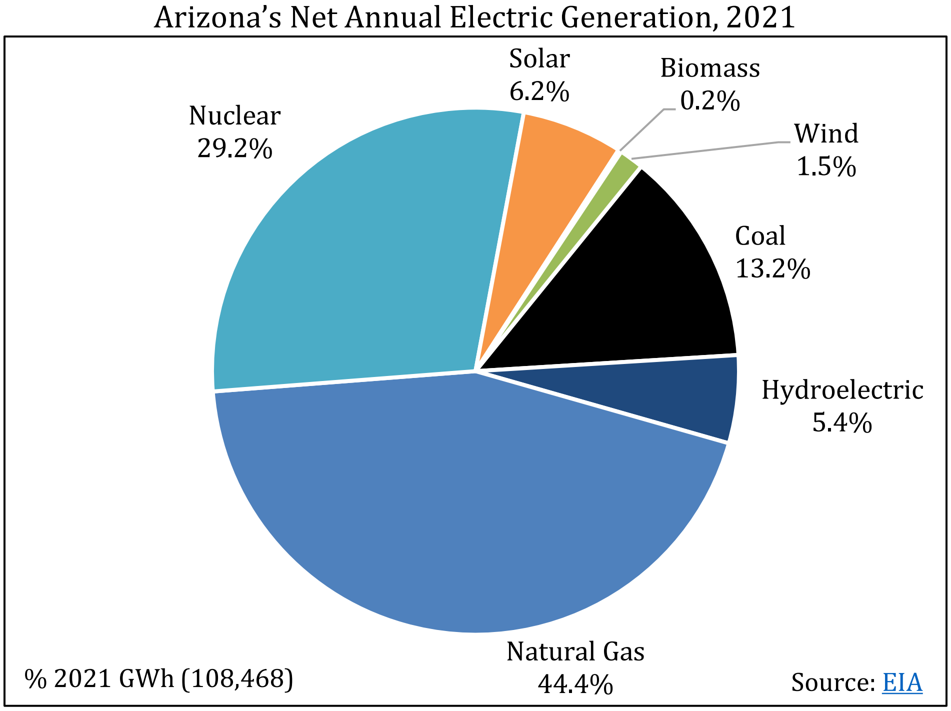
State Brief: Arizona

BACKGROUND

Arizona's net annual electric generation, 2021:



Arizona's electric generating mix is dominated by natural gas, nuclear, and coal. The Palo Verde Nuclear Generating Station[1] is the largest nuclear power plant in the nation and is second only to the Grand Coulee Dam in Washington state in total electric generating capacity. Annually, Palo Verde generates more than 32 million megawatt hours (MWh) of electricity. Arizona's last operating coal mine, Kayenta, located on the Navajo and Hopi reservations, closed in 2019, when its only customer, the Navajo Generating Station, also ceased operations.

The Glen Canyon and Hoover Dams, both located on the Colorado River in northern Arizona, have historically been major sources of hydroelectric generation for the Grand Canyon State. However, in large part due to prolonged drought conditions, hydroelectric generation only comprised about 5% of Arizona's electric generation mix in 2021. In 2021, Arizona ranked fifth in the nation in net generation from solar and is also in the top five in the nation for installed solar capacity. Arizona has the second largest solar energy potential in the U.S. (behind Nevada) and has considerable wind potential along the Colorado Plateau. The state is home to nearly 100 megawatts (MW) of battery storage; the Big Sandy open-pit lithium mining project has been proposed in Northern Arizona. While the state has geothermal resources, it does not yet have utility-scale power plants using geothermal energy.

Arizona's renewable energy standard and tariff (REST) sets a requirement of 15% renewable energy by 2025 for investor-owned utilities and electric cooperatives.[2] A 2020 study of the benefits associated with Arizona's REST found that the standard has led to approximately $2 billion in combined benefits for the customers of Arizona Public Service (APS) and Tucson Electric Power (TEP); $11.62 billion in solar-industry investments; and annual savings of 7,129 acre feet of water.

The 2022 U.S. Energy and Employment Report found that Arizona has 123,508 energy workers (4.2% of total state employment), which includes 41,271 workers employed in energy efficiency. In 2021, Arizona ranked nineteenth nationally for clean energy jobs, with 56,504 Arizonans employed by the industry.[3]

The Arizona Corporation Commission (ACC) regulates 16 electric utilities and six gas utilities. The ACC derives broad authority from the State Constitution to enforce public safety. However, a recent court case redefined and scaled back the Commission's jurisdiction (see below: Mainstreaming Renewables). ACC commissioners are elected, and three of the five members, including Chairwoman Lea Márquez Peterson, are Republicans. A Republican majority controls both chambers of the state legislature, and Governor Doug Ducey is also a Republican.

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[1] The licenses for all three units at Palo Verde will expire by the end of November 2047. Expiration dates: Unit One - 6/1/2045, Unit Two - 4/24/2046, and Unit Three - 11/25/2047.
[2] Electric distribution companies with more than half of their customers outside of Arizona are exempt from the REST.
[3] To see clean energy job numbers for your Congressional District, visit: https://cleanjobsamerica.e2.org/#map.

POLICY STRENGTHS AND OPPORTUNITIES

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[4] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for clean energy technologies. Tier 3, market expansion policies, create incentives and other programs to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

MODERNIZING UTILITIES AND EMPOWERING CONSUMERS

Digital technologies have enabled utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities. These technologies allow a two-way flow of information between the electric grid and grid operators and between utilities and their customers.

Emerging technologies improve system reliability and resiliency by enabling better tracking and management of resources. These technologies allow grid operators to incorporate central and distributed energy resources, energy storage technologies, and electric vehicles, and assist in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency.

