



# 2016

## CORPORATE RESPONSIBILITY REPORT

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PINNACLE WEST CAPITAL CORPORATION

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### THIS REPORT FEATURES PHOTOGRAPHY BY SUZANNE MATHIA

Suzanne is a photographer and author whose work regularly appears in National Geographic and publications for the Nature Conservancy. Her photographs capture the diversity and intense beauty of Arizona's immense landscape and reflect her curiosity, patience and ability to see the world in new and creative ways.

Featured Work: Wotan's Throne (Cover), Desert Wave (Pg 8), Labyrinth (Pg 20), Weathering Pit Ridge (Pg 30), Paradise Found (Pg 42), Golden Window (Pg 50).

PINNACLE WEST CAPITAL CORPORATION  
COMBINES A SOLID FOUNDATION AND A CLEAR  
STRATEGY TO BUILD SHAREHOLDER VALUE...

Superior reliability and operating performance across our business

Excellent customer service and deep community involvement

Affordable electricity rates

A balanced, high-performing power generation portfolio

A constructive regulatory environment

Targeted investments in innovative technologies

Solid financial results

...WITH A SHARPENED FOCUS ON OUR CORE UTILITY BUSINESS.

**THE APS VISION »**

Creating a sustainable  
energy future for Arizona.

**THE APS MISSION »**

We safely and efficiently generate and deliver reliable  
energy to meet the changing needs of our customers.

## LETTER FROM THE CEO & CSO

Arizona Public Service is committed to giving its customers what they want: increasingly clean, reliable and affordable energy, with rate options that give them more choices and control. Our company stands at the forefront of a changing energy industry.

Our commitment is reflected across our business, including in our deployment of advanced technologies, greater use of carbon-free resources and our active citizenship in the communities we serve.

It is our corporate responsibility to ensure future success and sustainability as we provide the service our customers desire and deserve. Sustainability encompasses a triple bottom line—balancing the needs of people, planet and performance. This means every decision should take into account not only environmental stewardship, but also customer and community considerations, economics, and the reliability of our operations.

Here are some of the ways we demonstrated that balance in 2016:

### **A RELIABLE AND DIVERSE PORTFOLIO**

In 2016 we reached more than one gigawatt of solar on our system. Prior to last year, no other electricity company outside California had reached that milestone. To foster the development of this growing resource and provide a cleaner energy future for Arizona, APS has invested in innovative solar deployment and research for both grid-scale plants and rooftop systems. Growth in renewable energy resources and advanced grid technologies expands customer choices and diversifies our portfolio. Natural gas resources continue

to represent a significant segment of our generation assets, providing relatively low cost, responsive energy needed to meet the needs of our customers. In addition, Palo Verde Nuclear Generating Station—the largest U.S. power producer of any kind—generates reliable, zero-emissions energy for 4 million people in Arizona, California, New Mexico and Texas. Palo Verde, our natural gas fleet, renewables and energy efficiency resources provide the bulk of our energy mix.

### **ENHANCED CUSTOMER ENGAGEMENT**

Advanced grid technologies and innovations such as home energy-management systems and smart thermostats are allowing customers to manage their energy like never before. Our job is to make sure these technologies integrate seamlessly into the electric grid. APS is pioneering two research programs designed to enhance our understanding of emerging technologies, including the Solar Innovation Study and the Solar Partner Program. Both programs provide insight into how rooftop solar interacts with the grid and other distributed energy resources.

### **ENERGY IMBALANCE MARKET**

APS began participating in the California Independent System Operator (CAISO) Energy Imbalance Market (EIM) in October 2016. As the only five-minute energy market in the western United States, the EIM enables us to more quickly take advantage of favorable pricing opportunities in wholesale energy markets, more effectively integrate all generation resources and pass the savings on to our customers. In just the first three months of participation, we saved \$6 million, all of which gets passed directly to our customers.

## COAL STRATEGY

Electricity companies around the country are experiencing mounting pressures on coal-fired generation. In addition to environmental regulations, the low cost of competing resources, such as natural gas-fired generation, are making coal assets less economical to operate. The challenge is to manage these issues and act responsibly. APS continues to execute our stated plans for the Four Corners and Cholla power plants.

Our ability to manage environmental risks and opportunities is a significant part of our progress. Our dedication to environmental stewardship was recognized by the CDP (formerly the Carbon Disclosure Project) in 2016. The CDP noted that Pinnacle West is “taking coordinated action” on climate change issues and graded the company above industry and regional averages for climate change management. The CDP credits itself as the only global disclosure system for companies, cities, states and regions to manage their environmental impact and for investors or purchasers to access environmental information for use in financial decisions. This recognition provides further validation of our efforts to implement long-term solutions for sustainable energy production, distribution and use.

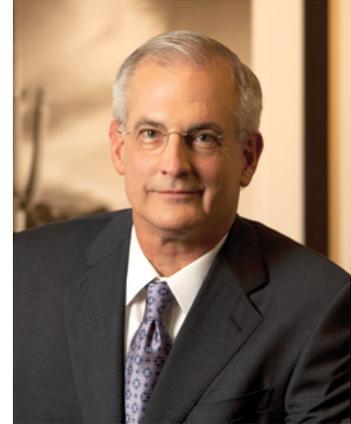
APS contributes more than \$3.4 billion annually to Arizona’s economy, and we remain dedicated on the future of our state. Our commitment to safety and reliability guides our strategies. Enriching our communities through corporate giving and volunteerism programs is an ongoing goal. A diverse and empowered workforce strengthens every area of our company. Embracing emerging technologies and staying ahead of changes to our business cultivates innovation. Through it all, we are making APS a stronger, more resilient enterprise that is better prepared to shape a sustainable future for our company and the customers who count on us to power their homes and businesses.



**DONALD E. BRANDT**



**PATRICK DINKEL**



**DONALD E. BRANDT**

*Chairman, President & Chief Executive Officer, Pinnacle West and APS*



**PATRICK DINKEL**

*Vice President, Environmental & Chief Sustainability Officer, APS*

## FORWARD-LOOKING STATEMENTS »

This report contains forward-looking statements based on current expectations. These forward-looking statements are often identified by words such as “estimate,” “predict,” “may,” “believe,” “plan,” “expect,” “require,” “intend,” “assume” and similar words. Because actual results may differ materially from expectations, we caution you not to place undue reliance on these statements. A number of factors could cause future results to differ materially from historical results, or from outcomes currently expected or sought by us. A discussion of some of these risks and uncertainties is contained in our annual report on Form 10-K and is available on our website at [pinnaclewest.com](http://pinnaclewest.com), which you should review carefully before placing any reliance on our forward-looking statements, financial statements or disclosures. We assume no obligation to update any forward-looking statements, even if our internal estimates change, except as may be required by applicable law.

## REPORT METHODOLOGY »

This report was prepared using guidance from the Global Reporting Initiatives guidelines for G4 and Electric Utilities Sector Supplement and focuses on APS, our primary subsidiary. Our greenhouse gas (GHG) emission and water usage data was third party verified by Yorke Engineering. All other information in this report is reviewed and verified internally.

## ABOUT THIS REPORT »

Sustainability requires balancing the triple bottom line—people, planet and performance. At APS, we address sustainability through our Strategic Framework, known as our Core. Using our Core to achieve triple bottom line results positions APS to be a leader in our industry.

While achievement of this leadership position is a culmination of all the work done across the company to meet our business objectives, there are currently five critical areas that drive our sustainability efforts. This year’s Corporate Responsibility Report highlights five critical sustainability focus areas:

- Carbon Management
- Energy Innovation
- Safety and Security
- Water Resources
- People

Other sustainability initiatives remain important to our success. However, we are no longer including them in this report and have placed that information on our website. You can find this report, and more information on our sustainability, at [pinnaclewest.com](http://pinnaclewest.com) (select “Corporate Responsibility”).

## ABOUT APS »

Pinnacle West Capital Corporation is an energy holding company with a focus on the business of its primary subsidiary, APS. APS is Arizona’s largest and longest serving electric company. APS has been powering Arizona’s economic growth since our company’s founding in 1886. Today, new technologies and evolving customer expectations are leading to rapid changes in our company and our industry. We are investing in innovative technologies to build an energy infrastructure that will be smarter and stronger. We are making the next generation of power cleaner and more efficient through a balanced energy mix, investments in renewable energy and upgrades to power plants. Through these efforts, we intend to succeed as a next-generation energy

company, while preserving the reliability, affordability and service our customers have come to expect from us.

**SUSTAINABILITY GOVERNANCE »**

At APS, sustainability means we work to support a vibrant economy, a healthy environment and strong communities for future generations. Sustainability drives business value, mitigates risk and enhances brand reputation, and is ingrained in our culture of excellence and our commitment to continuous improvement. Our Vice President, Environmental & Chief Sustainability Officer oversees the company’s strategic efforts to integrate sustainable practices into our core business operations.

Our sustainability priority areas integrate directly into the APS Core, which provides the foundation from which we operate and keeps us focused on the right things. It begins at the center with our vision (what we aspire to be) and our mission (what we do today). Our values guide our decisions and behaviors. Our critical areas of focus are where we direct our work to drive success.

