



CLEAN ENERGY FOR A HEALTHY ARIZONA

July 19, 2018

Re: Effect of the Clean Energy for a Healthy Arizona Initiative on Palo Verde Nuclear Generating Station

I. Executive Summary

The Clean Energy for a Healthy Arizona Initiative (“the Initiative”) would increase the percentage of renewable energy that utilities in Arizona must procure to 50% by 2030. Arizona Public Service Company (“APS”) opposes the Initiative in favor of a continued build-out of fossil-fuel resources.¹ In an effort to dissuade voters from embracing the Initiative, APS has stated that, if it passes, APS will be forced to retire the Palo Verde Nuclear Generating Station (“Palo Verde”). APS understands what Palo Verde means to Arizona as an employer and source of tax revenue. Evidently, APS hopes that fears of losing this important resource will scare off voters otherwise inclined to support renewable energy.

Such fears are unfounded. APS lacks the legal authority to close Palo Verde. Palo Verde is owned jointly by seven utilities. To shut the plant would require approval of all of them. Most of these utilities, however, are located in other states, and none would be subject to the Initiative. Even if APS sincerely desired to close Palo Verde, therefore, it would be difficult, perhaps impossible, to convince these other utilities to give up a low-cost, zero-emission power source they have planned to rely on for decades.

We also doubt APS would ultimately seek to retire Palo Verde prematurely or that the Arizona Corporation Commission (“ACC”) would permit it to do so. Palo Verde is the lowest-cost thermal generator in the APS portfolio. It uses no fresh water, has no harmful air emissions, and is immune to the volatility of natural gas prices or the risk of future climate regulation. Given these attributes, both APS and the ACC will almost certainly conclude that any number of alternatives, including reducing the use of fossil fuel-fired power plants if necessary, are better ways to meet the Initiative’s renewable energy targets than shutting down Palo Verde.

¹ See APS, *Requests for Proposals*, 2018 Request for Proposals – Peaking Capacity, APS (Apr. 26, 2018) (soliciting 400 - 800 MW of peaking capacity but limiting the amount of energy storage or combined renewable energy plus energy storage to no more than 100 MW, even if bids from renewable resources are superior in terms of cost and performance), available at <https://www.aps.com/en/ourcompany/doingbusinesswithus/rfp/Pages/home.aspx>; see also APS, 2017 *Integrated Resource Plan* at 12 (Apr. 2017) (“2017 APS IRP”) (proposing to add 5,387 MW of fossil-fuel resources by 2032).

II. Closing Palo Verde Would Require Unanimous Consent among Seven Utilities that Rely Heavily on its Low-Cost, Emissions-Free Energy

Palo Verde is not an APS-owned plant, and APS cannot dictate its future. Palo Verde is jointly owned by seven electric utilities across four states. Although APS operates the plant and owns the single largest share, the unanimous consent of all seven utilities would be required to terminate operations at any of Palo Verde’s three generating units. But these utilities are nearly certain to oppose any effort to close the plant. They have planned to rely on Palo Verde as a resource for decades to come, and have only recently extended the plant’s operating license,² and the agreement between them, until 2047.³

Participating Utility	Palo Verde Ownership Percentage ⁴
APS	29.10%
Salt River Project	17.49%
El Paso Electric Company	15.80%
Southern California Edison	15.80%
Public Service Company of New Mexico	10.20%
Southern California Public Power Authority	5.91%
Department of Water and Power of the City of Los Angeles	5.70%

² In 2011, the Nuclear Regulatory Commission approved license renewal applications for all three Palo Verde generating units until 2045, 2046, and 2047, respectively. See *Arizona Public Serv. Company et al.*, Renewed Licensed No. NPF-41, § 2.H (Apr. 21, 2011); *Arizona Public Serv. Company et al.*, Renewed Licensed No. NPF-51, § 2.H (Apr. 21, 2011); *Arizona Public Serv. Company et al.*, Renewed Licensed No. NPF-74, § 2.I (Apr. 21, 2011).

