

Sandia Report  
SAND2019-11175 C  
Unlimited Release  
September 2019



Sandia  
National  
Laboratories

# Energy Storage Policy Summaries For The Global Energy Storage Database



# States Highlighted

Arizona

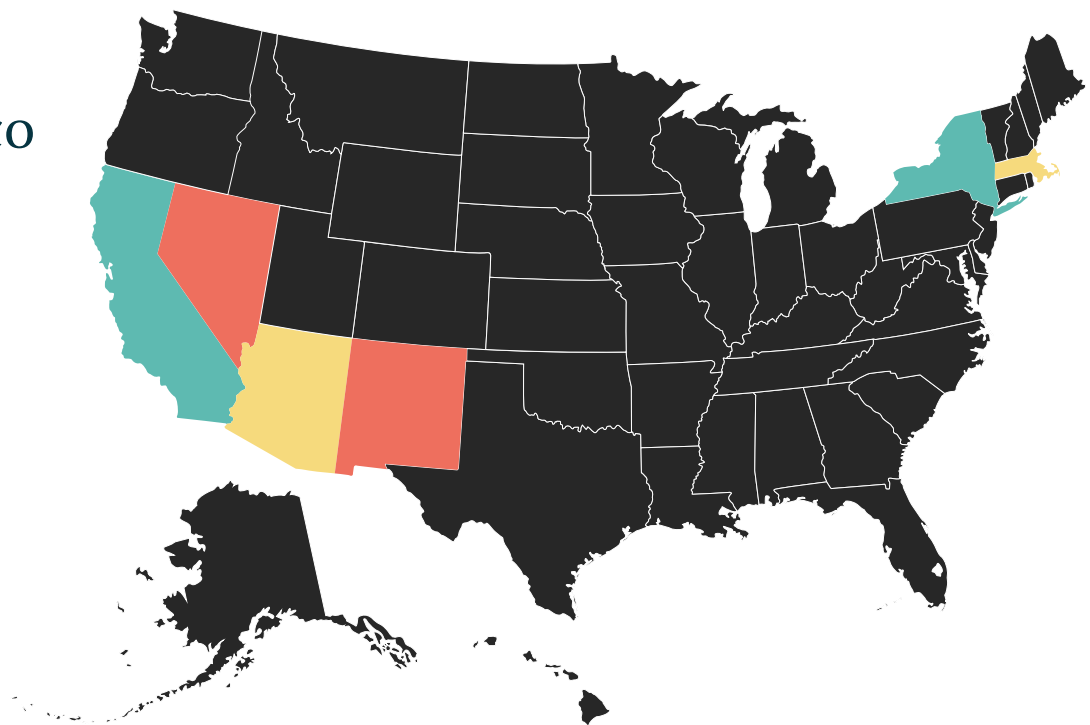
California

Massachusetts

Nevada

New Mexico

New York




# Abstract

This report includes energy storage policy analysis from six states: Arizona, California, Massachusetts, Nevada, New Mexico, and New York. These summaries offer prototypes for summaries that will subsequently be prepared for all 50 states (and territories). There is presently a shortage of comprehensive energy storage policy analysis that public utility regulators can call upon to inform policymaking in their own jurisdictions. The state policy summaries that will be offered publicly on the Global Energy Storage Database (GESDB) will include analysis on the executive directives, legislation, regulations pertaining to energy storage that have been adopted by an individual state, along with perspective on the remaining policy issues pertaining to storage that a state will be likely to address in the future. It is anticipated that public utility regulators in particular will find the database to be a useful resource in benchmarking policy approaches critical to the continued development of an energy storage marketplace in the U.S., including policy approaches specific to storage and renewables procurement targets, interconnection standards, valuation of energy storage, rate reform and tariff design specific to energy storage, consideration of multiple uses for storage at the distribution level, and potential revisions to existing state net metering programs to accommodate an expected growth of energy storage technologies.



# Table of Contents

Arizona	3
California	7
Massachusetts	10
Nevada	12
New Mexico	16
New York	18



# Arizona



Does Arizona have an renewables mandate?	YES; 15 percent by 2025
Does Arizona have a state mandate or target for storage?	NO
Does Arizona offer financial incentives for energy storage development?	NO
Does Arizona have a policy for the strategic deployment of Non-Wires Alternatives or Distributed Energy Resources to defer, mitigate, or obviate the need for certain T&D investments?	NO
Does Arizona have a policy addressing multiple use applications for storage?	NO
Does Arizona have a policy on utility ownership of storage assets?	NO
Does Arizona allow or mandate the inclusion of energy storage in utility IRPs?	YES
Has Arizona modified its permitting requirements specific to energy storage?	NO
Does Arizona allow customer-sited storage to be eligible for net metering compensation?	UNCLEAR
Has Arizona revised its rate structures to drive adoption of behind-the-meter storage?	NO
Approximate development of storage capacity in Arizona	?