On the customer's side of the meter, dynamic pricing, advanced metering infrastructure, and other technologies allow an exchange of information and electricity between a consumer and their electric provider. Grid modernization is associated with greater consumer choice by allowing customers to meet their energy priorities by producing their own energy or through contracting innovative clean energy services from different providers. Grid modernization will require a suite of state and federal policy changes to support advancements in grid technologies, grid management, and utility regulation.

The Infrastructure Investment and Jobs Act of 2021 (IIJA) is a landmark federal spending bill that includes funding earmarked for grid modernization projects. This includes $11 billion for Department of Energy (DOE) grants directed specifically towards electric infrastructure resiliency projects (including grid hardening against severe weather and cybersecurity improvements), $2.5 billion for transmission development, and $3 billion for the Smart Grid Investment Matching Grant Program.[5] Launched in April 2022, Arizona's Infrastructure Investment Jobs Act Task Force will coordinate the state's use of these funds.

Enacted August 2022, the Inflation Reduction Act (IRA) set aside $2 billion in loans for constructing new high-capacity transmission lines and upgrading interties. The bill includes funding for technical assistance and grants for states and tribal governments, which includes assistance for siting transmission projects. The bill also directs DOE

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[4] V.A. Krasko and E. Doris. 2012. "Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions." *National Renewable Energy Laboratory*. Available: http://www.nrel.gov/docs/fy13osti/56428.pdf.

[5] For more information on the grid-related earmarks included in the IIJA, see Potomac Law Group's January 2022 analysis: "The Infrastructure, Investment & Jobs Act of 2021: What's in It for You? (Part V: Grid Infrastructure and Resiliency)" https://www.potomaclaw.com/news-Infrastructure-Investment-Jobs-Act-of-2021-Whats-In-It-For-You-Part-V-Grid-Infrastructure-and-Resiliency.

to undertake interregional transmission planning, modeling, and analysis, including analysis of transmission for offshore wind and the use of grid-enhancing technologies (GETs).[6]

A 2020 analysis by Advanced Energy Economy (AEE) found that $1.5 billion in investments in transmission and grid modernization (including technology and software development for residential and commercial energy management) in Arizona could generate approximately $3.2 billion in Gross State Product (GSP) and create 32,000 new jobs.[7]

There are policies that Arizona's policymakers could adopt to support in-state grid modernization efforts:

1. Require that utilities' integrated resource plans (IRPs) include plans to enhance cybersecurity, integrate distributed energy resources (including electric vehicles and energy storage) and demand response and/or demand-side management (DSM) programs, and measure and report on the results of grid modernization efforts.

2. States might also provide incentives or cost recovery mechanisms for utilities that meet grid modernization goals. Policymakers could consider directing the PUC to evaluate alternative ratemaking mechanisms, performance-based regulation, and/or new utility business models that support grid modernization.

3. Arizona does not have clear policies governing customer data access and privacy protections. To address this, policymakers could develop legislation or rules that, at minimum, do the following: clarify who owns the energy data associated with consumer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible. The state could establish customer access to energy data through the Green Button Connect program, for example. APS offers online services to provide customers with energy consumption data, but it is unclear how this program compares to the Green Button Connect program.

4. State departments of workforce services or their equivalent can be directed to work with utilities and other stakeholders to develop training programs for grid technicians and engineers. With new grid technology and distributed energy systems coming online, a new generation of workers can be trained to meet evolving needs, which will keep jobs local and contribute to economic development.[8]

The adoption of incentives for or a requirement to integrate a certain amount of renewable energy and energy storage on the grid alongside enhancing energy conservation and electric vehicle policies can support modernization efforts.

MAINSTREAMING RENEWABLES

Renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices for integrating distributed renewable energy resources. In the U.S., the expansion of renewable energy has been one of the most consequential shifts in electricity generation over the last decade. The U.S. Energy Information Administration (EIA) predicts that most of the growth in U.S. electricity generation in 2022 and 2023 will be from new renewable energy sources. It is in the interest of policymakers to ensure that their states are well positioned to benefit from this shift.

While the IIJA does not provide money for specific renewable energy projects, the energy funding in the Act will benefit renewable energy development as grid resiliency, increased deployment of energy storage, and modernized

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[6] J. Runyon and J. Engel. 2022. "The Inflation Reduction Act is Signed into Law." *PowerGrid International*. 16 August. Available: https://www.power-grid.com/td/the-inflation-reduction-act-is-signed-into-law/#gref.

[7] P. Hibbard and P. Darling 2020. "Economic Impact of Stimulus Investment in Advanced Energy: An Economic Assessment of Applying Stimulus Funds to Advanced Energy Technologies, Products, and Services in Arizona." *Analysis Group for Advanced Energy Economy*. October. Available: https://www.aee.net/aee-reports/advanced-energy-state-economic-impact-reports-for-2020.

[8] For a discussion of specific workforce needs states might explore see: GridWise Alliance and U.S. Department of Energy. 2020. "Grid Modernization Index Insights into a Transformation: Principles for the Next Decade of Progress."

transmission are all essential to the successful integration of renewable energy generation. The IRA appropriated $369 billion to fund a variety of energy and climate initiatives – the largest climate investment in U.S. history. The bill also extended the investment tax credit (ITC) and the production tax credit (PTC) through the end of 2024 and revived the PTC for solar projects. For projects placed in service in 2025, the bill "effectively extended" the ITC and PTC by creating new tax credits for zero emission facilities. The bill also extended the residential energy property tax credit through 2034 and created a new advanced manufacturing production credit, to apply to sales of components for constructing wind and solar energy facilities beginning in 2023. [9]

The IRA also includes several provisions related to energy equity, including $3 billion to the Environmental Protection Agency (EPA) for grants for community-led projects in disadvantaged communities and $27 billion for nonprofit, state, and local climate finance institutions supporting the deployment of low- and zero-emission technologies. In support of rural communities, the bill includes a $1 billion appropriation to the U.S. Department of Agriculture (USDA) for loans to finance renewable energy projects, $1 billion for USDA's Rural Energy for America Programs, and $9.7 billion to USDA to finance rural electric cooperatives' purchases of renewable energy.