³ See Arizona Nuclear Power Project Participation Agreement § 35.7 (Aug. 23, 1973) (“Participation Agreement”) (as amended by Amendment No. 16 § 6.2, effective April 28, 2014, and *Arizona Public Service Company, Palo Verde Nuclear Generating Station, Units 1, 2, and 3, Notice of Issuance of Renewed Facility Operating License Nos. NPF-41, NPF-51, and NPF-74 for an Additional 20-Year Period*, Record of Decision, 76 Fed. Reg. 24064 (Apr. 29, 2011) (renewing the licenses for all three generating stations)). Unit 1 is extended until 2045, Unit 2 to 2046, and Unit 3 to 2047.

⁴ These percentages include capacity that has been sold to financial institutions and leased back to the utilities. For example, APS owns 29.1% of Palo Verde units 1 and 3, and approximately 17% of Unit 2, but has leased back approximately 12.1% of Unit 2. Without its leasehold interest, APS owns approximately 25.1% of the facility as a whole. See Pinnacle West Capital Corp. 2017 Form 10-K at 7 (filed Feb. 23, 2018) available at <https://www.sec.gov/Archives/edgar/data/7286/000076462218000018/pnw2017123110-k.htm>.

The rights of the seven utilities that own Palo Verde are set forth in the Arizona Nuclear Power Project Participation Agreement (“Participation Agreement”).⁵ The Participation Agreement specifies the utilities’ ownership shares and their obligations to one another, as well as the governance structure of the management and operations of the plant. The six other utilities—Salt River Project Agricultural Improvement and Power District, Southern California Edison Company, Public Service Company of New Mexico, El Paso Electric Company, Southern California Public Power Authority, and the Department of Water and Power of the City of Los Angeles—collectively own over 70 percent of the Palo Verde Plant and are entitled to an equivalent amount of its generating capacity.⁶ As a minority owner and the agent for the participants, APS lacks the contractual authority to decide on its own when to shut down any of Palo Verde’s generating units.

Under the Participation Agreement, the plant’s policies are set by several committees, each of which consists of representatives from all seven utility owners.⁷ Importantly, any decision to terminate operations of any of the three generating units would require the unanimous consent of all of the participating utilities on the Administrative Committee.⁸ Unanimous consent of all of the participating utilities on the Engineering and Operating Committee would also be required for the approval of any recommendation by APS to set or revise the budget, maintenance and outage schedules, and generating capability levels for Palo Verde.⁹ As the operating agent, APS is contractually obligated to follow the decisions of these committees.¹⁰ If APS breaches its contractual obligation, the other participating utilities can seek arbitration to remove APS as the operating agent.¹¹

There is no reason to believe that the six other participating utilities would consent to an early shut down, and ample reason to believe they would oppose it strenuously. To begin, APS’s claim that the Initiative would lead to closing Palo Verde ignores that APS is the only one of the seven participating utilities that would be subject to the Initiative. Five of the participating utilities are out of state and have no retail electricity sales in Arizona that would incur obligations under the Initiative. The only other Arizona owner, the Salt River Project, is not covered by the Initiative,

⁵ See Participation Agreement.

⁶ See *id.* § 3.28 (as amended by Amendment No. 11, effective January 10, 1987).

⁷ See *id.* § 6.1.

⁸ See *id.* § 6.6 (as amended by Amendment No. 13, effective June 15, 1991) (requiring unanimous consent for “[a]ny action or determination of a committee” with certain exceptions not relevant here); *id.* § 8A.1.3 (as amended by Amendment No. 13, effective June 15, 1991) (“The Administrative Committee shall make the determination to permanently terminate the operation of each Generating Unit and remove such unit from service and establish the Unit Termination Date therefor.”).

⁹ See *id.* §§ 6.3.2.1, 6.3.2.2, 6.3.2.5.

¹⁰ See *id.* § 8.3.25 (providing that the Operating Agent shall “[c]arry out and follow the practices and procedures and directions which have been approved and issued by the Administrative Committee, [and] the Engineering and Operating Committee”).