# Arizona

Arizona is an interesting state to follow given its unique approach toward both the tactical development of an energy storage marketplace and the creation of energy storage policies to drive and define such a marketplace. Among the group of approximately 15 states that have witnessed a significant growth in energy storage development and/or created energy storage policies at either the state legislature or public regulatory commission, Arizona remains unique in that its energy storage marketplace has been advanced primarily due to utility initiatives as opposed to policy directives. In all other states, it can be argued that policy has driven market development, either through outright mandates for energy storage (e.g., California, New York) or advantageous incentives that have subsidized the exploration of storage technologies. Not so in Arizona. The state's energy storage marketplace has continued to develop in spite of a near-total absence of policy guidelines; and despite this absence of policy directives, growth to date of energy storage initiatives in Arizona has been noteworthy and its potential for future growth is massive.

Storage technologies and utility-driven storage deployments continue to gain momentum in Arizona, while policymakers play “catch up” to develop appropriate rules and regulations. This approach has been thwarted at times due to conflicts among the state's policymakers and disagreements regarding which state agency (the governor's office, the legislature, or the Arizona Corporation Commission) should take the lead role in defining energy storage policy in the state.

Arizona's unorthodox approach is likely due to several distinguishing factors that simultaneously make the Grand Canyon State inherently unique and a benchmark for other states to be evaluated against. In other words, the factors that make Arizona unique also make it a testing ground for how to create an energy storage marketplace “from scratch.” Consider the following dichotomies that exist within Arizona, which have caused the energy storage marketplace in the state to experience growth in a series of fits and starts.

*Arizona is one of the sunniest states in the country, with some areas of the state having 300+ days of sunshine in an average year. Thus, Arizona's potential for solar power is enormous.*

**AND YET**, Arizona still gets only about 6 percent of its energy from solar power. More than 50 percent of Arizona's power continues to come from fossil fuels and fracked gas, most of which ends up being transported to other states like California. The state's low levels of overall usage of solar power relative to other states, particularly in its own region, means that even with their aggressive approach toward renewables development Arizona's utilities are still behind the curve when it comes to moving toward a carbon-free marketplace.

*Despite being an exporter of power to neighboring states, Arizona does not participate in any regional transmission organization (RTO). The oversight to run a central energy market, provide reliability services and assure operating reserves to prevent power blackouts is arguably a level of oversight that is beyond the capability of Arizona's state regulators.*

**AND YET**, although Arizona continues to operate in a rather isolated manner, its dependence on access to outside markets moves it increasingly closer to participation in an RTO, which due to geographical local would likely be the California ISO. If it were to participate in an RTO, Arizona's energy market would increasingly fall under federal jurisdiction, which would create its own layers of complexity. The decision of RTO participation is further complicated by concerns about the available transmission lines that connect Arizona to neighboring states. A lack of transmission capacity would limit Arizona's ability to export and import power from other states, thereby deepening its need for resource self-sufficiency through renewables and energy storage.

*Arizona was the first U.S. state, in 2006, to require utilities to get a certain percentage of their power from renewable resources, specifically 15 percent by 2025.*

**AND YET**, Arizona presently falls last among its neighbors in terms of renewables mandate. By comparison, Nevada and New Mexico have adopted a 50-percent requirement; Colorado has a 30-percent-by-2020 requirement; and California's RPS is 60 percent by 2030. Efforts to increase the state's renewables requirement (including public ballot initiatives such as 2018's Proposition 127) have failed, mostly due to concerns about how an increased renewables target would result in increased costs for end-use customers

*Arizona is in the midst of a contentious "turf war" between the state's executive and legislative branches regarding the policy oversight of its energy sector. Arizona's constitution uniquely establishes the ACC as a separate entity outside of the legislative and executive branches. The governor believes that the ACC's role should be limited to setting rates and its recent move into setting new renewables targets represents an inappropriate and unwanted "mission creep." The ACC says its responsibilities are unambiguous and include the oversight of the state's investor-owned utilities, including their generation mixes.*

**AND YET**, the conflict continues...which leaves Arizona in somewhat of a "policy paralysis" with regard to setting new renewables, energy storage, or clean energy policy. Having the Legislature — presumably with the governor in the driver seat— setting energy policy for the state would potentially create a conflict with the specific powers given to the ACC under the Arizona Constitution. The ACC believes it has the power to enact and enforce rules over its sphere of influence just as if it were acting as the Legislature. Whether or not a compromise can be reached remains unclear.

# Arizona

*Arizona continues to wrestle with the question of energy competition or “deregulation,” which would open its generation market to independent providers.*

**AND YET:** If deregulation were to include a separation between transmission & distribution responsibilities from generation, the question of potential utility ownership of storage assets would be further complicated.