A 2020 analysis by AEE found that a $3 billion investment in solar and a $750 million investment in wind energy resources in Arizona could add approximately $17 billion to the GSP and create 110,000 new jobs.[7]

To reduce barriers to customer and utility participation in the renewable energy market, and to build upon the federal initiatives, policymakers in Arizona might consider several options.

Customer-Oriented Policies

1. **Interconnection, Net Metering, and Streamlined Permitting –** In general, customers want a clear, streamlined, affordable, and predictable process for connecting renewable energy systems to the grid. At the end of 2016, the ACC voted to eliminate conventional retail net metering, lower the credit residential solar customers receive for excess energy sent back to the grid, limit how long customers can keep their rates, and establish a separate rate class for solar customers. Arizona's policymakers could consider crediting net excess generation at the customer's full retail rate. Allowing aggregated net metering would be especially beneficial to the state's agricultural sector. Other applications for aggregated net metering include commercial properties and public entities like state and local governments, universities, and schools. The state might consider enhancing existing permitting standards to provide for streamlined permitting processes. Alternatively, the state might consider providing resources to support local governments that voluntarily implement a streamlined program.

   In May 2021, NREL launched the SolarAPP+, an online platform designed to automate the solar permitting process. By running compliance checks and processing permit approvals, the service is intended to drastically reduce permit wait times. Currently restricted to rooftop solar, twenty communities in Arizona and California have adopted the platform, processing over 7,750 permits for more than 51 MW of generation with an estimated 7,750 hours saved in permit review time.

2. **Shared Renewables –** Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the generation provided by the system. Arizona does not have a state policy to require shared renewable projects, but individual utilities, including APS and TEP, offer community solar programs. To support program participation, Arizona could consider adopting a policy that requires the development of shared renewable energy projects. For example, Minnesota's Solar Energy Jobs Act required that utilities purchase output from community solar gardens no larger than 1 MW per site and requires compensation at a value of solar tariff.[10]

   The state might also consider adopting a virtual net metering policy. Virtual net metering allows a customer to

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[9] For a detailed discussion of the IRA's tax provisions, see: A.S. Levin-Nussbaum. 2022. "Update: President Biden Signs Historic Legislation Providing Expansive Clean Energy Tax Incentives." *The National Law Review*. 17 August. Available: https://www.natlawreview.com/article/update-president-biden-signs-historic-legislation-providing-expansive-clean-energy

[10] Compensation for distributed generation will default to the retail rate until the Minnesota PUC approves a value of solar tariff.

receive credits from a shared system as if the generation were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays the customer for the proportion of power they produce. Because this is treated as a "credit" on the customer's bill, the customer can avoid the tax implications of a PPA payment – which can adversely affect the economics of the system (and may come as a surprise to the participant).

Low credit ratings often deter participation in renewable energy markets; this can affect low- and moderate- income (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to encourage participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. LMI participation can be encouraged either through a percentage mandate for the overall annual contracted capacity, or by offering a higher rate of payment for the portion of shared solar capacity attributed to LMI customers. States that have a shared renewable program may want to coordinate this program with implementation of the federal Weatherization Assistance Program (WAP) to provide recipients of assistance with access to participation in a shared system.

3. **Adapt Energy Assistance Programs –** Programs such as the Low-income Home Energy Assistance Program (LIHEAP) and WAP provide assistance for paying utility bills and reducing household energy costs. Including distributed energy resources as eligible for funding under these programs can reduce energy costs and increase energy security for those LMI families who are able to benefit from WAP and LIHEAP. Colorado, for example, includes rooftop solar in their WAP program. For approval to add solar to a state's implementation of WAP, a state must show that the investment would be cost-effective – achieving a Savings to Investment Ratio (SIR) of 1.0 or more.[11] Since 2010, Arizona has received $17.5 million from WAP and $8.2 million from the State Energy Program (SEP), which has helped fund a number of energy initiatives in the state.

4. **Fund Distributed Generation (DG) for Community Organizations –** Organizations or groups that provide support services for LMI communities can be provided funding to install solar or other distributed energy resources. Sites such as homeless shelters, food banks, clinics, and community centers often have enough rooftop area for solar installations. After installation, these resources can reduce an organization's utility bills, freeing up funds for other activities that support the community.

5. **On-Bill Financing/Pay As You Save (PAYS) –** On-bill Financing and Repayment programs enable consumers to invest in energy upgrades with no upfront payment. The utility or a third party will pay the initial costs to install the upgrade with the cost of that upgrade recovered through the utility bill. Because repayment includes consideration of the cost savings resulting from the energy upgrade, customers can see monetary benefits almost immediately. Once equipment costs are recovered, the equipment belongs to the customer. State policies that reduce lending risk by creating a loan loss reserve and/or a credit enhancement fund can encourage lending to customers that might otherwise not qualify for a loan and can keep interest rates low.

6. **Corporate Procurement –** Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Since 2016, over 41 gigawatts (GW) of renewable contracts have been announced by corporate entities. In 2020 alone, corporations signed 100 agreements for over 10 GW of renewable energy. To increase corporate access to renewable energy, the state could consider allowing companies to purchase renewable energy credits or renewable energy through green tariffs. Green tariffs allow customers to source their electricity from renewable sources through a fixed rate. In 2019, the ACC adopted a policy statement requiring regulated utilities to propose alternative generation buy-through programs for larger commercial and industrial customers. Arizona's policymakers might also consider allowing companies to enter into onsite third-party PPAs which are currently restricted by the ACC to schools, governments, and other nonprofit entities. In addition, it is prudent to incorporate corporate renewable purchase commitments into the IRPs that utilities submit to regulators to plan for resource needs over multiple decades. By integrating these renewable purchase commitments into the IRP process, utilities can avoid over-building resources and stranding generation assets.

