Phoenix's "competitive business climate" makes the region an ideal location for housing global solar company headquarters.[13] Annual operating costs for sustainable industries headquarters in Phoenix are relatively low when compared to its solar competitor states. The Greater Phoenix Economic Council compared Phoenix's sustainable headquarter

annual operating costs with those of solar competitor cities, Dallas-Fort Worth, Denver, Portland, Los Angeles, and San Francisco. Phoenix was found to have the lowest total operating costs out of the six solar headquarter cities examined.[13]

- In addition, the Arizona Renewable Energy Tax Incentive Program supports state investments in "headquarter operations of in-state and out-of-state renewable energy companies, including solar headquarters."[14] Program requirements for eligible businesses include: "51% of new jobs must pay a wage that is equal to or exceeds 125% of the state's median wage as determined by the Arizona Department of Commerce" and the "firm pays 80% or more of the cost of the healthcare premium."[14] Benefits to eligible solar companies include a "refundable corporate income tax credit of up to 10% of the total capital investment of the project," as well as "real and personal property tax reductions of 77% for projects with a minimum of $25 million in capital investment."[14] This program remains effective until December 31, 2014 with a cap of $350 million.[14]

- **Generation Recommended Actions:**
  1. Projects of Significance
     - In efforts to encourage investment for developers, Arizona should define *projects of significance* by a set of selective characteristics, such as employment, MW, and funding need.[15]
     - Selected solar *projects of significance* could then be tied to performance-based incentives to encourage the development of a sustainable Arizona solar market. Such incentives could occur in the form of production tax credits.[15] This type of incentive is considered to be the most suitable for Arizona's solar industry development in that it is more politically viable, while still being attractive to developers and investors. Such efforts could be guided by the Arizona Energy Consortium under the Arizona Technology Council.
     - **Update:** The AEC has formulated a series of objective criteria to aid in the identification of "Projects of Significance." Objective criteria were selected in an effort to provide greater certainty around project development. Objective criteria used to identify Projects of Significance include: size of facility, dollars invested, jobs created, and induced benefits. The ultimate goals of the identification of Projects of Significance include: greater certainty for timelines, reductions in development timelines, greater access to capital, and reductions in development costs.

2. Arizona is encouraged to reach out to its solar neighboring states, such as California, Nevada, Colorado, and New Mexico, in efforts to discuss the Southwest regional need for renewable energy. The coordination of solar efforts could be implemented as a means to meet such designated regional renewable needs.
    - **Updates:** The Governor's Office of Energy Policy has made significant efforts to address the need for the regional coordination of renewable energy. Arizona's Governor Janice Brewer addressed the need for Arizona to work with its neighboring states with regard to regionally coordinating transmission in her March 2012 letter to the Western Governors' Association. In this letter, Governor Brewer proposed the short-term objective of coordination among "states with direct connections to the California grid to ensure compliance with California Renewable Portfolio Standard rules," namely "Nevada, Oregon, Arizona, New Mexico, Utah and possibly Wyoming."[16] Governor Brewer also outlined a long-term objective in the form of broadening the discussion surrounding the examination of "lowest cost strategies" to meet "renewable policy objectives within the Western Interconnection."[16] The Governor requested that the "Staff Council" create a subcommittee of interested states, dedicated to the research and construction of recommendations surrounding this initiative.[16]
    - In addition, Governor Janice Brewer has created a Transmission Sub-Committee to the Solar Energy Task Force as a means to work with Arizona's neighboring states on coordinating regional transmission.[17]
    - Governor Janice K. Brewer recently commissioned a bi-national Arizona & Sonora Task Force to investigate transmission opportunities between the two states.[17] The Arizona Governor and the Governor of Sonora, Guillermo Padrés Elías, met in June in an attempt to "overcome the legal and regulatory hurdles that now prevent U.S. energy firms from selling electricity in Mexico."[18]
3. Regional standardization of permit application processes.
    - An online repository needs to be established for up-to-date permitting-related information for solar project developers.[11]
    - In addition, the state should consider investing in the creation of regional permit approval centers.[11] The development of such regional entities could greatly facilitate Arizona's permitting procedures, including reductions in both process time-delays and process costs. By allowing the bulk of the permitting process to be housed under one roof, the duplicative nature of previous permitting procedures can be eliminated.[11]

A permitting standardization effort is being coordinated by the Governor's Solar Task Force.