*Despite all these systemic challenges, the largest utilities in Arizona—Arizona Public Service (APS), Tucson Electric Power (TEP) and Salt River Project (SRP)—have all pursued renewables and energy storage on their own. Unlike APS and TEP, SRP is not under the jurisdiction of the ACC, but despite this difference all three utilities have been aggressively pursuing renewables and storage development, as illustrated by the following: the*

APS has been viewed as an “early adopter” of battery storage technologies and publicly stated its intent in February 2019 to install over 850 MW of energy storage by 2025. APS’ storage strategy is built upon three core initiatives:

- The first initiative includes upgrading scale solar plants across the state with 200 MW of battery storage. APS has already selected Invenergy to install 141 megawatts of new battery systems at six solar sites, with the first expected to begin service by the summer of 2020.
- The second initiative is APS’ plan to build an additional 500 MW of battery storage and at least 100 MW of solar resources by 2025.
- The third initiative has APS pursuing shorter term power purchase agreements with natural gas providers (e.g., a 7-year contract as opposed to the more typical 20-year contract). Shorter contracts are intended to provide APS flexibility to take advantage of clean energy technologies as they continue to mature.

TEP added two 10-MW battery systems within the last year:

- A lithium nickel-manganese-cobalt storage system at a TEP substation near Interstate 10 and West Grant Road, built by a subsidiary of NextEra Energy Resources
- A 10-MW lithium titanate oxide storage facility linked to a 2-MW solar array at the UA Tech Park southeast of Tucson, built by E.ON Climate & Renewable

SRP has started construction with AES Corporation for the SRP’s first standalone battery-based energy storage project. The 10-MW, four-hour duration energy storage solution, to be supplied by Fluence, is intended to provide peaking capacity support. Under the 20-year agreement, AES will provide SRP with 10 MW, 40 MWh battery based energy storage system.

Meanwhile, Arizona is also home to what have been two widely publicized fires and explosions at battery-powered plants, highlighting the challenges and risks that can arise as utilities rely more heavily on battery storage. APS had installed a 2 MW battery system at a substation in Surprise, AZ, just outside of Phoenix, and another near the Festival Ranch development in nearby Buckeye. But an April fire and explosion sent eight firefighters and a police officer to the hospital. An investigation into the causes of the event is ongoing, but it appears that in response to the fire and explosion, APS announced that would be temporarily delaying its investments in new battery storage, although it will still issue two requests for proposals to add up to 250 MW of wind generation to its portfolio no later than 2022 and 150 MW of solar power to its portfolio by 2021.



# California



Does California have an renewables mandate?	YES. 50 percent renewables by 2026 and 60 percent renewables by 2030
Does California have a state mandate or target for storage?	YES. 1,325 MW by 2020
Does California offer financial incentives for energy storage development?	YES
Does California have a policy for the strategic deployment of Non-Wires Alternatives or Distributed Energy Resources to defer, mitigate, or obviate need for certain T&D investments?	YES
Does California have a policy addressing multiple use applications for storage?	YES
Does California have a policy on utility ownership of storage assets?	YES
Does California allow or mandate the inclusion of energy storage in utility IRPs?	YES
Has California modified its permitting or interconnection requirements specific to energy storage?	YES
Does California allow customer-sited storage to be eligible for net metering compensation?	YES
Has California revised its rate structures to drive adoption of behind-the-meter storage	YES
Approximate development of storage capacity in California	Approximately 4.2 GW

An aerial photograph of a rugged coastline. The foreground shows a steep, rocky cliffside with sparse vegetation. The middle ground features a wide, sandy beach and a rocky shoreline with waves crashing against the rocks. The background shows a vast expanse of the ocean under a clear blue sky with a few wispy clouds. The overall scene is a dramatic and scenic view of a coastal landscape.

**W**ith its innovative and ambitious policies, California is a global leader in the development and application of energy storage technologies. For the last decade, the state has been a frontrunner in both the development of storage technologies and the legislative and regulatory policies that are needed to enable the growth of a storage marketplace.

It is clear that California has set the course for developing a clean energy future, a course that other states continue to monitor and, in several cases, mirror in their own policies. The specifics of California's clean-energy infrastructure are impressive. As of 2018, California has generated about 29 percent of its power from renewables. Another 9 percent came from nuclear and 15 percent from large hydropower (both of those count as carbon-free, but the last remaining nuclear plant in the state is slated to retire by 2025). Natural gas provided 34 percent of California's electricity. Further, since 2010, California has procured 1,514 MW of new energy storage capacity to support grid operations. Also in 2010, California became the first U.S. state to mandate energy storage procurement with targets imposed on the state's three investor-owned utilities (Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric, formalized by the California Public Utilities Commission (CPUC).

California recently upped the ante on its clean-energy goals, with its newly established goal to generate 60 percent of its generation from renewable resources. In addition, California has adopted a 100 percent carbon-free electricity by 2045.

Energy storage factors prominently into California's clean energy goals, and in fact some market observers have concluded that California's goals are not achievable without a significant amount of new storage capacity being developed over the next two decades. Policymakers in the state appear to agree on the critical role that storage will play going forward, and in 2018 through legislative and regulatory policy the state formally adopted a new energy storage target of 1,325 MW by 2020. This mandate is the outcome of California's conclusion that energy storage will continue to be a main ingredient in the mix of strategies the state is using to balance supply and demand, support the California Independent System Operator (CA ISO) in maintaining grid stability; avoid voltage and

# California

frequency imbalances; and support the state's transition to a renewables-centric energy infrastructure.