[11] For guidance on the state approval process, see WAP Memorandum 024 (2017), the Solar Template for Incorporating Solar Photovoltaics into WAP, and the Preliminary Assessment Guide for Integrating Renewable Energy into Weatherization (2019).

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas (GHG) emissions and increase investments in clean energy resources. Utilities are also setting their own GHG reduction goals and are increasingly investing in clean energy resources. In 2006, the ACC adopted rules to expand Arizona's Renewable Energy Standard to require investor-owned utilities and electric cooperatives serving retail customers in Arizona to obtain renewable energy credits from eligible renewable resources to meet 15% of their retail electric load by 2025 and thereafter.[12] While the ACC is authorized by the state Constitution and prior case law to impose clean energy requirements on utilities, a recent court case weakens the ACC's jurisdiction in non-ratemaking cases. In July 2020, the Supreme Court of Arizona issued a ruling which recognized the ACC's authority to appoint an interim manager to operate Johnson Utilities due to public health concerns arising from existing management.[13] In its decision, the court affirmed the ACC's ability to enforce public safety rules as part of its constitutional "permissive" authority, which can be superseded by the legislature. The court disagreed with the ACC that overtaking utility operations fell within its "ratemaking" authority, in which the ACC has exclusive jurisdiction. The ruling also declared that previous cases broadly construing ratemaking authority, such as an appellate case affirming the ACC's ratemaking authority to adopt the Renewable Energy Standard, were made in error. The new case law might create a space that allows the legislature greater authority to update renewable energy policies.

In May 2021, the ACC voted against its proposed clean energy rules that would have set a 100% clean energy target for the state by 2050 and extended the energy efficiency standard, ending a three-year collaborative process that had seemingly broad support from utilities and stakeholders. However, the state's two largest IOUs have set their own targets. TEP has a goal of 70% renewable energy by 2035 and APS has a 65% clean energy by 2030 target and a 100% clean energy by 2050 goal.

To increase utility adoption of clean energy technologies, Arizona's policymakers might consider the following:

1. **Accelerating and Amending Renewable Portfolio Standards –** States can revisit existing RPS policies to increase targets to continue to spur the development of renewable resources and save ratepayers money. Additionally, states might add one or more carve-outs to incentivize the development of distributed generation. Embedding an RPS within a broader clean electricity or emissions standard can allow technological flexibility.

2. **Emissions Standards** – Emissions targets can take a technology neutral approach that looks at the total emissions of the utility portfolio and drives emissions down with a combination of renewables, traditional fuels, efficiency, and technological advances. Emissions reductions can be achieved through 1) a carbon portfolio standard approach, or 2) a market-based approach. A portfolio emissions standard sets emissions reduction targets to be achieved over time. This can be implemented through the IRP process or by establishing a maximum allowable rate of emissions per unit. Under a market-based approach, a state or a group of states might set a certain emissions reduction target, for example, 50% below 2005 levels by 2030. This reduction is achieved by the distribution of annual emission allowances that decrease to the point that the standard is met in 2030. One of the advantages of a market-based program is that it is designed to reduce emissions in the most economically efficient manner possible. Such a standard can also address other concerns such as pollution, asthma risk, environmental justice, and water use.

3. **Clean Peak Standards (CPS) –** In January 2018, Arizona became "one of the first states to propose a Clean Peak Standard." The effort to establish a clean peak standard for the state ended when the ACC voted down proposed clean energy rules in May 2021. Clean Peak Standards aim to increase the share of clean energy resources used to meet peak demand and decrease energy bills over the long-term by reducing peak demand in the hours when energy costs are highest. These objectives can be met through different policy options, including planning and procurement that focuses on peak demand; a moratorium on the construction of new peaking units or a phase out of existing units; incentives – including carve-outs in states with RPSs – for clean energy resources delivered

[12] Of this percentage, 30% (i.e., 4.5% of total retail sales in 2025) must come from distributed renewable resources by 2025. Half of the distributed renewable energy requirement must come from residential applications and the remaining half from non-residential, non-utility applications.

[13] Johnson Utilities vs. Arizona Corporation Commission et al., Case No. CV-19-0105-PR. 31 July 2020.

during peak times; and/or adopting a new clean peak standard that sets a target for clean energy deliveries during peak times.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while also maximizing the value of grid resources. By deploying storage to strategic locations, utilities can more effectively manage their energy portfolios. First, storage allows utilities to manage intermittent demand – helping reduce peak demand requirements. Because the generation resources that provide peak power are the system's most expensive, reducing peak demand can save consumers money. Second, the responsiveness of energy storage can allow utilities to implement voltage regulation and other ancillary services, which improve system efficiency. Third, because storage technologies can both store and dispatch power, storage enables better integration of intermittent power generation resources, like wind and solar, to the grid.

The flexibility of battery storage combined with advanced metering infrastructure can allow customers to control how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than standalone solar systems. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can also lead to a number of economic and environmental gains.

Energy storage can also help the commercial sector avoid demand charges, which establish an incremental cost above energy usage based on the highest period (highest 15 minutes, for example) of demand during the month. Eliminating spikes in demand with storage can reduce these costly charges for businesses. As utilities around the country consider implementing or extending demand charges to other sectors, energy storage will become more relevant as both a customer cost-saving investment and a system efficiency measure.

Declining costs and technological advancements in battery storage have contributed to increased deployment. State policies can further encourage this by establishing both a framework for easy integration of energy storage resources onto the grid and a marketplace that monetizes the benefits of energy storage for cost-effective investment.