- **Updates:** As part of its "2011 Recommended Actions," the Arizona Governor's Solar Task Force put forth a series of recommendations "to simplify and standardize statewide permitting for solar energy projects in the residential sector."[19] This initiative can be achieved through the modification of the following metrics: "standardized fee schedules, expedited review and approval processes, and submittal requirements."[19] Recommended metrics for Photovoltaic (PV) and Solar Water Heater (SWH) residential permitting segments included: "a proposed flat fee schedule ($0-$500 for PV and $0-$200 for SWH), an over-the-counter review and approval time (10 business days for PV and 3 business days for SWH), and a completed permit submittal application based on specified requirements."[19]
- In addition, the Arizona Governor's Solar Task Force is leading a statewide campaign in the form of the "Rooftop Solar Challenge." In 2011, the Arizona Governor's Office of Energy Policy was awarded $708,992 for the "SunShot" Solar Initiative by the U.S. Department of Energy.[17] The grant will identify best practices in finance, permitting, and zoning to move toward voluntary statewide uniformity. Arizona was one of 22 regional teams competing for $12 million in funding and will bolster our commitment to solar technology, allowing it to create statewide, streamlined processes for permitting and interconnection of distributed generation projects.[17]

4. Regional standardization of transmission line application processes.
   - In efforts to increase its export capability, Arizona should heighten the development of its physical connections with California ISO (CAISO).[2]
   - Update: Arizona entities have been in communication with California agencies to explore non wires solutions to transmission of Arizona generated energy to California markets.[11]
   - As part of the state's efforts to increase the construction of new transmission lines, Arizona could issue state bonds, resulting in a reduction in transmission line costs.
   - Arizona should initiate an interstate collaboration of transmission line development as a means to reduce time-delays within the transmission approval process.
5. Arizona should develop a detailed solar energy generation plan.[1] The state's solar exports should occur be in the form of large-scale generation.[1]

6. Arizona should encourage the employment of both distributed and utility scale solar generation and energy storage options on military land and air force bases to enhance national security.
    - **Updates:** The Department of Defense (DoD), which accounts for nearly 80% of the government's energy consumption is mandated to produce or procure at least 25% of its electricity consumption from renewable resources by 2025.[20] At the May 2, 2012 Greater Phoenix Economic Council Business Leader's Forum, Richard Kauffman, Senior Advisor to U.S. Secretary of Energy Steven Chu, stated that in order to achieve this goal, the Army, Air Force and Navy are planning to implement 1GW each of new renewable energy.[21] To meet this challenge, the Army has established an Energy Initiatives Task Force (EITF) to manage the procurement of large scale renewable energy generated on or near Army land. A draft solicitation was issued by the Army in February 2012 to procure reliable locally generated renewable and alternative energy utilizing Power Purchase Agreements (PPAs) for federal installations located within the United States and its territories. Under this arrangement, the Government has set aside $7 Billion to contract with developers to purchase the energy for up to thirty years. The developer's will be responsible for developing, financing, designing, building, owning, operating and maintaining wind, solar, biomass and geothermal assets. It is anticipated that the Army's final request for proposal will be issued this summer and that this initiative will lead to many opportunities for independent power producers and American manufacturers, helping to boost the US renewable energy industry.[20]
    - In addition, SolarCity is currently in the process of developing a "6 MW solar powered community at Soaring Heights Communities at Davis Monthan Air Force Base in Tucson, Arizona."[22] This project is expected to produce "10 million kWh of electricity annually," providing approximately 75 percent of residents' energy.[22]

FINANCE & ECONOMIC DEVELOPMENT

- **Capital Access Recommended Actions:**
    1. Arizona should develop federal, performance-based incentives (back-end incentives) to encourage solar project investment.[15] The potential effectiveness of such incentives is exemplified in the case of the First Solar Arizona development project.