With approximately 4.2 GW of energy storage capacity already in development, California has a large amount of installations that can be analyzed and used to inform related policy decisions. California also has been a pioneer in testing and utilizing large-scale lithium-ion battery deployments as a swift response to compromised grid conditions, and is the location for prominent demonstrations intended to evaluate storage technologies for various grid-scale applications, including PG&E's use of batteries to replace gas-powered plants that are shutting down. Moreover, due to the sheer volume of California's energy storage development and the fact that it has wrestled with what will ultimately be critical storage policy issues for other states, it is no surprise that California has become the benchmark against which policies and market development for storage across the U.S. are being evaluated.

California has used a mix of executive directives, legislation, and regulatory decisions to define energy storage policy, and has relied upon coordinated efforts among the Legislature, CA CPUC, California Energy Commission (CEC), and the CA ISO. The policy initiatives related to storage that have been developed by California policymakers over the last decade have been focused in three key areas:

- Requiring utilities to procure significant amounts of new energy storage resources;
- Developing robust incentives through the Smart Grid Incentive Program) that provides consumer rebates to enable storage development (totaling about \$450 million in 2019); and
- Evaluating the value of energy storage through consideration of multiple use applications (MUAs) (i.e., storage's many contributions to grid stability and reliability).

Through these efforts, California has addressed a number of complex technology and policy factors including storage's role in a clean-energy environment, how a storage market should be designed, barriers that prevent storage's participation in both retail and wholesale markets, and the various ways in which storage can and should be used. Given that the state's

legislators opted not to define specific paths for storage development but rather deferred to regulators and market drivers, California has experienced somewhat of a "learning by doing" process as it pertains to developing its storage market. Accordingly, California's efforts provide many "lessons learned" for other states across the country, many of which have taken very few steps toward developing their own policies for storage. Key storage issues that California has addressed over the last decade include:

- Determining an appropriate amount to be included in a storage mandate;
- Defining a realistic and achievable timetable for storage procurement;
- Allowing flexibility in types of storage projects that will be considered;
- Providing financial incentives that are offered appropriately and fairly;
- Evaluating various ownership models for storage; and
- Determining the value for storage across a suite of MUAs

California has almost single-handedly jump-started the advanced storage industry by setting statewide mandates for renewables, storage and carbon-free electricity, but the state is still in the early stages of this rollout. That means utilities are still testing how storage works on the grid, and how it performs after several years of service, both of which are crucial to planning a grid that is all renewables

The challenges for the state to achieve its vision are significant. For example, according to a study prepared by the National Renewable Energy Laboratory (NREL), even with optimal grid improvements, California would still need an estimated 15 GW of additional storage just to reach 50 percent solar by 2030. That's more than 11 times the amount of storage mandated currently in California, and 66 times the total megawatts deployed in the U.S. last year. For now, though, California has solidified its leadership role in building the future paradigm for clean energy and the grid. If it succeeds, others will learn from it. If it falls short, that expensive experiment will be instructive, too.

# Massachusetts



Does Massachusetts have a renewables mandate?	YES. The current RPS is 13 percent but new legislation increases the standard by 2 percent a year beginning 1/1/2020. On 1/1/2030, the yearly increase will be reduced back to 1 percent unless further legislation revises this plan. By 2030, the RPS in Massachusetts is anticipated to be about 35 percent.
Does Massachusetts have a state mandate or target for storage?	YES 1,000 MWh by 2025
Does Massachusetts offer financial incentives for energy storage development?	YES
Does Massachusetts have a policy addressing multiple use applications for storage?	NO
Does Massachusetts have a policy that allows utility ownership of storage assets?	YES
Does Massachusetts allow or mandate the inclusion of energy storage in utility IRPs?	NO
Has Massachusetts modified its permitting or interconnection requirements specific to energy storage?	NO
Does Massachusetts allow customer-sited storage to be eligible for net metering compensation?	YES
Has Massachusetts revised its rate structures to drive adoption of behind-the-meter storage?	UNCLEAR
Approximate development of storage capacity in Massachusetts	Including projects that are in a queue for state incentive funding and projects that are already operating, Massachusetts has approximately 190 MW of energy storage capacity



**M**assachusetts is among a handful of U.S. states that is currently on the forefront of establishing energy storage policies through legislation and regulatory directives. Like California, Hawaii, and New York, Massachusetts has created policy on critical energy storage issues that now serve as reference points and/or precedents for developing storage policy in other states. In fact, Massachusetts has been a front-runner in developing energy storage policy since 2015 with the creation of an Energy Storage Initiative (ESI) for the Commonwealth, which included comprehensive studies about the capabilities of energy storage, funding for storage demonstration projects, and the Commonwealth's authorization to establish a statewide energy storage target.