Arizona does not have an energy storage procurement target or goal. In November 2019, the ACC approved new interconnection rules to standardize and fast-track the interconnection of distributed generation, including storage technologies. In 2020, the ACC approved the state's first residential storage pilot program, offering incentives of $500/kilowatt (kW) of installed energy storage, up to $2,500 total for APS consumers. A modification to the pilot program was approved in 2021 to include an additional one-time $1,250 incentive for participants who allow APS to access up to 80% of the consumers' home battery capacity up to 100 times a year for grid support.

Utilities in the state have developed their own energy storage projects. For instance, APS installed its first two grid-scale batteries in 2017. In February 2019, the utility announced plans to install 850 MW of energy storage by the mid-2020s, which, at the time, was hailed as potentially "the largest amount of announced storage by a utility to be deployed in such a short period of time [(six years)] in the U.S." In October 2018, the Salt River Project (SRP) teamed up with researchers from NREL to study the value of distributed storage and encourage installation by offering incentives to 4500 customers to enroll a qualifying system in the study. In 2021, SRP completed the state's first standalone energy storage plant for peak power, supplying 25 MW of 4 hour storage.

The IIJA provides a unique opportunity to fund energy storage projects. According to an analysis by the Energy Storage Association, the IIJA provides $505 million for grants to support energy storage demonstration projects, $6.15 billion for building out the U.S. battery supply chain, and $14.7 billion for grid resilience programs that include energy storage as a qualified technology. The IRA extended the ITC to include standalone energy storage systems. When the ITC is replaced by the technology neutral Clean Electricity Investment Tax Credit (CEITC) in 2025, qualified storage facilities placed in service after 2024 will remain eligible. The advanced manufacturing production credit, established by the bill, will apply to battery cells and modules and the critical minerals used in their production. The $27 billion GHG Reduction Fund, also established by the bill, will provide funding enabling low-income or disadvantaged communities to adopt zero-emission technologies including energy storage.

A 2020 analysis by AEE found that a $2.25 billion investment in energy storage in Arizona could add approximately $5.9 billion to the GSP and create 59,000 new jobs.[7]

There are several policy opportunities to take advantage of the growing technological advances in and declining costs of energy storage and build upon federal initiatives. The recommendations here draw heavily from the Interstate Renewable Energy Council's (IREC) 2017 report, "Charging Ahead – An Energy Storage Guide for Policymakers." Policymakers in Arizona could consider the following:

1. Evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it is cost-effective or identify the price point at which it will be cost-effective. Ensure that cost-effectiveness calculations include all the benefits storage can deliver to the system, including frequency regulation and avoided investments in new infrastructure.

2. Require the inclusion of energy storage as a critical piece of the energy system as both a demand and supply management resource. Some states have required that utilities evaluate the cost effectiveness of non-wires alternatives (NWAs) to large transmission and generation investments. Alternatively, states might want to require that utilities develop a distribution investment plan that identifies the locations on the distribution system where energy storage or other distributed resources would offer the greatest value.

3. Consider creating a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can limit the amount of utility-owned storage; require that a certain amount of storage be targeted to low-income customers; and create carve-outs for storage at the transmission, distribution, and customer levels. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

4. Finance and incentivize energy storage for customers and utilities. Incentives could enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment of storage. Incentives can be designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide incentives to customers to recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This could also signal to customers the value of leveraging storage and better align customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects. Policy might also target solar system owners. Financial incentives should be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

5. Clear data access policies that allow third parties to provide energy management services based on signals from the utility can greatly increase the value of efforts to monetize the value stream offered by energy storage. State policy should include measures to protect customer data, while also encouraging the use of this information to facilitate additional improvements to grid management and customer services. To address this, policymakers can develop legislation or rules that clarify who owns the energy data associated with customer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible.

THE BUILT ENVIRONMENT

In the U.S., buildings consume nearly 40% of total energy used.[14] Because it reduces energy demand and emissions, and creates savings for utility customers, energy efficiency[15] often plays a prominent role in state energy and climate policies. Coupled with beneficial electrification, which involves replacing direct fossil fuel use with electricity, there is even greater potential to reduce energy costs and pollution, and provide more resilient,

[14] For additional information, see ACEEE Building Policies and Codes.

[15] Energy efficiency includes a multitude of measures to reduce the energy consumption of a building. These measures range from installing energy efficient appliances to full building renovations updating a building envelope.

comfortable, and healthy buildings. This is especially the case in states where increasing levels of low carbon resources are supplying the electric grid. When policies are adopted to shift energy uses based on fossil fuels (such as natural gas) for building heating, water heating, and appliances, to highly efficient electric alternatives, states can maximize achieving the dual objectives of increased energy efficiency and reduced emissions. In some cases, this can also result in lower energy costs.

As a home rule state, building energy codes are adopted by local governments in Arizona. However, the state has taken steps to incorporate energy efficiency and beneficial electrification into its built environment. In February 2022, the ACC approved, with modifications, the IRPs submitted by APS and TEP. As part of this approval, the ACC required that both utilities meet an Energy Efficiency Resource Standard (EERS) of 1.3% annual savings between 2021 and 2023. The ACC has allowed full revenue decoupling for Southwest Gas since 2011, lost revenue adjustment mechanisms for electric utilities since 2012, and energy savings performance incentives for APS and TEP.

The IIJA provides $500 million for grants to fund energy efficiency and renewable energy upgrades in public schools, $3.5 billion for the Weatherization Assistance Program, and further funds the Energy Efficiency and Conservation Block Grant program by $550 million and the State Energy Program by $500 million. The IRA appropriates $4.3 billion to DOE for an energy efficiency rebate program that will be administered through state energy offices. Another $4.3 billion appropriation will fund electrification rebates for single- and multi-family homes. The bill also extends the tax credits for residential energy efficiency improvements and new efficient home construction and increases the maximum deduction for energy efficient commercial buildings. A $837.5 million appropriation will be used by the Department of Housing and Urban Development (HUD) for resiliency, energy efficiency, renewable energy, and grid integration projects at public housing units.