¹¹ See *id.* §§ 26.2.1, 26.2.2.

because it is not a public service corporation under Arizona law.¹² Therefore, even if APS was correct that the obligations imposed by the Initiative would reduce the value of the plant, those are obligations the plant's other owners do not share.¹³

The other owners rely on Palo Verde and would have no reason to support a premature shut down. Palo Verde supplies a significant percentage of the energy and capacity needs of the six other utilities. For example, according to the utilities' most recent public data, Palo Verde supplies 49 percent of the energy requirements of El Paso Electric Company¹⁴ and approximately 30 percent for Public Service Company of New Mexico.¹⁵ It is inconceivable that these utilities would readily consent to the premature closure of a facility that makes up such a substantial percentage of their portfolios simply because APS is now required to use a greater percentage of renewable energy, or because abundant solar energy may push down wholesale energy prices at the Palo Verde Hub at certain times of the year. Moreover, not only do these other utilities rely on Palo Verde to serve their customers, they also greatly value that it is a zero-emission, zero-fresh water resource that reduces their exposure to natural gas price volatility. Public Service Company of New Mexico summed it up well in a recent statement explaining why it intends to retain the portion of Palo Verde that it holds under lease:

Retention of this leased capacity beyond 2025 avoids the need to replace it with carbon emitting generation, preserving the CO₂ emission reductions that result from the coal plant retirements. Moreover, retention of the leased capacity preserves carbon-free baseload capacity that is needed, particularly after the retirement of all of PNM's coal-fired baseload resources [in 2031]. Maintaining [Palo Verde] capacity also minimizes freshwater use and serves as a balance against potential increases in natural gas prices.¹⁶

These are not the words of a utility that would be easily convinced to shut down Palo Verde prematurely.

¹² See ARIZ. CONST. art. 15, § 2; & art. 13, § 7; *Uhlmann v. Wren*, 401 P.2d 113, 136 (Ariz. 1965).

¹³ The California utilities are also subject to a requirement that they procure 50% renewable energy by 2030. CAL. PUB. UTIL. Code § 399.11(a). Despite having been subject to this requirement since 2015, however, we are unaware of the California entities ever having suggested they would reduce or divest their shares of Palo Verde in response. See also California Public Utility Comm'n, Energy Division, *Proposed System Reference Plan* (Sept. 18, 2017) at Attachment A page 31 (assuming Palo Verde to stay in operation past 2030 in all cases modeled).

¹⁴ See El Paso Electric Company, *El Paso Electric 2017 Annual Report* at 18, available at https://s22.q4cdn.com/953030901/files/doc_financials/annual_reports/EE_2017_Annual_Report.pdf.

¹⁵ See Public Service Company of New Mexico, *PNM 2017-2036 Integrated Resource Plan* at 65 (Jul. 3, 2017), available at <http://www.pnm.com/documents/396023/396193/PNM+2017+IRP+Final.pdf/ae4efd7-3de5-47b4-b686-1ab37641b4ed>.

¹⁶ *Id.* at 2.

Finally, the early shutdown of Palo Verde would accelerate the owners' obligation to pay the substantial costs of decommissioning the plant, which could otherwise be deferred until the late 2040s. Due to the presence of radioactive contaminants, even the best-managed nuclear power plants are expensive to close down. The cost of dismantling Palo Verde has been estimated at over \$2.7 billion.¹⁷ Under the Participation Agreement, all seven utilities have agreed to contribute proportionate amounts into a fund based on the scheduled decommissioning of the generating units between 2045 and 2047.¹⁸ Shutting the plant down prematurely would require the participating utilities to pay their full share of the decommissioning costs much earlier than anticipated. For example, for El Paso Electric Company, this would mean an immediate need to contribute at least an additional \$63 million to fund its share of the obligation.¹⁹ For utilities that have already collected their share of decommissioning costs through rates, premature closure would cause them to forego over two decades of appreciation on those funds. For those utilities, the lost time value of money would reduce the amount that could be put to other purposes or returned to customers—a result that state regulators, including the ACC, would surely disfavor.

In sum, APS's threats to close Palo Verde ignore the company's contractual obligations to the six other participating utilities. APS cannot shut any of the three generating units without the unanimous consent of the plant's co-owners. The six other participating utilities, none of which are subject to the Initiative, have every incentive for Palo Verde to continue operating.

III. Alongside Increased Renewable Energy, Palo Verde Will Remain a Valuable Asset

Even if APS had the legal right to shut down Palo Verde—which it does not—it is very doubtful that it would do so in response to the Initiative, despite its threats. Because Palo Verde has lower costs and superior environmental performance to other non-renewable generators, APS and its regulator, the ACC, will likely see Palo Verde as a valuable resource for decades to come.