Some of the unique decisions that have framed Massachusetts' precedent-setting energy storage policy include:

- Massachusetts is one of the first states to provide comprehensive guidance focused on parting energy storage with solar panels;
- Massachusetts became the first state to allow behind-the-meter (BTM) energy storage to qualify for energy efficiency incentives;
- Massachusetts was one of the first states to adopt a target for storage and has ratcheted up the target to its current level of 1,000 MWh by 2025;
- Massachusetts includes storage as an eligible resource for the state's solar incentive program, the Solar Massachusetts Renewable Target (SMART); and

- Along with the SMART program, Massachusetts has several incentive funding mechanisms that are aimed at unlocking the full potential of energy storage, either as a stand-alone resource or as a hybrid resource with renewables (e.g., solar + storage).

With regard to incentive funding, Massachusetts has awarded approximately \$20 million in grants to 26 energy storage projects, doubling the state's original \$10 million commitment. The grants were awarded under the state's Advancing Commonwealth Energy Storage (ACES) program that is part of the ESI funded by the Massachusetts Department of Energy Resources (MA DOER).

Massachusetts is part of the New England Independent System Operator (ISO-NE), which over the last several years has experienced a number of challenges including the retirement of traditional power plants, diminished capacity of available resources and restrictions against building new transmission lines that would enable the development of power-generating resources. Energy factor factors prominently into the region's efforts to address these challenges at the wholesale level. To date, energy storage in Massachusetts has been primarily limited to pumped hydro storage in Northwest Massachusetts that is provided as bulk energy to the ISO-NE. State-level incentive offerings are intended to spur storage deployment and enable broader opportunities for storage to participate in residential, commercial, and wholesale energy markets.

# Nevada



Does Nevada have an renewables mandate?	YES; 50 percent by 2030
Does Nevada have a state mandate or target for storage?	NO, although the Nevada PUC appears to be in the process of evaluating.
Does Nevada offer financial incentives for energy storage development?	YES
Does Nevada have a policy for the strategic deployment of Non-Wires Alternatives or Distributed Energy Resources to defer, mitigate, or obviate need for certain T&D investments?	NO
Does Nevada have a policy addressing multiple use applications for storage?	NO
Does Nevada have a policy on utility ownership of storage assets?	NO
Does Nevada allow or mandate the inclusion of energy storage in utility IRPs?	YES, mandated
Has Nevada modified its permitting or interconnection requirements specific to energy storage?	YES
Does Nevada allow customer-sited storage to be eligible for net metering compensation?	YES
Has Nevada revised its rate structures to drive adoption of behind-the-meter storage	UNCLEAR
Approximate development of storage capacity in Nevada	?

The energy sector in Nevada has experienced a rather tumultuous evolution over the last few years. While seeking to make systemic changes to its regulatory structure and its approach toward grid planning and operations, the state has experienced some very public setbacks with regard to its market and policy initiatives for clean energy. However, despite these setbacks, Nevada now appears to be back on track toward assuming a leading position in developing innovative energy storage policies while simultaneously supporting what is clearly a rapidly growing sector for clean energy development. Within these broader initiatives Nevada has also assumed its current position as a market leader for energy storage. What makes Nevada an important case study today is the extent to which voluntary, business-driven decisions to expand renewables and energy storage solutions has been spearheaded by the primary utilities in the state. This is in contrast to how the development of renewables and energy storage has evolved in other states, which has typically been driven through policy directives.

While Nevada is currently considered a leader in both the clean energy space generally and in renewables and energy storage specifically, its path within these sectors has not been a straight line toward success. Further, while the inherent characteristics that define Nevada's energy sector also make it fundamentally unique, the state still provides an important experience that in a number of ways may foreshadow the development of energy storage policy that is still yet to be developed in other states.

Let's first remind ourselves of the key characteristics that make Nevada and its energy sector unique. These factors include:

- The population concentration of the state. Almost three-fourths of Nevada's residents live in Clark County, which includes the city of Las Vegas.

- Nevada is one of the fastest-growing states in the U.S.
- Nevada is a net importer of energy (in 2016, about 87 percent of the energy consumed in the state came from outside sources).

There has been a rapid increase of solar development in the state. Hydro remains the prominent source for renewables-based generation, but the use of solar has been steadily increasing and recently moved past geothermal as the second-largest contributor to renewables generation in the state behind hydro. In addition, Nevada is also rather unique in the sense that it does not produce much of its own energy (the state ranks in the bottom ten in terms of states that produce their own energy). Compared to neighboring states, Nevada has very little generation capacity in-state, and reportedly nine-tenths of Nevada's power comes from outside of the state. Moreover, Nevada has no significant fossil fuel reserves. Rather, natural gas is the primary fuel for power generation in the state, with the majority of the state's remaining power plants primarily relying on this fuel source. In 2017, about 72 percent of Nevada's generation mix came from natural gas; and only about 7 percent came from coal. This fossil-fuel base still overshadows renewables, which in 2017 accounted for approximately 18 percent of the energy mix. In Nevada, renewables have mostly meant hydro, solar, and geothermal. Even though it is one of the driest states in the nation, historically most (over 80 percent) of Nevada's renewable resources have come from hydroelectric power plants, primarily the Hoover Dam. This unique energy mix, particularly the need to import power, has made the state dependent on transmission capacity that can deliver power from other regions. Further, the lack of its own power resources or long-term commitments to traditional forms of generation arguably has positioned Nevada as state that can move to a completely clean energy mix more seamlessly than others.