2. The Arizona Congressional Delegation is encouraged to become active participants in the support of federal grants and tax credits for renewable energy development.
3. By focusing on the use of performance-based incentives, Arizona will encourage the development of a sustainable solar industry.
   - Such incentives would help provide investors and developers with needed market certainty for solar project development.
4. The state should utilize Master Limited Partnerships (MLPs) to attract investors for solar project development.[3]
   - MLPs allow project investment to occur through a master entity.[3]
   - Allows tax benefits to be monetized in a similar manner to Real Estate Investment Trusts (REITs), expanding the short list of investors that can currently utilize the tax advantages of solar development.
   - MLPs also reduce the typical two-fold taxation in the form of a corporate tax and shareholder tax down to one level of taxation.[3]
5. Educate potential investors on the proven economic benefits of Arizona's solar industry.
6. Provide pre-negotiated guaranteed rate for utilities that implement "new technology" in solar.
   - Implementation could occur through the Arizona Corporation Commission.
7. Focus on obtaining project investment through public-private partnerships.[23]
8. Encourage bank investment by connecting solar development to community reinvestment.
   - **Update:** As discussed above, the Solar Phoenix program, a public-private collaborative between the City of Phoenix, the National Bank of Arizona, APS, and Solar City, represents one such example of encouraging bank investment in solar development. Solar Phoenix "allows qualified homeowners within the Phoenix APS and SRP utility districts to adopt solar without large upfront investment."[10]
   - The Community Reinvestment Act could allow for the securitization of solar projects on a community scale as cooperative ventures.
9. Consider demand for solar development through state-wide feed-in tariffs.
   - This type of supportive policy has proven successful in the European market.

POLICY & REGULATORY

- **Policy Recommended Actions:**
    1. Encourage longer term planning of utility incentive programs to increase certainty in the investment and development sectors.
    2. To ensure the sustainability of Arizona's solar industry development, meaningful collaboration must occur among the executive government, legislative government, local government and the Arizona Corporation Commission.
    3. Establish economic development zones (EDZs) and renewable energy development zones to encourage solar industry cluster growth.
        - Enterprise zones are "government programs that provide incentives for businesses to locate or expand in targeted, geographically defined areas."[24]
        - EDZs are typically utilized by governments as a means to increase job opportunities for individuals that are located within such zones.[24]
        - EDZs have been implemented extensively by the Chinese government as a means to encourage growth in its technology sectors.[25]
        - Economic development zones are "a good example of how the interplay of economic and political decision-makers fosters regional development."[25]
        - Renewable Energy Zones are regions that promote the development of renewable projects and transmission.
    4. Creation of supportive performance-based, back-end incentives to encourage the sustainable growth of Arizona's solar industry development.
        - Such incentives could occur in the form of a tiered, regressive income tax structure based on employment and production criteria.
        - Federal incentives should also encourage public-private partnerships for obtaining solar project investment.
    5. Implementation of the 1603 Treasury Grant Program or similar program to support continued solar project funding.
        - The expiration of the 1603 Treasury Grant Program at the end of 2011 resulted in a significant reduction in Arizona capital for the development of future solar projects.[3]
        - The grant's expiration also greatly discouraged potential investments within the state's renewable energy sectors, resulting in a diminished demand for renewable, and the enforcement of more strict applications for solar project development.

6. Encourage Arizona's Congressional Delegation to develop more aggressive renewable energy incentives and tax credits to further the investment in the growth of the industry.
7. Consider whether de-coupling utility rates provides for more incentive for heightened investment by utility companies in solar project development.

- **Education Recommended Actions:**
  1. Develop a cohesive narrative for Arizona's future solar industry.
     - Arizona should increase its branding efforts with regards to its growing solar industry efforts.
     - Educate State legislators, Congressional Delegation members and the Arizona Corporation Commission on surveys showing the state's solar industry economic benefits.
       - **Update:** The Governor's Office of Energy Policy plans to conduct an ongoing process of legislative outreach to educate the Arizona legislature on the state's energy mix, new initiatives being undertaken by the Office of Energy Policy and renewable energy opportunities.[17]
     - Encourage State legislators and Congressional Delegation members to visit Arizona's solar sector companies to realize the potential economic benefits created by such industry's growth.
     - Send an Arizona solar delegation to neighboring states to address regional and national need for renewable energy.
     - Recognize solar as a valued component of Arizona's balanced energy mix.
     - **Update:** The ASU Solar Summit Narrative Working Group is moving ahead to facilitate initial efforts to design, construct and deliver a compelling Solar Narrative for the State of Arizona.[26] The Working Group recognizes that i) to be effective, the narrative should be endorsed by a broad range of stakeholders and influencers; and ii) the process of educating and influencing stakeholders can be challenging, time consuming and resource intensive. The Working Group seeks to identify appropriate funding /organizational vehicles, prioritize desired outcomes and then build a framework and roadmap that have a high probability of achieving these outcomes.[26] It was further recognized that the message needs to be succinct, compelling, bipartisan and simple for all stakeholders to understand and embrace.
  2. Create a consolidated solar repository for up-to-date information pertinent to Arizona's growing solar industry.