Our corporate and business unit metrics and the initiatives supporting them align with the critical areas of focus. Our business plans support our long-term company strategy and provide a single, well-defined direction. These plans help us prioritize our work,



CRITICAL AREA OF FOCUS	TIER 1 CORPORATE METRIC	2017 GOAL
 EMPLOYEES	OSHA Recordable Incidents	35
 OPERATIONAL EXCELLENCE	System Average Interruption Frequency Index (SAIFI)	0.89
	Summertime Equivalent Availability Factor (EAF)	91.8%
	Palo Verde Capacity Factor	92%
	Palo Verde INPO Performance Indicator Index <sup>1</sup>	96.4
 ENVIRONMENT	Conservation of Non-Renewable Water Supplies	10% DECREASE (from 2014 usage)
 CUSTOMER VALUE	Customer Outcome Satisfaction— Measured by Customer Contact Tracking	85%
 COMMUNITY	N/A	N/A
 SHAREHOLDER VALUE	PNW Earned ROE <sup>2</sup>	≥ 9.5%
	PNW O&M <sup>3</sup>	\$938 MILLION
	PNW Capital	\$1,365 MILLION

<sup>1</sup>Palo Verde Institute of Nuclear Power Operations (INPO) Performance Indicator Index

<sup>2</sup>Pinnacle West Earned Return on Equity (ROE)

<sup>3</sup>Pinnacle West Operations and Maintenance (O&M)

collaborate across the organization, align our resources and measure our progress with rigor and discipline.

Our executive officers' compensation is connected to business unit performance, individual performance and value-driving business metrics. The business unit performance is tied to operational excellence, shareholder value, environment and measures related to customers, communities and our employees.

### BOARD OF DIRECTORS' ROLE IN SUSTAINABILITY OVERSIGHT »

As of January 31, 2017, the Board of Directors consisted of 11 directors, 10 of whom are independent. The makeup of the Board

includes two women and one director of Hispanic descent. The Pinnacle West President and CEO is the only board member who is not independent, and he serves as Chairman. The Board of Directors has five standing committees: Audit, Corporate Governance, Finance, Human Resources, and Nuclear and Operating. The Board's oversight of sustainability is conducted primarily through the committee most closely aligned with the particular area or topic of the company's sustainability model. For example, the Nuclear and Operating Committee has oversight of sustainability issues associated with all generation, including carbon and water management, fuel supply, transportation, environmental stewardship, and security

controls for the protection of cyber and physical assets. The Human Resources Committee is responsible for oversight of our programs to attract, retain, motivate and develop our employees. As part of its regular review of strategic issues, the full Board regularly considers the sustainability of our energy innovation activities, our safety practices and our human resources programs.

### **STAKEHOLDER ENGAGEMENT »**

In 2016, APS participated in the Ceres Stakeholder Engagement process to get feedback on our sustainability performance and disclosures.

### **WHAT WE LEARNED »**

The Ceres Stakeholder Engagement process provided insights for improvements to our Corporate Responsibility Report, including:

- Providing a clearer description of how sustainability is a core aspect of our business strategy;
- Setting and disclosing ambitious short- and long-term goals;
- Adding more details on the Pinnacle West Board of Directors' role in sustainability oversight; and
- Discussing the role of the customer as a critical aspect of the company's business strategy.

We have reviewed these recommendations and have incorporated them into this year's report.

### **ETHICS »**

APS has built a legacy over the past 130 years of doing the right thing. That is why APS takes our Code of Ethics & Business Practices so seriously.

In 2016, the Pinnacle West Board of Directors approved an updated APS Code of Ethics and Business Practices. The Code incorporates the APS Core plus expanded safety, privacy and physical security content. The Code applies to all company employees and the Board of Directors. Code topics include, among other things, being fit for duty, providing a respectful work environment, using company resources appropriately, ensuring regulatory compliance and protecting privacy. To emphasize the importance of ethics in the workplace, APS trains all employees and the Board of Directors annually on the Code.



## CARBON MANAGEMENT

Our vision is to create a sustainable energy future for Arizona. To accomplish this, we must strike a balance between delivering reliable, affordable energy and being responsible stewards of the environment.

By the end of 2016, 50 percent of our diverse energy mix was carbon-free. We reached this level with a combination of traditional and renewable energy resources and energy efficiency actions.

We continue working to make that mix cleaner. These efforts include closing coal units, modernizing natural gas plants, deploying renewable energy and improving energy efficiency. Our Palo Verde Nuclear Generating Station continues to be the country's largest source of carbon-free energy, far surpassing other energy sources for producing clean, around-the-clock power.

Our efforts to reduce our carbon footprint are not limited to energy generation. We also have made our own buildings more energy efficient and continued converting our fleet to more fuel-efficient vehicles. Through these combined efforts, APS avoided 4.9 million metric tons of carbon dioxide emissions that otherwise would have been emitted in 2016—equivalent to removing more than 1 million automobiles from the road.

In line with projected population growth in Arizona, we anticipate customer growth of approximately 45 percent by 2032, representing up to an additional 549,000 customers. We expect renewable energy and energy efficiency to meet more than 50 percent of that growth. This will help us achieve our long-term goal to reduce our carbon-emission rate to less than 600 pounds per megawatt-hour (lb/MWh) by 2032.



OF OUR DIVERSE ENERGY MIX  
IS CARBON-FREE

300

INDIVIDUAL ENERGY-SAVING  
OPTIONS FOR CUSTOMERS



4.9 MILLION METRIC TONS OF CO<sub>2</sub> AVOIDED IN 2016 VS. GOAL OF 3.5 MILLION

32.2 MILLION MWH

CARBON-FREE ENERGY PRODUCED BY PALO VERDE

## **CARBON REPORTING AND METRICS »**

We believe it is important to disclose our carbon management strategies and greenhouse gas (GHG) emissions to customers, investors and other stakeholders. APS voluntarily reports to the CDP (formerly the Carbon Disclosure Project) on an annual basis. CDP is a global nonprofit organization that collects and analyzes environmental data for investors to use in financial decisions. This organization's network of investors represents more than \$100 trillion in assets. CDP reporting provides a benchmark for APS to evaluate how well we manage our carbon emissions and climate change risk, and to identify opportunities for improvement. In addition, we submit a comprehensive annual report of our GHG emissions to the Environmental Protection Agency (EPA) as required by federal law.

In 2016 we improved our CDP reporting for climate change and water resources management, including for the first time obtaining third party verification of our GHG emissions. Our reporting improvements resulted in achieving a "Management" score (letter grade "B"), which exceeds industry averages for climate change management.

For APS, short-term (annual) carbon emissions from generation sources are predominantly a function of energy demand due to weather and variations in our generation resources due to fuel prices. Reductions in natural gas prices allowed us to shift a large portion of our energy generation from coal to gas. Carbon emissions from our gas-fired fleet increased by about 27 percent; however, the carbon emissions from our coal-fired fleet decreased by more than 40 percent. For 2016, the cumulative effect was a 26 percent decrease in total carbon emissions.

To measure our overall carbon reduction—not just decreasing emissions from generation but also in our own operations—we use a carbon-avoidance metric. This reflects actions taken throughout the company, including retiring coal units, installing renewable generation and energy efficiency, increasing our building and operating efficiencies and pursuing fleet electrification. Our 2016 carbon-avoidance goal was 3.5 million metric tons. We ended the year with a carbon avoidance of 4.9 million metric tons. The primary reason for far surpassing our carbon avoidance goal was due to more renewable energy generation than originally projected.

As Arizona's population grows, APS plans to provide the increased energy required to support this growth as efficiently as possible relative to carbon emissions. Therefore, we set long-term carbon emission goals based on our carbon intensity, as measured by the pounds of carbon emission per megawatt-hour of energy. By 2032, we expect our carbon-emission rate to decrease to less than 600 lb/MWh.

## **COAL REDUCTION »**

We have permanently retired four coal-fired units since 2013—one unit at our Cholla Power Plant in Arizona in 2015 and three units at our Four Corners Power Plant on the Navajo Nation in 2013.

Plans call for the end of all coal-burning generation by our other Cholla units by mid-2025. On our remaining coal units at Four Corners, which are newer and more efficient than the three that were closed, we will add an additional \$400 million in pollution control equipment by 2018. This new pollution control equipment is designed to reduce nitrogen oxide emissions up to 90 percent.

This focused coal reduction plan is expected to decrease the share of coal-fired energy in our generation mix from its current level of 25 percent to about 14 percent by 2032.

With the closure of these four units, we have retired a cumulative 820 megawatts (MW) of coal-fired generation since 2013, which resulted in a regional reduction of carbon emissions of approximately 29 percent. These closures also resulted in collateral emission reductions that included nitrogen oxide

#### **PALO VERDE NUCLEAR GENERATING STATION »**

APS operates the Palo Verde Nuclear Generating Station and owns or leases 29.1 percent of the facility.

For the 25th consecutive year, Palo Verde was the nation's biggest power producer, generating 32.2 million MWh of carbon-free electricity in 2016. Palo Verde is the only generating facility in the nation to produce more than 30 million MWh in a year, a milestone the plant has achieved eight consecutive years and a total of 12 times.

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**Electricity generated by Palo Verde annually displaces more than 13.2 million metric tons of GHG emissions that would otherwise have been produced, providing clean energy that powers homes and businesses throughout the Southwest.**

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emissions (reduced by 36 percent), particulate emissions (43 percent), sulfur dioxide emissions (29 percent) and mercury emissions (63 percent).

In 2016, overall carbon emissions from our fossil-generation fleet totaled 10 million metric tons. This is 3.5 million metric tons fewer than 2015. The carbon intensity of our fossil-generation fleet was reduced to 1,476 lb/MWh in 2016, representing a 25 percent decrease from the 2015 fossil carbon intensity. This decrease is due to a larger percentage of energy being generated from our gas-fired units.

Palo Verde produces 80 percent of Arizona's carbon-free electricity, with nearly half of the plant's output dedicated to serving Arizona consumers. Electricity generated by Palo Verde annually displaces more than 13.2 million metric tons of GHG emissions that would otherwise have been produced, providing clean energy that powers homes and businesses throughout the Southwest.



# MORE THAN 16,200

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RESIDENTIAL CUSTOMERS INSTALLED ROOFTOP SOLAR IN OUR SERVICE TERRITORY IN 2016

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### **GROWING SOLAR GENERATION »**

To meet Arizona’s goal for renewable energy to account for 15 percent of total energy generation by 2025, APS continues to develop industry-leading, sustainable solutions.