# Nevada

The move toward a clean energy environment in Nevada has its roots in economic analysis, and thus even in the absence of stringent requirements the main utilities in the state have been moving away from carbon-intense energy sources for a number of years. Perhaps illustrating this point best is the recent announcement from NV Energy, the primary utility in Nevada, which stated it will no longer own any coal generation plants moving forward.

The future of renewables in Nevada is now pointed toward the sun. Solar continues to develop rather rapidly in Nevada and is expected to supply an increasing share of Nevada's net generation. About one-fourth of Nevada's utility-scale electricity is now generated from renewable resources, and about half of those renewables are now coming from utility-scale solar resources. In fact, according to most rankings, Nevada leads other states in terms of solar power potential, and has generally ranked within the top five states for installed solar capacity.

NV Energy (which operates through its two regulated utilities, NV Power and Sierra Pacific Power), provides about 81 percent of the state's electricity and is clearly the dominant utility operation in the state. NV Energy has publicized aggressive, voluntary plans for solar + storage development through its integrated resource plans, placing it in a lead position among utilities that are pursuing hybrid solutions. NV Energy is owned by Warren Buffett's Berkshire Hathaway Companies (which also owns PacifiCorp in the Northwest and MidAmerican Energy in Iowa). Berkshire Hathaway has established an over-arching strategy across its utility subsidiaries to strategically move away from coal-fired generation into a renewable-centric generation portfolio.

The new plan is part of the company's long-term goal, as outlined in its Integrated Resource Plan approved by the PUCN in December 2018, of serving its customers with 100-percent renewable energy. Again, in the



absence of an enforced mandate via the legislature or PUCN, NV Energy is opting to pursue this increase of renewables and storage on its own accord.

In the near term, NV Energy announced the addition of nearly 1,200 MW of new solar PV generation to be built in the state, along with 590 MW of battery storage. The renewable energy will come from three projects, all expected to enter commercial operations by 2023 (still pending approval from the PUCN):

- Arrow Canyon Solar: 200 MW solar PV project with a 75-MW, five-hour battery storage system. (Developed by EDF Renewables North America.)
- Gemini Solar + Battery Storage: 690 MW of solar energy coupled with a 380-MW battery storage system. If completed, this project could earn status as the largest solar plant in the United States. (Quinbrook Infrastructure in collaboration with Arevia Power will develop and manage the project.)
- Southern Bighorn Solar & Storage Center: 300 MW of generating capacity including a 135-MW, four-hour Li-Ion battery storage system. (Built by 8minute Solar Energy).

This utility activity preceded but was ultimately validated by increases to the state's renewables target. Nevada's initial renewable portfolio standard (RPS), set in 2009, required that annually increasing percentages of the electricity sold to retail customers in the state come from renewable resources, reaching 25 percent of retail electricity sales by 2025. Additionally, the RPS originally required that 6 percent of the renewable requirement, 1.5 percent of the state's total net generation, had to come from solar power by 2016. That requirement was exceeded and almost half of the utility-scale and distributed renewable generation in Nevada—11 percent of the total state net generation—was solar-powered in 2017.

However, it is the solar industry in the state that has been the focus of what has arguably been the greatest

setback to the development of clean energy initiatives in Nevada. In December 2015, the PUCN voted in favor of a new tariff structure that reduced net metering rates — the rates NV Energy pays to buy back excess energy generated by those with rooftop solar. It also increased the monthly service charge for those solar customers. The PUCN ruling was considered a major setback for the industry. It caused a number of solar companies (most notably Sunrun and SolarCity) to leave the state entirely, leading to the loss of hundreds of jobs. In 2017, Nevada fell from the No. 4 state for overall solar jobs to No. 10, according to The Solar Foundation. The net metering program was reinstated in late 2017, but in many respects the damage to the solar sector in the state was already done.

Public support for more renewables in Nevada was confirmed in November 2018 when a ballot initiative was approved that would require electric utilities to acquire at least 50 percent of their electricity from renewable sources by 2030. However, because it amends the Nevada Constitution, the ballot measure must be approved by voters twice in order for the requirement to go into effect. Nevada voters will vote on the measure again in 2020. Subsequent legislation (SB 358) enacted this increase into law.

A key part of Nevada's renewables law, which positions the state as an innovative leader in the energy storage realm, is that every kilowatt-hour of energy delivered by a qualified storage device will count double for the purpose of meeting the RPS requirement. This is a very innovative approach; Nevada may in fact be the only state to have enacted such a provision allowing energy storage to be eligible for a renewables requirement in such a significant way. There are two ways in which storage can meet the renewables requirement in Nevada: 1) if the energy storage system charges from renewable generation and discharges during a peak load period or 2) if the energy storage system performs ancillary grid services that enable the integration of renewable generation.