A. The ACC Is Unlikely to Determine that Plant Closure Is “Prudent.”

As a regulated utility, APS's profitability depends on its ability to charge rates that recover its costs plus a return on equity. The ACC has authority over APS's rates. In the context of a plant closure, the ACC would determine whether the costs incurred in closing the plant and procuring

¹⁷ See Testimony by Jose L. Perez, Southern California Edison Company, before the Public Utilities Commission of the State of California, App. 1 at 13 *2016 Decommissioning Cost Study for the Palo Verde Nuclear Generating Station*. (May 31, 2017), available at [http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/DEC898B14C07ADE28825813100747A9B/\\$FILE/A1603004%20SCE%20-%20Perez%20-%202016%20PVNGS%20DCE%20SCE-05%20Rev%201.pdf](http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/DEC898B14C07ADE28825813100747A9B/$FILE/A1603004%20SCE%20-%20Perez%20-%202016%20PVNGS%20DCE%20SCE-05%20Rev%201.pdf).

¹⁸ See Participation Agreement § 8A.7.2.3 (as amended by Amendment No. 13, effective June 15, 1991).

¹⁹ APS's 2016 decommissioning funding report filed with the Nuclear Regulatory Commission shows that El Paso Electric Company has funded approximately \$249 million toward its 15.8% share of the total reported decommissioning costs of approximately \$1.8 billion. See *2016 Decommissioning Funding Status Report for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 and Independent Spent Fuel Storage Installation (ISFSI) Docket Nos. STN 50-528/529/530 and 72-44; Consolidated Decommissioning Funding Status Report – 2016*, Enclosure 1 at 4 (Mar. 31, 2017), available at <https://www.nrc.gov/docs/ML1709/ML17090A532.pdf>. Given the revised decommissioning cost estimate in the 2017 study, see *supra* note 17, this likely understates the amount of the shortfall.

replacement energy were “prudent” and therefore recoverable in rates. To avoid risking an adverse prudence determination, APS would likely submit any controversial plant closure proposal to the ACC in advance. APS would likely do so by including the proposal in its integrated resource plan and seeking ACC approval in that proceeding,²⁰ as it did recently for its proposal to retire Cholla Power Plant Unit 2.²¹

In evaluating utilities’ integrated resource plans, including plant retirement proposals, the ACC considers numerous factors.²² Of crucial relevance here are the following factors: cost to ratepayers, environmental considerations, and fuel diversity. Each of these factors would support continuing to run Palo Verde and backing down fossil fuel generation instead, if necessary, to meet the requirements of the Initiative.

When determining whether a proposed resource planning action, such as a power plant retirement, is reasonable and in the public interest, the ACC’s regulations direct it to consider the “total cost of electric energy services.”²³ For a facility like Palo Verde, the ACC would need to consider the cost of energy provided by Palo Verde as compared to alternatives, and the considerable capacity value that Palo Verde has as a reliable source of electricity on the APS system. Within the APS portfolio, Palo Verde has the lowest costs among non-renewable resources.²⁴ This means that in times of low energy demand or high renewable energy output, grid operators will continue to order Palo Verde to run ahead of every other non-renewable resource on the grid. Palo Verde also has low operating and maintenance costs. As the largest nuclear plant in the nation, Palo Verde has economies of scale that keep its costs low.²⁵ For example, Palo Verde has a cost advantage from the fact that it consists of three identical reactors,

²⁰ See ARIZ. ADMIN. CODE § 14-2-704(E).

²¹ See ACC, *Resource Planning and Procurement in 2013 and 2014*, Order, Decision No. 75068, Docket No. E-00000V-13-0070 at 4 ¶ 8 (May 8, 2015).

²² See ARIZ. ADMIN. CODE § 14-2-704(B).

²³ *Id.* § 14-2-704(B)(1).