In 2016, we opened a new solar plant in Red Rock, Arizona. The 40-MW plant, which is one of the largest solar photovoltaic power plants in the state, is owned and operated by APS in a unique partnership with Arizona State University and PayPal. The Red Rock plant is an example of how we can partner with customers to develop cost-effective solar energy and help customers realize their green energy goals.

More than 16,200 residential customers installed rooftop solar in our service territory in 2016. To help us understand the impact of high deployment of rooftop solar on our system, we are conducting two innovative, research-focused programs with residential customers—the Solar Partner Program and the Solar Innovation Study—which are discussed in detail in the Energy Innovation section of this report.

In May 2016, APS surpassed 1 gigawatt (GW) of overall solar energy capacity. Prior to last year, no other utility outside of California had achieved such a milestone. When generating at full power, this capacity meets the partial

daytime needs of 250,000 Arizona homes. Our solar portfolio includes 551 MW from rooftop systems and 539 MW from grid-scale projects.

Grid-scale solar is the most cost-effective and efficient way to produce solar power, conserve water and avoid carbon emissions. Nine solar power plants in our AZ Sun Program collectively produce 170 MW of clean power using more than 1 million photovoltaic panels in the Arizona desert. Since the first of our APS-owned AZ Sun solar plants came on line in 2011, our grid-scale plants have produced more than 1 billion kilowatt-hours (kWh) of clean energy for our customers.

#### ENERGY EFFICIENT OPTIONS FOR OUR CUSTOMERS »

APS is recognized as a leader in developing energy efficiency programs that enable our customers to have greater control over their energy usage.

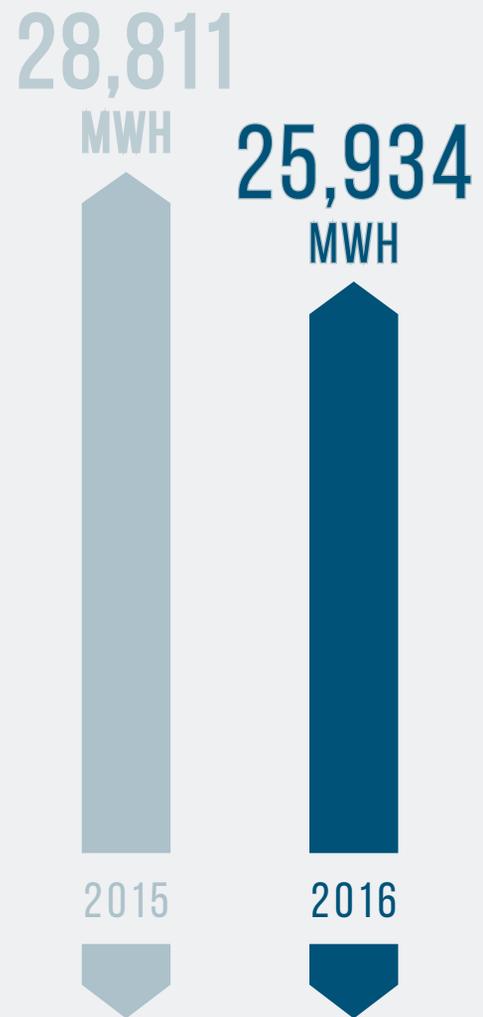
Specifically, the APS 2016 Demand Side Management Plan focuses on helping customers manage peak demand and adopt smart technologies. The plan, which was approved by the Arizona Corporation Commission in July, contains more than 300 individual energy-saving options for customers, ranging from efficient appliances and behavior change education for residential customers to high efficiency equipment such as motors, lights, refrigeration and cooling for business customers.

To continue providing our customers with the latest energy saving solutions at their homes and businesses, we implemented five new or expanded measures in 2016:

- Smart thermostats – Customers can receive incentives for these thermostats that automatically adjust temperature settings

# MORE THAN \$600,000

ANNUAL ENERGY COST SAVINGS FROM THE SCHOOLS PILOT PROGRAM



ELECTRICITY USAGE AT APS FACILITIES YEAR-OVER-YEAR, AN IMPROVEMENT OF APPROXIMATELY 10 PERCENT

and optimize heating, ventilation and air conditioning (HVAC) operation by learning users' patterns over time. In addition to their significant energy saving features, smart thermostats also offer capabilities for smart grid enabled, automated demand response (ADR), in which thermostat settings can be automatically adjusted based on energy prices.

- Western Cooling Control devices for HVAC – Customers can receive incentives for the installation of a device on HVAC equipment that helps optimize its operation for the arid Southwest climate. This device allows the air handler fan to continue operating for five minutes after the HVAC compressor cycle has shut off. This allows the unit to benefit from “free cooling” by circulating air over the coil while it is still cold, saving energy every time the AC unit runs.
- Behavior Demand Response – We send customers event-based messages with the goal of reducing peak demand and saving energy during the highest system-peak days of the year.
- HVAC EC motors – Business customers can receive incentives for using high efficiency Electronically Commutated (EC) motors in their HVAC systems, which can reduce energy usage by 65 percent or more.
- LED linear lighting and LED outdoor lighting – Business customers can receive rebates to switch from fluorescent to LED lighting.

In addition, the APS Solutions for Business program helps schools partially fund energy efficiency projects. Through this program, we have invested more than \$23 million since 2006 to help Arizona schools save more than \$15 million annually on energy. In 2016, a new pilot program launched to help Arizona schools

become more energy efficient. In the Schools Pilot Program, APS paid 100 percent of project costs to install new overhead lighting and HVAC systems in 66 participating schools. The projected result is more than \$600,000 cumulative savings in annual energy costs, which allows schools to redirect funds to the classroom and reinvest in their students.

For the 10th consecutive year, APS in 2016 earned the U.S. Environmental Protection Agency's prestigious ENERGY STAR® Partner of the Year award. This elite award recognizes organizations that have made outstanding contributions to protecting the environment through energy efficiency programs. Additionally, 2016 marked the seventh year in a row that the EPA awarded APS with its highest honor—the ENERGY STAR Sustained Excellence Award—for continued leadership in protecting the environment through energy efficiency.

APS also was recognized for energy efficiency by Ceres, a sustainability nonprofit advocacy organization. We received high rankings for energy efficiency measures in Ceres' 2016 edition of its Benchmarking Utility Clean Energy Deployment report. The study ranked 30 of the largest U.S. investor-owned electric utilities on energy efficiency and renewable energy, including life cycle energy efficiency savings, incremental energy efficiency savings and renewable energy savings. APS was among the top performing companies in incremental energy efficiency savings and life cycle energy efficiency. The benchmarking report showed that in 2015, we achieved an incremental annual energy savings from energy efficiency programs equivalent to 1.5 percent of our previous year's total retail electric sales.

APS continues to meet the energy efficiency standard set by the Arizona Corporation Commission, which is one of the most aggressive standards in the nation. The policy requires APS by 2020 to achieve cumulative savings equivalent to 22 percent of prior year retail sales. Our current portfolio of energy efficiency programs is anticipated to provide over 573,000 MWh of energy savings in 2016. That is enough energy to power more than 40,000 typical Arizona households for an entire year.

permit, clearing the way for construction to begin. Demolition on the abandoned oil tanks was completed by the end of the year, with construction of the new turbines scheduled to break ground in the first quarter of 2017.

The new gas turbines will be fully compliant with the EPA's New Source Performance Standards for carbon emissions from new generating units. The nitrogen oxide and carbon monoxide emissions rates will be cut in half. The new gas turbines are expected to be in commercial service by the

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Since 2005, the lifetime energy savings from APS energy efficiency programs have avoided approximately 17 million metric tons of carbon emissions.

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#### **OCOTILLO POWER PLANT MODERNIZATION »**

Progress continued in 2016 on the Ocotillo Power Plant modernization project. Two 1960s-era natural gas-fired, steam generating units at the power plant in Tempe, Arizona, are being replaced with five new gas-fired turbines equipped with state-of-the-art pollution control technology.

Maricopa County approved the air permit for the plant in March 2016, and in September the EPA Environmental Appeals Board upheld the

summer of 2019. In addition to the modernized plant's environmental benefits, the new units' quick-start capabilities provide the flexible generation required to integrate more renewable energy into our generation resource mix.

#### **CLEAN POWER PLAN »**

Introduced in 2015, the EPA's Clean Power Plan is a comprehensive regulatory program to reduce, by 2030, carbon dioxide emissions from existing power plants nationwide by 32 percent from 2005 levels. States are mandated to develop plans for reducing carbon dioxide emissions to meet state-specific performance standards.

Despite an unclear future for the Clean Power Plan, in 2016 APS continued to participate in a technical working group to provide input to the Arizona Department of Environmental Quality regarding development of the state's response to the plan. The Clean Power Plan could impact the Navajo Nation, where APS owns and operates fossil fuel-fired units. We continued to work to ensure that EPA policies would be developed and implemented in a way that is sustainable for our business and the long term prosperity of the Navajo Nation, should further carbon reductions be required there.

APS over the years has anticipated market movements toward renewable energy, natural gas and energy efficiency. We have a balanced portfolio of generation assets, including carbon-free nuclear, renewables (solar, wind and biomass), natural gas (producing less than one-half the carbon dioxide emissions of coal) and coal, so we are well positioned regardless of the outcome of the Clean Power Plan.

#### **CLIMATE CHANGE »**

APS recognizes that climate change is an important issue affecting the global environment and impacting our business, customers, employees and shareholders. Electric utilities face a unique challenge when it comes to reducing their GHG emissions. For more than a century the majority of electrical energy has been generated with carbon-based fuels. Transitioning to a decarbonized generation resource mix is a long and expensive undertaking. However, APS has been moving toward a lower carbon position for many years.