# Nevada

This policy alone positions Nevada among the ranks of other important storage markets (e.g., California, New York, Massachusetts) as in practice it will position storage devices as renewable energy assets that can deliver energy. It should be noted that the law caps the role of energy storage at 10 percent of the electricity eligible for RPS compliance, meaning that the majority of energy eligible for RPS compliance will still be generation.

Nevertheless, without a statewide storage mandate in place, this legislation in Nevada (SB 358) should be viewed as the leading policy measure that is now driving storage development in the state. In the absence of a statewide procurement mandate for energy storage (as of September 2019 the Public Utilities Commission of Nevada (PUCN), directed by state legislation under the enacted SB 205 in June 2017, is still evaluating the appropriateness of a mandate), this increased mandate for renewables is still viewed as a much-needed jolt for the solar + storage market in Nevada.

Nevada policymakers continue to vet the question of whether or not mandates for energy storage should be adopted statewide. It is expected that a decision along these lines should be made in early 2020. Meanwhile, behind the scenes, Nevada lawmakers, regulators, utilities and environmental and consumer stakeholders have also been putting together a plan to integrate distributed energy resource (DERs) into the state's grid planning and operations. The PUCN has called NV Energy to evaluate hosting capacity, grid needs, and potential DER impact and values of each circuit and feeder line across its 1.3 million-customer territory. If approved, the distribution planning plan (DRP) requirements would put Nevada in a small club of states — California, New York and Hawaii — that are actively asking their investor-owned utilities to bring DERs into their grid plans on a number of levels.

# New Mexico



Does New Mexico have a renewables mandate?	YES; 20 percent by 2020 for IOUs; 10 percent by 2020 for co-ops
Does New Mexico have a state mandate or target for storage?	NO
Does New Mexico offer financial incentives for energy storage development?	NO
Does New Mexico have a policy for the strategic deployment of Non-Wires Alternatives or Distributed Energy Resources to defer, mitigate, or obviate need for certain T&D investments?	NO
Does New Mexico have a policy addressing multiple use applications for storage?	NO
Does New Mexico have a policy on utility ownership of storage assets?	NO
Does New Mexico allow or mandate the inclusion of energy storage in utility IRPs?	YES (mandate)
Has New Mexico modified its permitting or interconnection requirements specific to energy storage?	NO
Does New Mexico allow customer-sited storage to be eligible for net metering compensation?	UNCLEAR
Has New Mexico revised its rate structures to drive adoption of behind-the-meter storage	UNCLEAR
Approximate development of storage capacity in New Mexico	TO BE CONFIRMED



# New Mexico

New Mexico for the most part operates outside of a competitive, regional market (the eastern part of the state participates in the Southwest Power Pool, but the largest market in the state served by the Public Service Company of New Mexico (PNM) does not belong to an RTO). Therefore, policies that are specific to storage are being developed primarily through state legislative and regulatory directives. The primary focus of New Mexico's storage policy development has been placed on removing or reducing barriers for storage and including new opportunities for storage to participate on a more level playing field with other resource alternatives.

Put another way, to date New Mexico has focused on policy revisions that are intended to broaden the competitive access for energy storage in the state. Broad policy initiatives that involve storage include the state's commitment to being "carbon free" by 2045. A primary example of New Mexico's efforts is the mandated inclusion of energy storage in utility integrated resource plans. With executive directives setting baseline expectations for storage, the New Mexico Public Regulation Commission (NMPRC) now takes the lead position in developing state-level policies that are intended to lay the foundation for a robust market for energy storage going forward. It is anticipated that future regulatory proceedings in New Mexico that are relevant to energy storage will include considerations of:

- Revised interconnection standards
- Asset classification for storage technologies
- Potential revision of net metering policies to include energy storage

- Consideration of multiple use applications for storage
- Cost-benefit analysis / valuation proceedings for energy storage
- Potential increases to the state's existing Renewables Portfolio Standard

In 2019, the state of New Mexico began to officially define an energy transition plan that emphasizes renewables and storage objectives as a pre-requisite for an envisioned carbon-free future in the state. Under the leadership of newly elected Democratic Governor Michelle Lujan Grisham, New Mexico has emerged among a handful of states that within the last year have publicly established a commitment to clean energy by directing power generators within its borders to produce more electricity from renewables, storage, and other non-polluting sources. In fact, New Mexico is among an elite group of states (California, Hawaii and, more recently, Washington and Nevada) that have publicly vowed to become carbon-free and receive most, if not all, of its power from renewable energy in the future. In New Mexico, the goal is to achieve zero-carbon electricity from public utilities by 2045 with 80-percent renewables by 2040.