- **Update:** The Arizona Energy Consortium has created its own GroveSite online repository in an effort to consolidate accessible, state energy information. In addition, the Technology and Innovation subcommittee members, along with many other individuals and organizations, identified a need for a searchable system that both lists organizations with Arizona connections and details the core capabilities of those organizations.[27] The subcommittee has identified other organizations which possess large amounts of relevant data, and is making progress on obtaining access to those data. Additionally, the subcommittee is working with other economic development organizations that also want to create similar systems to help minimize duplicative efforts. Finally, the subcommittee is working with the anticipated end users of such a system to ensure the system becomes a highly relevant and flexible tool that supporting strategic economic development.[27]
- As part of a collaborative effort with partners from industry and government, Arizona State University and the University of Arizona have created Arizona's Solar Market Analysis and Research Tool (AzSMART).[28] AzSMART is an online tool that enables targeted audiences, such as "solar developers, policy planners, and government agencies and utility companies" to examine "multiple solar instillation scenarios."[28] AzSMART allows participants to consider vital "inputs" within the solar development industry, such as "demand profiles, PV efficiency levels, transmission investment, and costs and incentives."[28] While already interactive portions of AzSMART are currently limited to the utility-scale sector, it will "ultimately develop into an all-encompassing utility- and distributed-scale tool."[29]

3. Develop training programs for the creation of a skilled solar Arizona workforce.
   - **Update:** The Arizona Energy Consortium's Workforce subcommittee is currently in the process of identifying gaps within the state's industry engineering training and certification programs. This Committee will work in conjunction with state universities to create a more qualified solar workforce, as well as to facilitate current student internship processes. The creation of a workforce industry database represents an additional subcommittee initiative in order to identify industry attraction needs.

Key Figures for Strategic Plan's Implementation

A meaningful collaboration between all levels of government – federal, state, and local – must occur for the creation of supportive policies to guide the state's growing solar industry along a sustainable path. In terms of a mature solar industry, states such as California, and nations, such as China, are considerably ahead of Arizona due to the supportive regulatory policies established by their prospective governments. Such efforts need to be implemented in our state's future if Arizona seeks to become a leader in the global solar industry. The *Governor's Solar Task Force,* as well as several working groups being led by Arizona State University, represent examples of Arizona entities that are working on efforts towards the growth of the State's solar industry future. A greater legislative and Congressional emphasis is needed in order to establish statewide support for Arizona's solar industry. Additional coordination by the Arizona Corporation Commission, the Arizona Commerce Authority, utilities, industry groups and state universities are imperative for the continued growth of the state's solar industry. Heightened usage of public-private partnerships is required for the procurement of adequate funding to ensure the securitization of future solar industry development within Arizona.

Measures of Strategic Plan Success

Through its creation of an *Energy Roadmap Subcommittee*, the Arizona Energy Consortium will serve to coordinate the successful implementation of this Strategic Plan. The successful implementation of this Strategic Plan can be determined by the occurrence of a multitude of specified positive outcomes within Arizona's solar industry including:

- Increased job creation and higher-waged salaries for the State's solar workforce resulting from a heightened solar manufacturing emphasis within the state.
- Increased internal economic revenue as a direct result of Arizona's growing solar industry in the form of heightened generation exportation.
- Energy security or self-sufficiency due to a reduction in the nation's reliance on foreign energy sources and increased emphasis placed on internal renewable energies.
- Progressive advances within the solar industry's technology innovation sector.
- Reduced greenhouse gas emissions resulting from increased use of solar energy.

Conclusion

Tomorrow is too late for us all to act to deliver a meaningful solar roadmap for Arizona; the present is the time for an essential collaboration between Arizona's political, financial, and industrial leaders, as well as the Arizona public, to develop Arizona's solar industry. Elevated interest by the State in solar development has been expressed through its creation of a series of committees and working groups that are dedicated to supporting Arizona's solar industry growth, highlighting the importance of the State's investment in the development of its solar industry.

Although much progress is being made, as outlined in the updates to this Strategic Plan, more efforts are needed to successfully promote the development of Arizona's solar industry. At present, Arizona still has a fragmented solar industry based on sector silos, this needs to evolve to a united industry based on collaborative interactions within the industry-at-large. If Arizona is to realize its vision of owning the solar industry, it will need to surpass the efforts made by other states which have implemented strong policies to support the development of their solar energy industries. The successes experienced by others should not deter our State's efforts in development, but rather serve as testimony that such vision will achieve measurable results. By strengthening our State's understanding of these opportunities and implementing these actions, Arizona will turn rhetoric into reality. The AEC will continue to work within the industry to move forward on the implementation of the recommended actions in this Strategic Plan.

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