A changing climate also makes it more challenging to provide reliable and affordable energy

to Arizona customers. We are seeing a reduction in the water supply that is critical to operating our generating units. As described in the Water Resources section of this report, APS has taken steps to ensure long-term water supplies for our generating units. We also have proactively increased our system resiliency, implemented forest management programs to mitigate the risk of wildfires, and developed rapid response plans to promptly restore power after storms.

APS participates in various research and policy organizations, such as the Electric Power Research Institute, Edison Electric Institute, Center for Climate and Energy Solutions and the Center for a New Energy Economy, to understand varied perspectives on climate change and the value of effective and actionable carbon reduction strategies.

#### **GREENER FACILITIES »**

Our commitment to reduce our environmental footprint through sustainable practices is evident throughout APS facilities.

Our corporate headquarters in Phoenix has earned five ENERGY STAR labels for energy efficiency from the EPA. Over the past 10 years, we have improved energy efficiency at this facility by approximately 20 percent. Overall, APS facilities have received 10 ENERGY STAR labels.

APS maintained a focus on green building principles in 2016 while renovating our primary data center. While the objective was to renew aging infrastructure with a focus on operational reliability, we emphasized environmentally friendly, energy efficient materials and systems in the project. Highlights include replacement of fluorescent lighting with a combination

of LED lighting and use of natural light, higher efficiency mechanical systems, replacement of plumbing fixtures with low-flush and low-flow fixtures, and utilization of low-VOC paint and flooring materials.

These strategies are now embedded within our standard architectural and engineering specifications when managing changes to our buildings or constructing new space. Ongoing initiatives to support green building principles include:

- Using LED light fixtures as standard to improve energy efficiency
- Utilizing natural light when viable
- Eliminating harmful PCBs
- Replacing HVAC systems with a focus on energy efficiency and reduction of ozone depleting refrigerant

As a result of these efforts, our 2016 electricity usage was 25,934 MWh, compared to our 2015 usage of 28,811 MWh, an improvement of approximately 10 percent year-over-year.

Going forward, proactive assessments of the health and use of our buildings, utilization of the most current technologies as we renovate, re-using materials where possible and further replacing ozone-depleting technologies will be the basis for our decision making. We will continue to design, construct, operate and maintain our new and remodeled facilities to ENERGY STAR and Leadership in Energy and Environmental Design (LEED) standards.

#### **GREENER FLEET »**

The APS transportation fleet continues its

conversion to more fuel-efficient vehicles. Through this ongoing conversion and by using our fleet more efficiently, we are working to reduce both carbon emissions and operating costs.

Our total 2016 fleet carbon emissions were 15,699 metric tons, which is essentially flat compared to our total 2015 fleet carbon emissions. However, 2016 followed two years where we averaged greater than a 12 percent reduction each year in total fleet carbon emissions.

Our plan is to transition our entire fleet of sedans to plug-in hybrid electric vehicles (PHEVs). For each conversion to hybrid electric, we estimate saving more than 24 tons of carbon emissions over 10 years. In addition, we are closely monitoring the market as manufacturers develop PHEV pickups and commercial trucks.

Electric power take-off (ePTO) technology is now standard in all APS troubleman bucket trucks. This technology allows the truck's boom to be operated without engaging the engine, which reduces engine idling time. During 2017, we will pilot new idle-mitigation technology, which provides cabin comfort without having to leave the vehicle running. In addition to reducing our carbon footprint, this decreases noise when working in residential neighborhoods.

Because of the PHEV technology, our Odyne bucket trucks use less fuel and have quieter operations than traditional diesel or gasoline engine trucks.

In 2016, APS joined the Department of Energy's Workplace Charging Challenge and the Edison Electric Institute Employee Plug-in Electric Vehicle Engagement Initiative, which call

on employers to encourage electric vehicle adoption among employees and provide charging access for employees who drive plug-in electric vehicles. New charging stations are being installed in 2017 for employees at our corporate headquarters facility, Palo Verde Nuclear Generating Station and a new service center being built in Prescott, Arizona. A charging station currently is available to employees at our operations center in north Phoenix.

#### **INTEGRATED RESOURCE PLAN »**

APS will file its 2017 Integrated Resource Plan (IRP) with the Arizona Corporation Commission in April 2017. The IRP is developed every two to three years to document our resource planning activities. It outlines our long-term strategy encompassing a 15-year planning period.

APS expects a need to replace 2.1 GW of resources and supply 4.4 GW of growth through 2032. This will be accomplished by growing sustainably through three planning drivers:

- Greater use of natural gas due to low natural gas prices and stable price forecasts for the next 15 years and the resource's lower emission benefits
- Environmental regulations, including installation of selective catalytic reduction at our Four Corners Power Plant and a definitive plan to end coal usage at Cholla Power Plant by 2025
- Increasing levels of renewable resources

#### **2017 AND BEYOND »**

Reducing our carbon emissions while meeting the energy needs of our customers remains a priority as we move forward. Highlights for 2017 include:

- Finalizing our full 15-year Integrated Resource Plan
- Beginning construction on the new, more efficient Ocotillo gas-fired units
- Beginning installation of pollution control equipment at Four Corners
- Furthering opportunities for improving energy efficiency in our facilities and electrification of our transportation fleet, as well as industrial equipment such as forklifts



## ENERGY INNOVATION

APS has a long history of energy innovation that continues today with numerous projects that are setting standards for the rapidly transforming utility industry. These projects are enabling us to build a smarter energy infrastructure with reliable, cost-efficient integration of emerging technologies, both on the grid and at our customers' homes and businesses. They also ensure that we will provide customers with more options than ever to power their homes and businesses while maintaining reliability and increasing productivity.

To illustrate the kind of progress we have made, consider this: Just a decade ago, there were less than 10 megawatts (MW) of solar power on the APS system. Today we have more than 1,000 MW of installed solar capacity, including more than 200 MW owned by APS. And solar is just one of many distributed energy resources (DER) that is expected to grow for the foreseeable future. Other DERs include smart thermostats, grid-interactive electric water heaters, energy storage, load controllers, and variable speed, multi-stage heating, ventilation and air conditioning (HVAC) systems.

As an industry leader, APS is engaged in studying and developing emerging resources that can generate power or mitigate the effects of over-generation or under-generation on our distribution system. We are evaluating how these resources work together and impact not only service but also customer behavior with projects such as our Solar Partner Program and Solar Innovation Study. Running these projects concurrently is increasing our knowledge and providing invaluable data about how emerging technologies can enhance customer control and choice while helping us build a more advanced grid.

**\$5.98  
MILLION**

SAVINGS IN FIRST THREE MONTHS  
OF ENERGY IMBALANCE MARKET

**TEN MW SOLAR  
102  
TWO 2-MWH BATTERIES**

IN SOLAR PARTNER PROGRAM

**ONE HUNDRED PERCENT**

BACKUP POWER AT MARINE CORPS AIR STATION YUMA FROM NEW MICROGRID

**1  
MILLION  
FIELD ORDERS  
AVOIDED**

WITH ADVANCED METERS

**\$20  
MILLION SAVED**

FROM ADVANCED METERS

### **ADVANCED METERING INFRASTRUCTURE »**

APS has fully deployed its Advanced Metering Infrastructure (AMI) with 1.25 million meters installed, including more than 55,000 meters on residential rooftop solar systems. This technology provides near real-time energy usage data, allowing us to have greater visibility and automation of the grid. The meters feature two-way communications that provide customers with more timely information to help them manage their energy needs.

The advanced diagnostic capabilities delivered by AMI systems allowed us to avoid more than 1 million field orders and save nearly \$20 million through remote meter reads and service connections, minimized system outage durations and improved customer access, awareness and proactive energy management.

with improved system reliability, increased outage information and better support for DERs and advanced grid technologies.

This new technology allows us to respond faster to outages by enabling operators to see the precise location of the cause without ever leaving our control center. ADMS also features mobile technology that lets field personnel and control center operators work from the same map and customer information. That puts more information at our employees' fingertips when restoring service, improving our ability to serve communities across our vast service territory of nearly 35,000 square miles.

ADMS also enables operators to see DERs including rooftop solar systems and other advanced grid technologies on the system, which helps us better understand how these technologies impact our system.

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The Advanced Distribution Management System allows us to respond faster to outages by enabling operators to see the precise location of the cause without ever leaving our control center.

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### **ADVANCED DISTRIBUTION MANAGEMENT SYSTEM »**

Project Illuminate is an APS initiative that deploys state-of-the-art technology to operate the grid from APS control centers with more remote capabilities and increased situational awareness. The new Advanced Distribution Management System (ADMS) benefits customers

### **UAS DEPLOYMENT »**

Our unmanned aircraft system (UAS) program continues to grow and provide benefits to APS customers. UAS technology, commonly referred to as “drones,” allows APS field personnel to work more safely and collect and manage information more efficiently, and at lower costs, than traditional methods. APS has worked

to ensure that our UAS program meets all Federal Aviation Administration requirements.

UAS-mounted thermal imaging and high-resolution cameras are used to inspect overhead lines and photovoltaic panels, tracking performance and determining the overall health of systems. In addition to providing improved inspection data, UAS help us respond more quickly to issues affecting the grid, such as storm damage. They also are used to survey substations annually and update image records. In the future, they may be used to survey remote transmission and distribution lines, reducing the cost to perform annual inspections for proactive maintenance.

The UAS program also is part of a comprehensive predictive maintenance program, which is geared to identify and resolve problems before they affect or interrupt service.

#### **DATA MANAGEMENT AND ADVANCED ANALYTICS »**

APS established a new Data Management and Advanced Analytics group in 2016. This new group performs five critical functions: business engagement, business data architecture, data management and governance, advanced analytics and change management.