It is an aggressive goal, given that presently New Mexico has achieved about 20 percent of its electric generation from renewables (in response to the previous renewable energy standard that was originally created in 2004). The Public Service Company of New Mexico (PNM) is currently the only utility in the state with existing storage capability due to its Prosperity

Energy Storage project that includes a 500 kW solar PV facility with a 250 kW, 1 MWh battery storage system). As has been well documented, the state of New Mexico has tremendous wind and solar resources that for the most part have been untapped to date, with reportedly some of the highest rates of solar irradiance and best wind conditions in the United States. It is clearly anticipated by the state's policymakers that energy storage will play a vital role in renewables development and achieving the carbon-free mandate established by new legislation. Consequently, New Mexico has the opportunity to become a national leader in grid modernization and energy innovations specific to storage development due to the local presence and expertise of the Sandia National Laboratories and the number of storage pilot projects and storage experiments being conducted at the Labs.

Storage policy development that is currently taking place at the New Mexico Legislature and the state's Public Regulation Commission (PRC) is currently defining the specific role that energy storage will play. High-level and long-range objectives for storage have been outlined by new legislation, and the PRC should be watched closely for more granular-level regulations specific to storage interconnection standards, valuation initiatives, and potentially mandated storage targets that will be addressed in the near term.

# New York



Does New York have a renewables mandate?	YES; 50 percent by 2030
Does New York have a state mandate or target for storage?	YES, 1,500 MW by 2025
Does New York offer financial incentives for energy storage development?	YES
Does New York have a policy for the strategic deployment of Non-Wires Alternatives or Distributed Energy Resources to defer, mitigate, or obviate need for certain T&D investments?	YES
Does New York have a policy addressing multiple use applications for storage?	NO
Does New York have a policy on utility ownership of storage assets?	NO
Does New York allow or mandate the inclusion of energy storage in utility IRPs?	YES
Has New York modified its permitting or interconnection requirements specific to energy storage?	NO
Does New York allow customer-sited storage to be eligible for net metering compensation?	YES (Energy storage projects paired with eligible DER are eligible)
Has New York revised its rate structures to drive adoption of behind-the-meter storage	PENDING
Approximate development of storage capacity in New York	Approximately 1,460 MW of storage deployed



Supported by a clear vision articulated by the state’s governor, actions by the New York Legislature and New York Public Service Commission (NY PSC) have solidified the role of energy storage as an important foundation of the state’s transition to a clean energy-powered future. In fact, New York has established one of the most aggressive procurement targets for energy storage in the country with its pledge to meet a target of 1,500 MW of storage deployed by 2025. By comparison, California has a 1,300 MW by 2020 target; Massachusetts is pursuing a target of 2,00 MW by 2025, and New Jersey recently adopted a 2,000 MW by 2030 target.

At this time, energy storage is still in the early stages of development in New York (as is the case with other states). Approximately 1,460 MW of storage have been deployed in New York, of which approximately 1,400 MW of pumped hydro at two New York Power Authority facilities. The largest non-hydro storage facility in the state is a 20-MW flywheel used for frequency regulation, operated by Beacon Power in Stephenstown, N.Y. Beyond that, another 100 MW of storage is in various states of development, mostly in constrained downstate regions, and about six other battery storage projects that in aggregate total 430 MW.

New York is defining energy storage policy within the broader efforts contained in the Reforming the Energy Vision (REV) initiative, which has been in place since 2015 and aims to make a number of systemic changes to the state’s regulatory model and operational requirements. REV’s clean energy goals for 2030 include:

- 40 percent reduction in greenhouse gas emissions from 1990 levels;
- 50 percent of New York’s electricity must come from renewables; and
- 23 percent reduction in energy consumption from 2012 levels

Provisions of the REV proceedings include moving New York utilities from a cost-of-service business model to a market-based model. Specifically, utilities will maintain their former status as energy distributors, but will also assume the role of “market operators,” facilitating transactions between those who provide energy and those who use it. Utilities will be incentivized to use DER in their grid planning efforts. In this new role, utilities will own the distributed service platform that DER sellers and retail customers use to buy and sell electricity. REV envisions that current utilities in New York state will become a sort of “mini-ISO” as it relates to DERs. Utilities will be incentivized to use DER in their grid planning efforts.

The REV policy is being executed in two tracks. Both tracks seek to meet the same three goals: Track One described in an order released on February 26, 2015, focuses on shaping the new utility vision and DER ownership challenges. Track Two described in an order released on May 16, 2016, focuses on the necessary changes in the current regulatory, tariff, market, and incentive structures.

With regard to the development of energy storage specifically, New York is in the midst of developing an energy storage policy framework that can support what is anticipated to be a robust market in both the state’s distribution system and wholesale market managed by the New York Independent System Operator (NY ISO). To date, New York’s energy storage policy framework has utilized procurement targets, financial incentives and demonstration projects to jumpstart the energy storage marketplace in the state. Two specific areas that have been the core tenets of New York’s storage policy are: 1) financial incentives provided by the state that are geared toward enabling the unique system benefits storage can provide; and 2) changes in rate design that would enable a shift toward energy storage, which are being assessed as part of the broader REV initiative.



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