²⁴ According to S&P Global Market Intelligence, Palo Verde had both a lower variable operating cost and total (fixed and variable) operating cost in 2017 (\$11.06/MWh and \$24.28/MWh, respectively) than either APS’s natural gas combined cycle plants (\$32.34/MWh and \$36.02/MWh, respectively) or coal-fired facilities (\$30.42/MWh and \$41.20/MWh, respectively). Only its renewable energy facilities have lower operating costs. S&P’s data are sourced from the FERC Form 1, RUS 12, RUS 7, EIA 412 (pre-2004) and S&P Global Market Intelligence estimates. See also Dale Probasco & Roger Schiffman, Navigant, *Overview of Desert Southwest Power Market and Economic Assessment of the Navajo Generating Station* at 14 (Apr. 6, 2017) (showing Palo Verde as having lower variable costs than any other thermal generator in the region) available at <http://yestongs.org/docs/Navigant%20NGS%20ACC%20Presentation.pdf>.

²⁵ See Energy Information Administration, *Annual Energy Outlook 2018*, Nuclear Power Outlook (May 7, 2018) (explaining cost advantages of multi-reactor plants), available at https://www.eia.gov/outlooks/aeo/section_issues.php#npo.

which enables savings in engineering modifications, workforce training, outage planning among other categories.²⁶

A recent analysis prepared by ICF, on behalf of NRDC, modeled the electricity market in Arizona (and the broader Western Electricity Coordination Council (WECC) region) under a few scenarios—a business as usual case, a case with a 50% renewable energy by 2030 requirement, and a case with expanded investment in natural gas generation that mirrored the utilities’ new natural gas builds in their respective, recent integrated resource plans. The study found that, because of Palo Verde’s cost structure, the plant continued to run nearly around-the-clock under every scenario studied.²⁷ Given these cost advantages over coal- and natural gas-fired generation, it is very doubtful that either APS or the ACC would think it prudent to retire Palo Verde prematurely.

The ACC’s regulations also direct it to consider the “environmental impacts of resource choices and alternatives.”²⁸ Compared to the fossil-fuel resources that would otherwise compose the non-renewable portion of APS’s portfolio, Palo Verde delivers valuable environmental benefits for the state that the ACC would be reluctant to lose. To begin, Palo Verde uses no fresh water. The facility uses municipal reclaimed water for cooling, which makes it resilient to drought and a key component of APS’s goal of reduced water usage.²⁹ Palo Verde also emits no local air pollutants such as mercury, nitrogen oxides, sulfur dioxide, particulate matter or carbon monoxide. Historically, ambient air quality standards have moved toward greater stringency to protect public health. Thus, a facility that will not require new capital investment if standards become more stringent will be a better choice from a cost and risk perspective.

Palo Verde also emits no carbon dioxide, and thus offers an important hedge against the possibility of federal regulations limiting greenhouse gas emissions. The U.S. Environmental Protection Agency’s Clean Power Plan promulgated in 2015 would have required Arizona’s rate of carbon dioxide emissions from the electric power sector to decline more than 50% by 2030,³⁰ a target that could have been far more difficult to achieve without Palo Verde. Depending on the outcome of litigation, the standards in the Clean Power Plan may never be enforced. But other standards may be imposed in the future. Accordingly, utilities and utility regulators across the

²⁶ See Rate Application of Arizona Public Service Company Part 3 of 3, Direct Testimony of John J. Cadogan, Jr. On Behalf of Arizona Public Service Company at 6, ACC Docket No. E-01345A-16-0036, (Jun. 1, 2016).

²⁷ See Dylan Sullivan, *New Study: Palo Verde Nuke Plant Stays Open with a 50% RPS*, NRDC.ORG: EXPERT BLOG (Jun. 5, 2018), available at <http://www.nrdc.org/experts/dylan-sullivan/palo-verde-nuke-plant-stays-open-50-rps>.

²⁸ ARIZ. ADMIN. CODE § 14-2-704(B)(7).

²⁹ See 2017 APS IRP at 184-85.

³⁰ Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64661 (Oct. 23, 2015); see also *Clean Power Plan (CPP)*, ARIZ. DEP’T OF ENV. QUAL. (Feb. 20, 2018), available at <https://azdeq.gov/clean-power-plan-cpp>.

country are planning for a future with limits on carbon dioxide emissions.³¹ In this environment, APS and the ACC would be reluctant to abandon a zero-emission resource.