The group performs advanced grid data analytics and visualization with innovative software applications designed to transform raw data into business intelligence. This allows us to use field data effectively to make more intelligent business decisions. Using real-time information allows us to proactively address equipment failures before they happen, operate the grid more efficiently and provide better customer service. Advanced meter data has been integrated

with other systems, such as the Geographic Information System and the Customer Information System.

Two applications deployed by our Technology Innovation and Integration department aggregate and correlate data from multiple systems. The Solar Forecasting and Visualization application provides a system-wide geographic view of how distributed energy resources, such as rooftop solar, contribute to overall APS net energy production on an hourly basis. The Voltage Exceptions application enables our distribution planners and engineers to visualize areas where voltage alarms occur and address them before they affect electricity service to customers.

Another recently deployed application, Asset Health, monitors data associated with critical equipment such as extra high voltage transformers and underground cables, and through use of industry established algorithms that predict asset failure, allows us to perform predictive maintenance and improve system reliability and safety.

Additional programs and applications will be developed as we gain greater access to information and develop easy-to-use analytics.



### **ROOFTOP SOLAR RESEARCH AND DEVELOPMENT »**

The APS Solar Partner Program is the nation's first utility-owned deployment of residential rooftop solar systems with advanced inverters and central wireless control. This program provides us with direct control of advanced inverters on rooftop systems that convert solar-generated DC power into AC power for use in homes. We are partnering with our customers and local solar installers to bring more solar energy to communities across the state while keeping jobs and money in Arizona.

Up to 10 MW of power is generated through the APS-owned and -maintained rooftop solar systems installed on the homes of approximately 1,600 customers. All Solar Partner Program participants receive an annual \$360 savings on their electric bills through the life of the 20-year program.

In addition to customer benefits, the Solar Partner Program is part of groundbreaking research on the use of advanced inverters to better integrate solar and other DERs into the distribution grid. APS is the first utility in the nation to deploy and control advanced inverters remotely—meaning that we can



operate the solar installations as we would a power plant, ramping up or curtailing power based on customers' real-time energy needs.

We are working with the Electric Power Research Institute (EPRI) to gather and analyze program data, which is being shared across the industry and with academic researchers, consumer advocacy groups and Arizona-based solar installers.

The Solar Partner Program helps us understand how to mitigate power quality issues caused by rooftop solar. High penetrations of solar deployment in our service territory can create

reverse power flow and produce power quality issues on distribution feeders, including voltage fluctuations, voltage excursions that may cause local brownouts, flicker and other system stress. The advanced inverters used in the Solar Partner Program allow us to modify the inverters' output to counteract these kinds of issues.

Solar Partner Program installations are also designed to generate additional power at times when our customers need it the most. The systems face west to southwest to capture sunlight late in the afternoon and maximize generation when peak demand occurs, typically around 5 p.m.

Another unique aspect is the program makes rooftop solar available to customers who may not otherwise be able to obtain it. Working with nonprofit partners and community action organizers, APS offered the installation of rooftop solar systems at the homes of limited-income customers whenever possible.

Moving forward, the Solar Partner Program will be used for additional research on emerging technologies. In December 2016, two distribution feeders were each equipped with a 2-megawatt-hour battery, which will allow APS to study energy storage at the feeder level and compare it to advanced inverters and other line devices that traditionally are used to manage power quality.

be used to expand industry-wide knowledge and enable the efficient use of available and emerging DERs.

The Solar Innovation Study will provide valuable insight about customer energy use and rate design. Customers participating in the program are equipped with a smartphone application that allows us to send them a notification when a peak demand period is beginning and energy costs are higher. Using the same app, customers can control the appliances connected to the system's load controller. Combining technologies and rate design helps us understand what is important to customers as new technology comes online. It also gives us an opportunity to observe and understand how these

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The APS Solar Partner Program is the nation's first utility-owned deployment of residential rooftop solar systems with advanced inverters and central wireless control.

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**SOLAR INNOVATION STUDY »**

Our Solar Innovation Study is a state-of-the-art initiative that integrates DERs such as rooftop solar, energy storage, home energy management systems, smart thermostats and multi-stage, variable speed HVAC systems and couples them with demand-based rates. The study on 75 single-family homes in the Phoenix metro area tests ways our customers can employ behind-the-meter DER technologies to manage their energy use. It also employs price signals that encourage customers to shift their energy use away from peak demand times. Data from the study will

technologies interact with each other and how they affect the grid. In addition, the program enables Arizona-based installers to learn how to install and maintain emerging technologies in their early stages.

The Solar Innovation Study moves APS closer to a future in which modernized rate structures and realistic pricing signals drive market innovation and unlock new technologies. This initiative will give our customers greater control over their energy use and increase our flexibility to integrate new energy solutions into the grid.

## ENERGY STORAGE »

Energy storage, including grid-connected batteries, is a rapidly developing technology with the potential to increase the value of variable generation resources and improve grid reliability and stability. It could make renewable resources more valuable to APS by better aligning power availability with peak demand. A major focus is determining how to integrate energy storage effectively on the grid and with customers' homes and businesses.

Energy storage can capture variable resources like solar energy during the day, which then can be used during peak demand in the early evening, when it provides the greatest benefit to our customers and the grid. Batteries can also provide ancillary benefits such as frequency response, voltage regulation and spinning reserve, as well as defer investment in transmission or distribution needs.

Our long-term energy storage strategy includes:

- The previously mentioned Solar Partner Program battery deployment
- Installation of an additional 6 MWh in 2018 in a distribution deferral application
- Evaluation of residential stand-alone batteries and combinations of batteries with other technologies as part of the Solar Innovation Study
- Research into the costs and benefits of new and emerging technologies
- Pursuing regulatory outcomes (such as FERC/NERC qualification of batteries for spinning reserve) that allow the development of energy storage projects within the regulated utility model and unlock additional value

- Developing processes and procedures for incorporating energy storage into our day-to-day operations and maintenance
- Proposing pilot programs that use residential batteries (approximately 5 kW) and intermediate batteries (100-200 kW) in targeted areas to relieve feeder congestion
- Proposing load shifting with thermal storage that uses grid-connected residential hot water heaters to move heating demand to midday hours, taking advantage of peak solar production
- Encouraging customers to pre-cool homes before on-peak hours through the smart thermostat program and rates proposed in the rate review (pre-cooling is another form of thermal storage that shifts load to off-peak hours)

## MICROGRIDS »

Microgrids are small-scale power facilities installed at customer locations that can provide backup power to the customer in the event of a grid outage and deliver peaking service to APS that benefits additional customers. APS and customers can share in the costs of developing a microgrid, which results in cost effective economic deployment of new grid resources. Its fast acting capabilities also enhance grid resilience and flexibility by providing important peak resources and ancillary services such as frequency response, which can lessen the frequency and impact of power outages.

Through an innovative relationship with the U.S. Department of the Navy, APS deployed a low emission, 25-MW microgrid at the Marine Corps Air Station (MCAS) Yuma. The system, which came online in December 2016, will provide

100 percent of the backup power needed by the base in the event of a grid disruption, enhancing the base's reliability and security.

APS has also deployed an APS-owned microgrid at the Aligned Data Centers campus, which will be built in phases. The first phase, 11 MW, was deployed in 2016. At full build-out, the project will comprise 63 MW of peaking generation within the heart of the Phoenix metro area. Like the MCAS microgrid, the APS-owned, cost-shared microgrid at Aligned will provide peak generation and frequency response to the APS grid, in addition to backup power for the data center in case of an outage.

#### **ENERGY IMBALANCE MARKET »**

In October 2016 APS joined the California Independent System Operator (CAISO) Energy Imbalance Market (EIM), the only five minute energy market in the western United States. Partnering with other utilities across the West to share generation resources provides us with greater operational efficiency and flexibility. The EIM relies on resource and geographic diversity to more economically balance supply and demand for electricity in five minute increments. The diversity of the participants enables better integration of variable renewable resources and more economic energy generation for our customers.

The EIM is already delivering benefits—CAISO reported that APS customers saved \$5.98 million in the first three months of our participation. We had estimated it would save customers \$7 million to \$18 million per year.

#### **NEW CUSTOMER INFORMATION SYSTEM »**

APS recently launched a new Customer Care & Billing (CC&B) system that is expected to transform how APS conducts business and interacts with customers. This system is used by more than 230 utilities around the world.

The new CC&B platform will deliver multiple benefits to APS as it supports the 42 million customer transactions we handle every year, including:

- Cost savings—The system, with minimal customizations, will help manage, reduce and avoid costs
- Enhanced customer experience—The CC&B platform will strengthen our ability to provide additional programs and services to our customers
- Easier upgrades—The out-of-the-box technology provides a more standardized product that facilitates upgrades as the software advances and improves

Two additional programs are being implemented in conjunction with the new system. The Mobile Workforce Management program supports logistics for assigning, routing and equipping jobs in the field. The Oracle Utilities Customer Self Service program allows customers to interact with [aps.com](http://aps.com), our customer website. The three new systems will interact with each other and more than 60 other systems in use at APS.

#### **HARDENING THE POWER GRID »**

To improve grid resiliency and our ability to prevent and respond effectively to weather-related outages, APS implemented a series of measures in 2016 that hardened the power grid. Each summer, Arizona's monsoon brings

heavy winds and rain that can significantly impact our operations. After evaluating potential vulnerable areas of our grid, we replaced and upgraded equipment, including more than 1,200 power poles. We also completed 70 miles of a high-voltage transmission line that loops around the Phoenix metro area, ensuring redundancy and reinforcing reliability. For information on grid-hardening performed for security reasons, please see the Safety and Security section.