A 2020 analysis by AEE found that a $3.75 billion investment in energy efficiency in Arizona could add approximately $172 billion to the GSP and create 1 million new jobs.[7]

Policymakers in Arizona can consider a variety of policies to encourage energy efficiency and beneficial electrification:

Energy Efficiency Policies

1. **Building Codes –** The Department of Energy projects that, over time, improvements in building codes can have the greatest single impact in energy efficiency within the built environment. On average, commercial buildings waste 30% of energy used.[16] Because buildings will be around for generations, energy efficiency within the built environment is a matter of statewide and long-term importance. States can set requirements for energy systems, require disclosure of energy use, and set performance standards for energy use or emissions. Building codes can be required by state legislation or implemented through 'home rule,' where local governments set their own standards. As noted above, Arizona is a home rule state, but the legislature could explore adopting policies to incentivize energy efficient buildings.

   The IIJA appropriated $225 million for a competitive grant program to support the "sustained cost-effective implementation of updated building energy codes." The grant program will run for five years, through fiscal years 2022 – 2026. On July 21, 2022, DOE issued a Notice of Intent (NOI) to publish a funding opportunity to support the implementation of "resilient and efficient" building energy codes. This competitive grant program requires the participation of a "relevant state agency" and projects must be tied to "an updated building energy code."

2. **Appliance Efficiency Standards** – Appliance efficiency standards set minimum requirements for efficiency in everything from washing machines to water heaters. Efficiency standards save consumers money on utility bills and reduce energy demand on the grid, most importantly reducing peak energy demand. Some states have elected to adopt the federal appliance efficiency standards that were in effect on January 1, 2017.[17] These include among other things, standards on metal halide lamp fixtures, residential furnaces and boilers, and external AC

[16] For more information, see the Office of Energy Efficiency & Renewable Energy's Commercial Buildings Integration (CBI) Program.
[17] Based upon research conducted by the Center for the New Energy Economy.

to DC power supplies. While Arizona has adopted appliance efficiency standards, policymakers could consider expanding these.

3. **Energy Saving Performance Contracts (ESPCs)** – ESPCs are a financing mechanism for energy efficiency upgrades. ESPCs are often used within large institutions, such as college or government campuses, allowing them to meet their energy and environmental goals. An energy service company will pay the upfront cost of efficiency upgrades and execute the project, often guaranteeing the projected energy savings. The large institution will then pay back the service company with savings from their utility bills. This allows institutions to pay for their upgrades from their operating budget, instead of finding new financing, such as loans or bonds, for capital upgrades. Essentially, they pay their upgrade costs with their energy savings.

4. **Low-Income Energy Efficiency Programs –** While equity should be incorporated into all policy development, it is often necessary to ensure that specific programs are targeted towards historically underserved populations. Recent research suggests that weatherization can reduce energy use by 25-35%, allowing households to reduce their financial energy burden. The federal Weatherization Assistance Program (WAP) provides energy efficiency upgrades for income-qualified homeowners. However, in many states there is difficulty in reaching individuals who may be eligible. Lawmakers can pass legislation requiring outreach and education to groups eligible for WAP. Arizona's LIHEAP program currently offers assistance with energy bill payment, energy crises, and residential weatherization.

5. **Energy Efficiency Resource Standards (EERS)** – EERS require utilities to demonstrate a reduction in energy demand from programs offered to their consumers. Because this means selling less energy and reducing revenues, there is not always an incentive for utilities to make their consumers more productive or efficient users of energy. If legislatures want to ensure a more productive and efficient energy distribution system that takes advantage of the latest technological innovations, they may want to require that a utility demonstrate a percent reduction in demand through efficiency or "demand side" programs. Legislators can also instruct their utility commissions to consider energy efficiency when approving rate cases by allowing cost-recovery of energy efficiency improvements on utility bills.

   In February 2022, the ACC approved, with modifications, the IRPs submitted by APS and TEP. As part of this approval, the ACC required that both utilities meet an EERS of 1.3% annual savings between 2021 and 2023.

6. **Revenue Decoupling and Performance-Based Incentives** – Utilities earn revenue by selling energy. As a result, there is little to no incentive for them to promote energy efficiency because it leads to a reduction in sales, and therefore a reduction in revenue. Revenue decoupling disconnects revenue from the amount of energy sold. This provides utilities a set amount of revenue regardless of the amount of energy sold. While this does not directly incentivize energy efficiency, it does remove the inherent disincentive to promote energy efficiency.

   Incentive policies can be layered on top of a decoupling policy. For example, if a utility meets set energy reduction targets, performance-based incentives, as determined by a state's PUC, can provide monetary rewards for meeting those targets. Arizona allows decoupling and provides performance-based incentives, as noted above, as the electricity generation mix changes however, it is important to incorporate a regular review of decoupling and other incentive policies to ensure they are still meeting their intended purpose.

Electrification Policies

1. **Strategically Target Beneficial Electrification** – Target areas of beneficial electrification in buildings include space and water heating systems and other systems and appliances that typically use natural gas or another fossil fuel as an energy source. According to the Environment and Energy Study Institute, new electric heat pump technology can heat space and water at efficiencies of 200 to 300%, compared to 67% efficiency in typical Energy Star gas water heaters.[18] This not only allows savings on energy bills, it also results in reduced greenhouse gas emissions and improved indoor air quality.

[18] For more information, see EESI's Beneficial Electrification.