The ACC's regulations further direct the Commission to consider "fuel diversity" when reviewing a utility's major decisions.³² Fuel diversity allows utilities to mitigate the risk of price volatility and supply constraints that come with relying on any one source. APS is the only nuclear generator in the Southwest and, were it to retire, it would be replaced overwhelmingly by natural gas, not just by APS but also by the other southwestern utilities that rely on it. In a recent proceeding on APS's 2017 IRP, the ACC staff noted the importance of hedging against natural gas price volatility:

[T]he level and volatility of the price of natural gas is very uncertain in the long-term future as a variety of factors domestically and internationally can exert upward or downward pressure on prices. Combined with Arizona's growing reliance on natural gas generation in recent decades and the expectation that such dependency will grow in the future, natural gas pricing issues are a key driver in future resource planning decisions by Arizona utilities. Thus, a very robust sensitivity analysis, considering a wide variety of natural gas price scenarios, should be a cornerstone of utility resource planning in Arizona.³³

Taking up staff's recommendation, the ACC refused to endorse APS's planned aggressive buildout of natural gas resources and instead ordered APS to study a wider range of natural gas price scenarios,³⁴ and to consider portfolios in which fossil fuels make up less than 20% of new resource additions.³⁵ With these concerns in mind, the ACC would likely view fuel security considerations to weigh heavily against any proposal to close Palo Verde.

B. APS Has the Ability to Integrate Increased Renewable Energy with Palo Verde's Existing Capability.

APS contends that, at times of the year when electric power demand is low and solar output is high, generation from Palo Verde might have to be curtailed. And if so, APS claims, that would change the plant's economics and lead to closing the plant.³⁶ APS has made this statement publicly

³¹ See, e.g., Southern Company, *Planning for a low-carbon future* at 11 ("there is no comprehensive federal regulatory framework for limiting CO₂ emissions from existing power plants in the U.S., absent major modifications at those plants. We recognize that domestic policies may emerge in the future that assist in transitioning the U.S. to a lower GHG-emitting economy.") (2018) available at <http://www.southerncompany.com/content/dam/southern-company/pdf/corpresponsibility/Planning-for-a-low-carbon-future.pdf/>.

³² ARIZ. ADMIN. CODE § 14-2-704(B)(5).

³³ See ACC, *Resource Planning and Procurement in 2015 and 2016*, Docket No. E-00000V-15-0094, Decision No. 76632 at 37 ¶ 219 (March 29, 2018).

³⁴ *Id.* at 48-49 ¶¶ 270-276; see also *id.* at 51.

³⁵ *Id.* at 51.

³⁶ See Ryan Randazzo, *Palo Verde nuclear plant could close if renewable-energy measure passes*, APS says, *The Republic*, Apr. 12, 2018, available at

but has produced no data or analysis to support it. The only analysis performed to date, by ICF for NRDC, has found the opposite—that Palo Verde will continue to run as it does now, even at 50% renewable penetration.

Moreover, should the Initiative pass, APS has the time and tools at its disposal to ensure that Palo Verde will continue running alongside increased penetration of renewable energy. The Initiative would not take effect until 2020. And, even then, it begins with a renewable energy requirement of 12%,³⁷ which APS already achieved in 2017.³⁸ That gives APS time to implement measures to integrate the increased use of renewable energy.

First, and most obviously, if it is concerned with oversupply, APS can take measures to reduce the use of fossil fuel-fired generation. Palo Verde is not the only resource in APS's portfolio that could be curtailed during times of peak solar output and low demand (and would in fact be one of the least economic resources for at APS to back down). On a capacity basis, Palo Verde comprised 14% of APS's 2017 portfolio, a figure the company expects will shrink to only 9% in 2032, compared to 74% fossil fuel generation.³⁹ These figures show that there are many other, more costly resources that could be backed down before curtailing Palo Verde.

Second, if APS is concerned about oversupply of solar resources during certain hours of the day or months in the year, then the solution is a renewable energy portfolio that is technologically varied and geographically dispersed. In addition to some of the best solar resources in the world, Arizona has access to abundant and low-cost wind power across the southwest, which peaks at different times of the day and year than solar.

Third, APS could increase its investment in energy storage and demand-side management. Storage resources support grid reliability and enable increased penetration of renewable energy by absorbing energy during times of peak output and releasing it when needed. The cost of battery storage has fallen by 79% in the last 8 years.⁴⁰ As a result, utilities across the southwest are increasingly investing in storage.⁴¹ APS itself made an investment earlier this year with Arizona's

<https://www.azcentral.com/story/money/business/energy/2018/04/12/palo-verde-nuclear-plant-could-close-if-renewable-energy-measure-passes-aps-says/491088002/>.