#### **2017 & BEYOND »**

As technologies emerge and our communities evolve, APS must constantly adapt, analyze and innovate in order to remain at the utility industry's leading edge. Providing our customers with the highest levels of service continues to be one of our top priorities. Highlights for 2017 include:

- Launching our ADMS and the new CC&B system in early 2017
- Continuing the research components of the Solar Partner Program, which involves side-by-side comparisons of solar advanced inverters, battery storage and integrated volt-VAR control for grid efficiency
- Continued Solar Innovation Study research into the intelligent combination of solar, battery storage, smart thermostats and load controllers in a residential setting
- Procurement of at least 6 MWh of lithium-ion battery storage systems for a transmission deferral application



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## SAFETY AND SECURITY

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At APS, our commitment to safety and security is fundamental to our business. Our safety and security efforts focus on six main areas: employee safety, public safety, cybersecurity, data privacy, physical security and the implementation of Critical Infrastructure Protection (CIP) requirements.

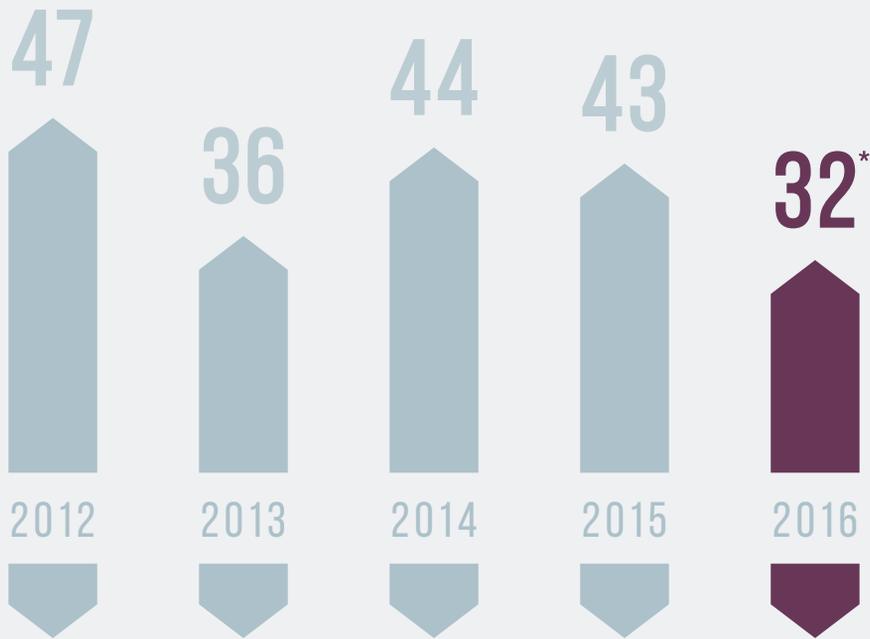
To increase safety and security throughout our operations, we implement new tools and technologies, train our workforce and develop solutions to reduce physical and cyber threats. We also partner with our industry peers and government agencies to share information and reduce potential exposure to risk.

# AWARENESS DEFENSIVE POSTURE RESILIENCY

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THREE ESSENTIAL ELEMENTS OF OUR CYBERSECURITY PROGRAM

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OSHA RECORDABLE INJURIES  
 \*LOWEST NUMBER ON COMPANY RECORD

# MORE THAN FIVE THOUSAND

FIRST RESPONDERS AND OTHERS REACHED WITH ELECTRICAL SAFETY PRESENTATIONS

**70**  
**PERCENT**

REDUCTION IN OVERHEAD  
 POWER LINE CONTACT EVENTS BY  
 THE PUBLIC OVER SEVEN YEARS

**\$8.7**  
**MILLION**

INVESTED IN PHYSICAL SECURITY  
 AT TWO CRITICAL SUBSTATIONS

## EMPLOYEE SAFETY »

Employee safety is of paramount importance at APS. We develop safety practices and programs that ensure all APS employees have safe and secure workplaces that allow them to perform at the highest levels.

Our industrial safety performance consistently ranks in the top decile of investor-owned electric utilities, according to the most recent Edison Electric Institute survey. The number of APS employees seriously injured on the job has declined by more than 80 percent over the past 10 years. Over the past five years, we reduced the number of Occupational Safety and Health Administration (OSHA) recordable injuries by 32 percent. We ended 2016 with 32 OSHA recordable injuries, the lowest number on company record and a significant reduction from our second best year of 2013 (36 serious injuries). Our comprehensive safety programs and our focus on human performance and injury case management contributed to this reduction in OSHA recordable injuries in 2016.

While we recognize this significant reduction in OSHA recordable injuries, we also saw a spike in our Severe Incident Rate (SIR) in 2016. The rate nearly doubled from 2.91 in 2015 to 5.91 in 2016. This jump was based upon an increase in lost time and days away from work due to injuries. Two of these injuries were the result of electrical contact events. All of them were impactful to our employees, peers and families. We recognize our work is not done.

As we continue to improve our safety performance, our ultimate goal remains zero injuries. Central to this objective is empowering our employees to take ownership of our safety culture. In 2016, we improved our safety

committee program. We created new safety committees and strengthened the roles of existing safety committees within their organizations. We now have safety committees operating in organizations throughout the company, providing opportunities for frontline employees to positively impact their local safety cultures and performance.

To help foster a safety conscious culture from the ground up, a mandatory safety orientation class was introduced in 2016 for all new hires. Class participants learn the basic principles behind employee safety, human performance, event reporting requirements and the safety resources available to support them.

We continue our emphasis on improving the reporting and tracking of injuries and other safety events. By being more rigorous in our reporting and tracking, we are increasing our understanding of the circumstances and behaviors that lead to these events and how to prevent them. We also track situations that could have but did not lead to injuries. Pairing this information with data derived from our behavioral observation program provides important leading indicators to reduce and eliminate future events.

In 2016, we enhanced two additional programs designed to promote employee health and safety. We expanded our hydration awareness training program to provide field employees with more comprehensive education on the importance of hydration, including nutritional instruction and training on methods of ensuring hydration while working in the field. The goals of the program not only encouraged hydration but also provided education on the importance of 24-hour hydration and the

impacts of hydration on job performance and injuries. In order to address a growing trend in sprain and strain injuries, we expanded a stretching program that was introduced to some business units in 2015. We will further expand this program to all business units in 2017.

To ensure the efficiency of our comprehensive safety management system, APS conducted a thorough review of our safety programs, procedures and processes in 2016. As part of this

we started using a third party vendor that scores contractors based on their previous safety performance. This enables APS to vet the contractors we work with based on a shared commitment to safety.

#### **HUMAN PERFORMANCE AND CORRECTIVE ACTION »**

Human performance is the science that helps us understand the nature of errors, both human and systemic. By gaining insight into what influences human behavior and leads to positive

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**The Corrective Action Program is at the heart of our culture of continuous improvement and allows us to identify the causes of problems and implement corrective actions that either prevent or reduce those problems in the future.**

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effort, we improved the documentation for our safety training programs and developed a new structure for our occupational health and safety compliance process to ensure we continue to meet all regulatory requirements.

In 2017, we will develop and implement a risk assessment program that assists employees in determining both personal and job risks in the field.

Safety is a critical focus area for APS, and we expect our suppliers to meet or exceed our safety standards. That is why we increased the safety standards for our contractors. In 2016,

performance results, we are better prepared to protect our employees, customers, assets and environment from significant events.

The importance of human performance is demonstrated from the time employees begin working at the company. New employees receive mandatory training in human performance fundamentals that introduces them to principles that apply both inside and outside the workplace.

We have integrated these human performance principles into work practices across the company. This includes using tools to identify and mitigate risks. A focus in 2017 is equipping





company leadership with additional hands-on and tailored human performance education and resources.

APS is one of the few electric utilities in the nation to implement a Corrective Action Program (CAP) across the entire company. The program is at the heart of our culture of continuous improvement and allows us to identify the causes of problems and implement corrective actions that either prevent or reduce those problems in the future. CAP focuses on events related to people, processes, procedures and equipment to ensure timely identification and resolution of issues. Integrating CAP into the daily workflow of each employee across the company helps keep them and the public safe without compromising our operational excellence.

In 2016, APS took the lead in convening electric utilities with non-nuclear corrective action programs across the country to establish an inaugural CAP Community of Practice working group. The CAP Community of Practice provides a unique opportunity to network and develop relationships with utilities that have similar programs, with the intent of sharing best practices and lessons learned. The North American Transmission Forum (NATF) was so impressed with this initiative that it asked to transition the group into their organization. APS will remain a driving force when NATF begins coordinating the group.

We are continually looking for ways to enhance our CAP. In 2017, we will focus on identifying trends and commonalities among lower-level events across the organization. Corrective actions will be implemented to reduce the likelihood those events will rise to a higher level of significance.

#### **PUBLIC SAFETY »**

APS is dedicated to ensuring the safety of the public. The cornerstone of this commitment is maintaining our assets in a safe condition. In addition, we have a number of programs that educate our customers and the general public about electrical safety and ensure the safety of contractors working on and around our facilities.

Through outreach to the news media and using social media, we raise awareness of topics such as safety around downed electrical wires, maintaining safe working distances around overhead lines and responding appropriately if unsafe electrical equipment conditions are found. This outreach takes the form of press releases and interviews, media events and individual story pitches to specific outlets.

APS also provides electrical safety programs to increase public awareness about electricity and electrical equipment. We reach thousands of Arizonans each year with our electrical safety trailer presentations as well as classroom and live demonstrations of the dangers of electricity. In 2016, we upgraded our electrical safety trailers and trained additional volunteers to allow for an expansion of this program statewide. In 2016, our electrical safety presentations reached more than 5,000 first responders, contractors, members of the public and municipal, state and county workers.

APS continues to partner with AZ 811 (an Arizona excavation notification service) and participated in 20 damage prevention seminars throughout the state in 2016. In addition, our Benjamin FranKlown program brings age-appropriate messages about electrical safety to more than 5,000 students across Arizona each year.