2. **Adopt Tools for Advancing Electrification Policies** – Building codes and financial incentive programs can be used to advance beneficial electrification. While in some states, local governments are primarily responsible for adopting and implementing building energy codes, in other states, a state legislature, or a code commission tasked by the legislature, adopts and implements statewide standards. Incentive programs established and implemented by states, local governments, or utilities can target replacing systems and appliances that traditionally rely on fossil fuel resources with high efficiency electric systems and appliances including water heaters, furnaces, ovens, and ranges. As an example, heat pump water heaters and space heating systems are being promoted as high efficiency replacements for traditionally fossil-based equipment. In conjunction with utility regulatory policy, these technologies can also serve as demand response management tools by utilities in exchange for compensation to the ratepaying customer.

   As a note, cities across the country are implementing new building codes promoting beneficial electrification by limiting or banning the installation of natural gas in new construction. State legislatures can pass enabling legislation, allowing municipalities to make independent decisions on beneficial electrification. On the other hand, some states have adopted pre-emptive legislation, banning local governments from adopting policies that limit utility service.[19]

Programmatically, there will always be greatest benefit by combining measures – incentives that bundle improvements will generate greater gains than individual measures. For example, a high efficiency heat pump will be much more effective and efficient when coupled with improved building insulation. Rather than only realizing the gains of the new mechanical component, this combination of measures will increase the efficiency of the entire system.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that nearly 80% of new car sales will be electric by 2040. Therefore, a key part of building a modernized grid involves designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid. One of the most important barriers to increased adoption of EVs is the consumer's awareness of the availability of EV charging stations. Ultimately, drivers want to be sure that their car will get them where they need to go. The good news is that both supportive policies for developing charging infrastructure and technological advancements have eased this "range anxiety."

Arizona offers some incentives for the owners of EVs, including a high occupancy vehicle lane exemption, a preferential parking incentive, and a reduced license tax. APS, SRP, and TEP offer rebates and charging rate incentives for plug-in EVs.

In December 2021, the ACC approved a comprehensive Transportation Electrification Plan, which requires regulated utilities to file EV proposals every three years and submit annual progress reports on their efforts at facilitating EV adoption. Based on a medium adoption scenario (1,076,000 EVs on the road in Arizona by 2030), the report finds that implementing the vehicle electrification plan could provide $9 billion in benefits to EV purchasers in the state by 2040, $12 billion to electric utility consumers through downward pressures on rates, and $28 billion to Arizona as a whole through reduced emissions and gasoline consumption.

The American Council for an Energy-Efficient Economy (ACEEE) published a State Transportation Electrification Scorecard in 2021 that evaluates states' progress in electrifying transportation in six key policy areas and offers nationally applicable policy recommendations. Arizona ranked 25th out of the 31 states evaluated in this report.

The IIJA provides nearly $5 billion over the next five years to support the electrification of the transportation sector. In 2022, $615 million will be made available for the installation of charging stations along designated alternative fuel corridors. The Act also provides approximately $1.1 billion for grants to state and local governments to assist with the purchase or lease of low- or no-emission vehicles for transportation fleets. To be eligible, a state must have a Zero-Emission Fleet Transition Plan in place.

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[19] See, "Battle Brews over Banning Natural Gas to Homes." The Wall Street Journal, 1 June 2021, https://www.wsj.com/articles/battle-brews-over-banning-natural-gas-to-homes-11622334674.

The IRA extended the $7,500 EV tax credit for purchases of new plug-in EVs through 2032 and removed the eligibility cap based on number of vehicles sold by manufacturers. The Act includes requirements for material sourcing that must be met by manufacturers starting in 2027. The IRA also created a new $4,000 refundable tax credit for the purchase of used EVs and a new credit for commercial EVs. Appropriations in the Act include $1 billion for replacing medium- and heavy-duty vehicles with EVs, $3 billion to fund projects to reduce transportation sector emissions, and $3 billion to procure alternatively fueled vehicles for the federal fleet.

A 2020 analysis by AEE found that a $3 billion investment in EVs including financial incentives to reduce up-front costs of purchases and state support for charging infrastructure deployment in Arizona could add approximately $9.9 billion to the GSP and create 383,000 new jobs.[7]

There are opportunities to expand the market for EVs in Arizona:

1. **Charging Infrastructure Plan** – Locating charging infrastructure is different from locating conventional fueling stations. While some drivers will need to charge more quickly, others will refuel when they are parked for longer periods of time, for example when shopping at the mall or going to work. Charging infrastructure plans should attempt to pair the appropriate level of charging (level 2 or direct current fast charging) with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process. Arizona's existing license tax for EVs could help fund these efforts.

   The IIJA included a new National Electric Vehicle Infrastructure (NEVI) formula grant program to provide dedicated funding to states to deploy charging infrastructure with the goal of creating an interconnected network of vehicle charging stations across the nation's highways. To be eligible to receive funding, states must develop and submit a NEVI plan to the Federal Highway Administration (FHWA) by August 1, 2022. NEVI funds cannot be obligated until a state's plan is approved by the FHWA. The Arizona Department of Transportation developed a draft NEVI state plan to coordinate the use of Arizona's expected allocation of $76.5 million in formula funding from the IIJA.

   Regional collaborations around the U.S. are coordinating the development of EV infrastructure. In December 2019, Governor Ducey signed the revised Intermountain West EV Corridor Memorandum of Understanding (MOU).[20] The mutual intention of the signatories (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming) is to update the Regional Electric Vehicle Plan for the West (REV West Plan) based on progress to date. The goals of the multi-state effort are to reduce transportation sector carbon emissions, bolster EV adoption, increase consumer awareness about the benefits of EVs, coordinate development of charging infrastructure, and incentivize manufacturing of EVs.

2. **Parking Infrastructure Requirements** – In tandem with the development of a statewide plan, legislation could set requirements for parking lots and other infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. These locations supply power to the point where a utility or third-party developer might install an EV charging station.