³⁷ See State of Arizona Application for Serial Number Initiative Petition § 2(D)(2) (filed Feb. 20, 2018), available at <http://apps.azsos.gov/election/2018/general/ballotmeasuretext/C-04-2018.pdf>.

³⁸ 2017 APS IRP at 12.

³⁹ *Id.* On an energy basis, APS expects Palo Verde will decline from 25% in 2017 to 17% in 2032 under its preferred portfolio.

⁴⁰ See Bloomberg New Energy Finance, *Batteries and their impact on the electricity sector*, NEW ENERGY OUTLOOK 2018 (2018), available at https://about.bnef.com/new-energy-outlook/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top#toc-download.

⁴¹ Xcel Energy Colorado recently announced a plan to add 1.8 gigawatts of renewable energy along with 275 megawatts of storage to be embedded with solar generation. The plan is expected to save the utility's customers \$215 million. See Public Service Company of Colorado, 2016 Electric Resource Plan, Colorado Public Utility Commission Proceeding No. 16A-0396E (June 6, 2018). NV Energy in Nevada also recently announced plans to add 1 gigawatt of solar with 100 megawatts of energy storage. See Press

First Solar to develop a solar-plus-storage facility to be built next to an existing natural gas plant in Maricopa County.⁴² APS also recently issued a Request for Proposals to construct 106 MW of battery storage to pair with APS solar plants.⁴³ Such projects, pursued consistently and at scale, would directly address the concern raised by APS about peak solar output. APS can also increase its investment in demand-side management, including load control and load shifting programs, which could include programs to ensure that electric vehicles and other grid-enabled electric appliances charge or run during times when solar energy is abundant. APS has begun to develop these types of programs,⁴⁴ but could do much more in the years to come.

Fourth, while we doubt it would be necessary, APS has the option of reducing the amount of electricity it receives from Palo Verde, either by reducing its ownership share or re-selling energy it does not need. As noted above, APS owns approximately 25.1% of Palo Verde outright and leases an additional 4%. If APS truly was unable to use its full allotment from Palo Verde, it could mitigate the problem by allowing its leased interest to expire, thereby reducing the level of generation it gets from the facility by roughly 14%. Palo Verde also sits at a major trading hub with transmission access to the four-state area it was designed to serve; which means that, if necessary, APS would have the option to re-market electricity it could not use to a broad array of utilities across the region.

Release, NV Energy, NV Energy Announces Largest Clean Energy Investment in Nevada's History (May 31, 2018) available at <https://www.nvenergy.com/about-nvenergy/news/news-releases/nv-energy-announces-largest-clean-energy-investment-in-nevadas-history>.

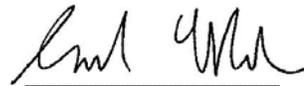
⁴² See Press Release, First Solar, APS, First Solar Partner on Arizona's Largest Battery Storage Project (Feb. 12, 2018), available at <http://investor.firstsolar.com/news-releases/news-release-details/aps-first-solar-partner-arizonas-largest-battery-storage-project>.

⁴³ See APS, 2018 request for proposals (rfp) – battery storage, available at <https://www.aps.com/en/ourcompany/doingbusinesswithus/rfp/Pages/home.aspx>.

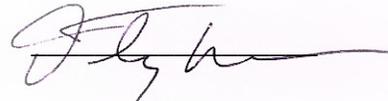
⁴⁴ See APS, Demand Side Management Implementation Plan for 2018, ACC Docket No. E-01345A-17-0134 (Sept. 1, 2017).

IV. Conclusion

APS claims that a 50% renewable energy standard will result in the closure of Palo Verde. This claim does not bear scrutiny. APS is one of seven utilities that jointly own Palo Verde and whose unanimous approval would be required to close the plant. APS cannot unilaterally close Palo Verde. Given the plant's low costs and environmental attributes, it is very doubtful that the other utility owners would agree to shut it down prematurely. Moreover, for those same reasons, and because it has multiple options to address the over-generation problem it points to, we doubt APS would ultimately seek to retire Palo Verde prematurely or that the ACC would permit it to do so.



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