In 2016, APS continued its downward trend for overhead power line contact events over a seven-year period and achieved a reduction of more than 70 percent in contact events by the public. When there are electrical contacts with overhead lines, buried lines and equipment damage, our public safety team responds in real-time.

APS distribution system troublemen conduct annual safety line patrols for all of our overhead distribution circuits statewide. In addition,

our transmission system linemen conduct annual safety line patrols on all 607 transmission sections. In support of this work, public safety consultants perform annual line patrol and substation security audits throughout the service territory as well as numerous field inspections, consultations and risk-assessment activities. We work closely with hauling companies and the Arizona Department of Transportation to ensure safe travel and clearance of oversized loads where our infrastructure crosses state highways.

#### **CYBERSECURITY AND DATA PRIVACY »**

As cybersecurity attacks become more frequent and more sophisticated across numerous industries, safeguarding the data and technology that delivers power to APS customers becomes increasingly important. Our comprehensive cybersecurity program is designed to prepare our people, programs and technologies for emerging threats. The program is built on three essential elements: awareness, defensive posture and resiliency.

The APS cybersecurity program begins with user awareness. All employees are required to take cybersecurity training and learn techniques to identify suspicious cyber activity and better protect data privacy. Quarterly security forums and other outreach activities raise employee awareness about emerging threats and risks to the company. We also hold workshops to educate employees on critical issues, such as creating secure passwords, recognizing potential attacks, protecting data privacy and ensuring safe file storage. Quarterly awareness testing assesses our employees' susceptibility to certain cyber threats, such as phishing.

In addition to user awareness, APS monitors for emerging cybersecurity threats 24 hours a day, seven days a week. Our Cyber Defense Center

detects, alerts, contains and mitigates attacks in real-time. To enhance our capabilities and provide improved threat intelligence, we maintain relationships with federal, state and local government partners, as well as fellow utilities and private sector information sharing organizations. We ensure that cybersecurity awareness is strong at all levels of APS, including briefings to the company's Board of Directors, presentations to senior management and updates at staff meetings companywide.

The second element of the APS cybersecurity strategy is defensive posture. We are continually deploying new defensive technologies designed

We conduct quarterly exercises to simulate emergent threats and scenarios that could arise from potential cybersecurity attacks and data breaches, ensuring that incident response and business restoration procedures are up to date and effective.

In addition to our cybersecurity efforts, APS takes even more measures to fiercely protect data privacy, reflecting our commitment to keep customers' sensitive information safe and secure. From internal audits and reviews to using Generally Accepted Privacy Principles, we have strengthened internal controls and systems to ensure safe handling of customer data. For example, in 2016 our data privacy program

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## Our comprehensive cybersecurity program is designed to prepare our people, programs and technologies for emerging threats.

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to detect malicious activity, uncover vulnerabilities and withstand attacks. Contingency strategies are in place to reinforce our internal efforts. Third party cyber specialists perform penetration testing on our system to uncover vulnerabilities that could potentially be exploited, and help us proactively resolve those issues.

The third element, resiliency, is central to our cybersecurity efforts. Our goal is to identify vulnerabilities in our system and remediate those issues quickly and effectively. Through response plans and training, we are ready to identify, respond and quickly recover from potential cyber attacks. When a threat is encountered, we work with federal authorities and outside agencies to track down and prosecute cyber criminals as appropriate.

started sending automated reports to leaders when employees aren't using approved storage locations for sensitive information.

Access to information is tracked, managed and approved by data owners. All vendors are required to adhere to security and data privacy standards and follow industry best practices, as well as applicable regulations. By evaluating vendors' internal controls and monitoring reputation and financial standing, we further protect sensitive information. Our data privacy and supply chain teams ensure the company is protected by requiring that contracts with new and existing partners account for cybersecurity.

All vendors are required to have effective security practices and controls in place, and



we work with these partners to ensure our customers are protected from potential third party data loss. Third party vendor relationships are thoroughly reviewed from a security and data privacy perspective, ensuring that all vendors have proper security controls in place to safeguard our customers' information. All vendor employees who access sensitive information participate in mandatory annual training about the proper use, retention and disclosure of customer and other sensitive information.

**PHYSICAL SECURITY »**

Providing our customers with safe, reliable power requires strong physical security for all of our facilities, including power plants, electric transmission and distribution systems such as towers and substations, and corporate offices.

Protecting company assets is an essential element in providing a safe and secure work environment for APS employees. We ensure this by improving employees' situational awareness, identifying and mitigating current and anticipated physical security threats, intelligence monitoring and detection, deterrence, and effectively responding to incidents and reports.

Our Corporate Security department works to ensure that operational resiliency is maintained by confirming that threat-level analysis and response plans are kept up to date. Corporate Security also educates employees on how to keep themselves and physical assets safe and secure. Situational awareness programs provide employees with strategies for dealing with emergency situations in the workplace and improve their awareness in identifying and reporting potential threats.



In 2016, APS developed a new Physical Security Index metric designed to measure the company's overall physical security health. The index incorporates security awareness, defensive posture and resiliency, with a goal to improve three percent year-over-year. We are on track to exceed our index goals.

The new APS Corporate Emergency Operations Center was completed in 2016 in downtown Phoenix. This fully functional facility provides a centralized command center where senior management from key areas of the company convenes to manage large scale emergency situations.

As part of our emergency management protocols, each APS business unit is required to develop, review and test their response and recovery plans to ensure their ability to remain functional in the event of an emergency.

We conducted four emergency operations exercises in 2016, simulating a critical data breach, an active-shooter scenario, a pandemic situation and a critical substation breach ultimately attacking APS networks. APS also participates in the national GridX exercise, a two-day, table-top exercise that simulates attacks on both physical and cyber components of the power grid. These drills involve businesses, law enforcement at all levels and emergency management teams throughout the country and ensure that we maintain the highest level of preparedness for any potential emergency situation. We plan to take part in the 2017 GridX exercise.

In 2016, APS invested \$8.7 million enhancing and hardening physical security at two critical substations. We plan to invest \$3.1 million

to secure another critical substation in 2017. Security enhancements at these facilities include:

- Perimeter fence enhancements
- Vehicle barrier systems at critical sites
- Intrusion detection systems
- Cameras for assessing alarms and monitoring activity during both day and night time hours
- Access controls that limit entry to approved personnel and sound an alarm when breached

Between 2018 and the end of 2019, we plan to invest an additional \$20.6 million in substation security, securing 14 additional substations as part of this hardening project.

APS spent an additional \$421,800 in 2016 to upgrade security systems and install new systems to help keep employees safe at our corporate headquarters. New security measures included the installation of turnstiles designed to prevent unauthorized entry, cameras to provide security personnel visibility outside of the building and the establishment of lockdown rooms for use in the event of active shooter situations.

Through the use of our Physical Access Control System and our Video Management System, the APS Security Operations Center (SOC) monitors for suspicious, criminal or emergency activity and responds to minimize or prevent damage to APS personnel or property. The SOC team provides our first line of protection in meeting the physical security standards established in the CIP Cyber Security Standards. In 2016, we implemented several improvements that have resulted in a more streamlined and efficient operation:

- Consolidating our SOCs to achieve a primary and backup site model, locating the primary

SOC within the Integrated Operations Center (IOC). The IOC creates a common operating picture, as it is comprised of Physical Security Operations, Network Monitoring Operations, Cybersecurity Operations and EOS/EMS Operations.

- Implementing an alarm reduction program that identified and eliminated false and nuisance alarms. This initiative reduced the total number of alarms by 75 percent.
- Segregating work functions to reduce operator errors associated with multi-tasking.
- Strengthening our incident command structure and simplified response instructions.
- Providing professional dispatcher and three-way communications training to our entire SOC team.
- Improving technology, including upgrading to IP video, consolidating to a single video management system platform and implementing real-time automated system health monitoring.

#### **CIP IMPLEMENTATION »**

New standards by the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) went into effect in July 2016. CIP standards are regulations intended to help secure North America's electric grid from cyber and physical attacks that could disrupt generation or transmission. CIP standards focus on protecting the critical cyber systems in larger substations, power plants and control centers, as well as physical security protections for certain large substations critical to grid reliability.

Several APS business units are strengthening and enhancing our security posture while ensuring compliance with CIP standards. The CIP standards

include measures to improve protections against cyber criminals who attempt to gain access to our network; increase electronic and physical security at substations, power plants and control centers; and document and store information and processes in a more secure manner. APS completed a federal audit in November with no findings that were not self-identified.

Additional CIP requirements will continue to go into effect in 2018. This multi-year implementation greatly expands the scope to several thousand cyber assets spread across the APS service territory. While prior CIP standards were limited to facilities regarded as having a high operational impact, the new standards include a wider range of facilities, including substations that are deemed medium and low impact. Through 2016, we spent approximately \$16.5 million implementing the new CIP standards at medium impact power plants and substations, including enhancements to physical and electronic security and monitoring, incident response and training. In addition, APS is completing the protections required under CIP-014 for transmission facilities deemed critical to the stability of the electric grid. To date, APS has spent \$6 million implementing the appropriate protections to meet the intent of the CIP-014 regulation.

Through the CIP compliance process, we reinforced security for our Energy Management System (EMS), which is one of the most critical systems at APS. This system monitors, optimizes and controls the bulk electric system, while also providing situational awareness and proactive management of grid reliability. We added several layers of security authentication to the process of accessing the EMS in accordance with the new CIP regulations.

Also, we developed more technology controls and built automation into key systems to reduce potential human error. Where automation wasn't viable, we maintained quality assurance by added more peer checking and other reviews.