3. **EV and Charging Equipment Financing and Financial Incentives** – Providing financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing the high up-front costs of EVs and EV charging equipment. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers, as the credit is not applied at the time of purchase.[21] States have adopted other financial incentives including low-interest loans, grants, vouchers, and rebates. A handful of states qualify EV charging equipment under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

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[20] Governor Ducey signed the original Intermountain West EV Corridor Memorandum of Understanding (MOU) in 2017.
[21] A study by the Congressional Research Service suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

States might consider adopting programs to incentivize the purchase of used EVs. With increasing battery capacities and falling prices, there are an increasing number of EVs with relatively low milage that are being traded in. States might also consider programs that target low- and moderate-income (LMI) customers that may not qualify for a loan directly. Such a program could facilitate sales through such things as loan loss reserve and interest buy down programs.

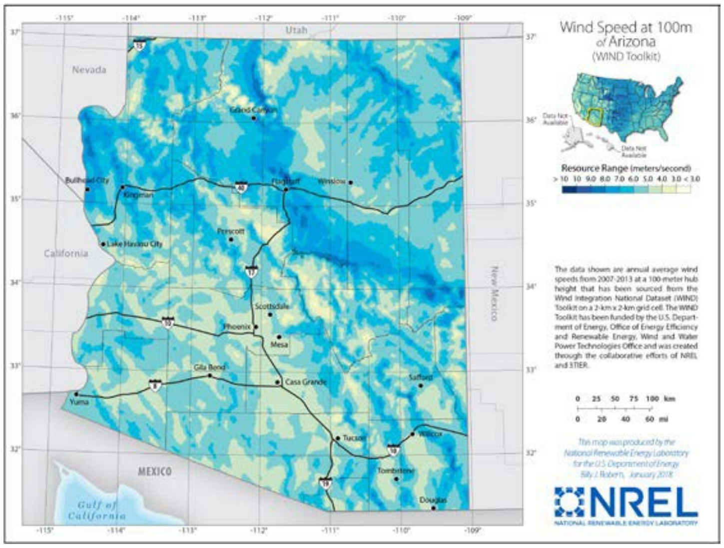
NEWS

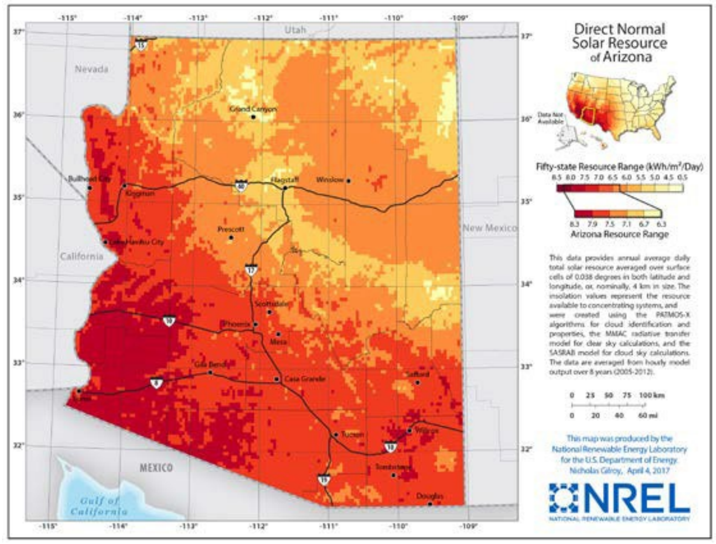
- September 1, 2022: Western Utilities to Share Capacity under Proposed Resource Adequacy Program
- August 31, 2022: Los Alamos-Led Federal Rapid Response Team to Support Four Corners Energy-Based Communities
- August 11, 2022: BLM Approves 250-Megawatt Solar-Plus-Storage Project in Arizona
- July 20, 2022: Arizona Utility Groups Sign PPA for 300MW/600mwh Solar-Plus-Storage Power Plant
- July 14, 2022: Biden-Harris Administration Approves Clean Energy Transmission Project in Arizona and California with Potential to Lower Costs for Consumers
- June 29, 2022: Solving Renewable Energy Challenges with a New Kind of Nontoxic Battery
- May 31, 2022: Southwest Megadrought Pushes Hydropower to the Brink
- May 27, 2022: Here's Why Sustainability Innovators are Planting Roots in Arizona
- May 17, 2022: Why Boulder County and Flagstaff are Enlisting Cities to Suck Carbon Out of the Atmosphere
- May 12, 2022: Arizona Energy Providers, State Universities Join Forces to Pursue a Carbon-Neutral Economy
- April 29, 2022: Arizona Public Service Asks Court to Reverse ACC Cost Recovery, ROE Decisions
- April 20, 2022: ICYMI: Secretary Granholm Traveled to Arizona and Nevada to Highlight Rural Investments in Clean Energy
- April 13, 2022: Arizona Regulators Deny SRP Gas Plant Expansion, Citing Community Impacts and Insufficient Supporting Evidence
- February 2, 2022: Appeals Court Decision Opens Door to Sue Public Power Utilities for Rooftop Solar Fees Under Antitrust Law

OTHER RESOURCES

- The American Council for an Energy-Efficient Economy State and Local Policy Database, Arizona: https://database.aceee.org/state/arizona
- The Database of State Incentives for Renewables and Efficiency, Arizona: https://programs.dsireusa.org/system/program/az
- U.S. Energy Information Administration, Arizona: https://www.eia.gov/state/?sid=AZ
- U.S. Department of Energy's Alternative Fuels Data Center, Arizona: https://afdc.energy.gov/states/az
- American Clean Power Association, Arizona State Fact Sheet: https://cleanpower.org/wp-content/uploads/2022/07/Arizona_clean_energy_factsheet.pdf
- SPOT for Clean Energy, Arizona: https://spotforcleanenergy.org/state/arizona/

ARIZONA'S WIND AND SOLAR RESOURCES
WIND https://windexchange.energy.gov/states/az





Our Resources

CNEE Homepage: https://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker:
https://www.aeltracker.org/

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