#### **2017 AND BEYOND »**

Ensuring the security of our data, systems and operations will continue to be a key consideration in all of all of our operations as we move forward. Highlights for 2017 include:

- Investing in additional public outreach, including community awareness campaigns for electrical safety
- Increasing our focus on risk assessment, including supporting observation programs that provide valuable feedback on worker safety in the field and creating additional programs to reduce observed employee injury trends
- Implementing security measures at facilities regarded as having low operational impact, in compliance with the new CIP standards (through 2017 and into 2018)
- Continuing operational improvements in the SOC as it joins with the Integrated Operations Center
- Continuing to focus on upgrading security systems, including camera monitoring and alarm systems



## WATER RESOURCES

Reliable access to adequate water supplies is critical in electric power generation. As a utility located in the desert Southwest, APS understands that responsible management of this vital resource can have a positive impact on the communities we serve as well as the environment. The APS Water Resource Management department is unique among utilities nationwide, due in part to regional water scarcity that has prompted us to take a leadership role in Arizona's water policy. We are committed to preserving the long-term quality and availability of our water resources and are guided by a strategic plan that promotes effective and sustainable water supplies.

The APS Water Resource Management Strategic Plan includes information to help efficiently manage our water resources portfolio. It helps ensure long-term water supplies and water contingency plans for each of our facilities, even in times of extended drought. Each APS power plant has a unique water strategy, developed to promote efficient and sustainable use of water.

Our usage of reclaimed water is a prime example of a sustainable balance, exemplifying our awareness of the water-energy nexus. A critical asset in our water resource strategy is Palo Verde Nuclear Generating Station, an internationally recognized leader in the use of reclaimed water for power generation. Thanks in large part to Palo Verde, reclaimed water accounted for 74 percent of the water used in our generating facilities in 2016. This is crucial in Arizona where a non-renewable water resource like groundwater accounts for 40 percent of statewide water use. APS has committed to a long-term goal of reducing groundwater use. In 2016, we reduced groundwater use by 28 percent compared to 2014 usage, far surpassing our goal of 8 percent.

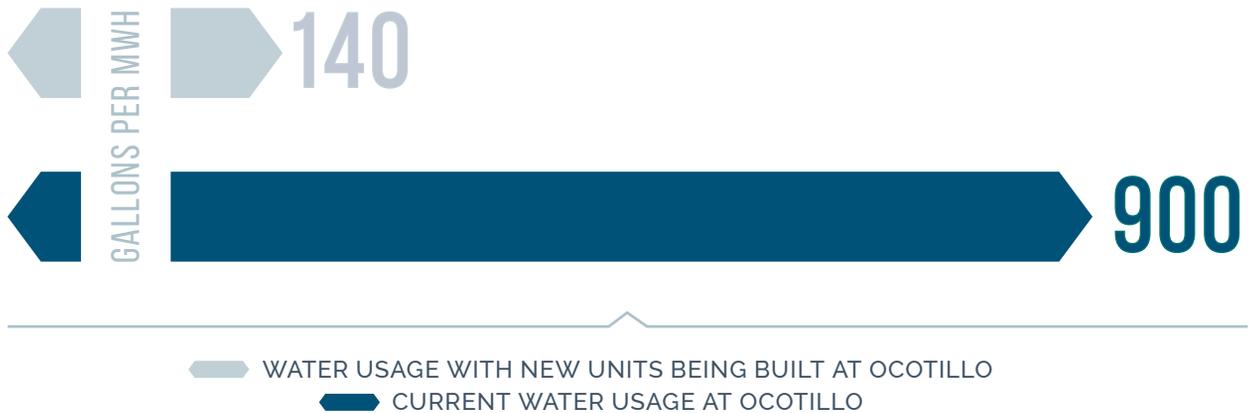
Additional water conservation efforts include retiring older, water-intensive units, upgrading to more water-efficient technologies at existing plants, and increasingly using renewable energy and supporting energy efficiency among our customer base. Over the next 10 years, our goal is to reduce water intensity company-wide by 20 percent compared to a 2014 baseline.

# 28 PERCENT

REDUCTION IN GROUNDWATER  
USE IN 2016

# 20 BILLION GALLONS

WATER RECYCLED EACH YEAR  
TO MEET PALO VERDE'S  
COOLING NEEDS



# LESS THAN 3 PERCENT

AMOUNT OF THE ARIZONA WATER BUDGET THAT IS USED FOR POWER GENERATION

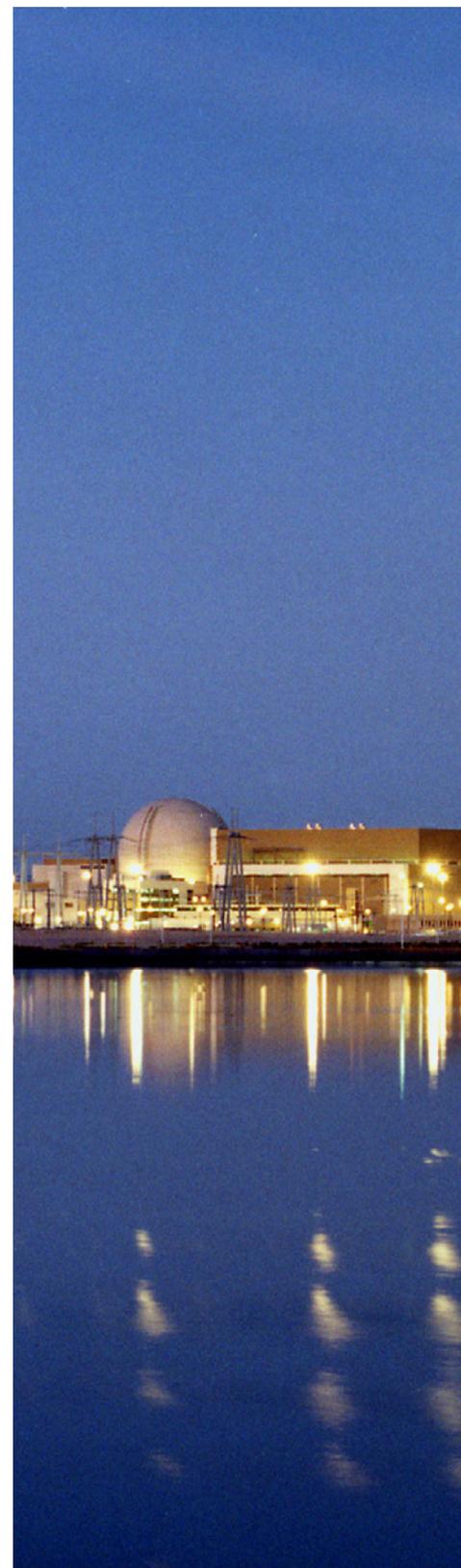
## ENSURING ADEQUATE WATER RESOURCES »

Population growth in Arizona is among the fastest in the nation. This will result in increased pressure on water supplies in the arid Southwest, including supplies required to meet the region's expanding energy needs.

APS has secured adequate water contracts and water rights to meet the future energy needs of our customers, even if climate change should negatively impact water supply. Contracts vary by type and duration for each plant, but most last 25 or 50 years or have no expiration date. Each APS power plant has a strategy and a contingency plan to ensure that water supplies are not jeopardized due to drought-related conditions.

Technological advances such as alternative cooling and water treatment may potentially improve water use efficiency. APS participates in the EPRI Water Research Center's membrane treatment and cooling tower technology research, which includes cooling tower studies and evaluation of potential use of alternative technology.

APS analyzed alternative cooling strategies and selected state-of-the-art hybrid cooling technology for new units being constructed as part of our Ocotillo Power Plant modernization project. Hybrid cooling will decrease water use from 900 gallons per MWh to 140 gallons per MWh—a reduction of more than 80 percent. Moving forward, we have committed to consider the use of hybrid cooling in any new combined cycle plants.





## **WATER USAGE AND INTENSITY »**

At every APS power plant, specific strategies are in place to ensure efficient water use. Examples include the utilization of Zero Liquid Discharge blowdown/recovery systems at the Redhawk and West Phoenix power plants, which maximize reclamation and on-site water reuse. At the Cholla Power Plant, a site with a large and complex well field, APS has performed groundwater modeling to prioritize withdrawal from wells with the highest water quality. This results in increased efficiency of the cooling towers and ultimately conserves water.

In 2016, APS implemented a Tier 1 water metric designed to reduce consumption of non-renewable groundwater supplies—those most at-risk in Arizona. We far exceeded our goal by reducing non-renewable water use 28 percent compared to 2014. The limited operation of our Cholla Power Plant throughout the year contributed significantly to this large decrease.

Further reductions are planned in 2017 (10 percent from the 2014 baseline) and in 2018 (12 percent from baseline).

This will be accomplished by retiring older, water-intensive units and replacing them with new units that employ water-efficient technologies; implementing water conservation strategies developed during water efficiency audits at each power plant; implementing leak reduction programs; and expanding reliance upon renewable generation that requires little or no water. Increasing energy efficiency programs that reduce the need for new, potentially water-intensive generation will lead to further reductions.

## **PALO VERDE AND ZERO LIQUID DISCHARGE »**

The Palo Verde Nuclear Generating Station is the only nuclear plant in the world that is not located next to a large body of water. Instead it uses treated effluent, or wastewater, for plant cooling. No other nuclear power plant in the world exclusively utilizes wastewater for cooling water.

Wastewater is transported to Palo Verde through 36 miles of underground pipe from treatment facilities in Phoenix and Tolleson, Arizona. Unlike other nuclear plants, Palo Verde

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**The Palo Verde Nuclear Generating Station is the only nuclear plant in the world that is not located next to a large body of water. Instead it uses treated effluent, or wastewater, for plant cooling. No other nuclear power plant in the world exclusively utilizes wastewater for cooling water.**

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maintains zero liquid discharge, meaning no wastewater is discharged to rivers, streams or oceans.

More than 20 billion gallons of municipal effluent is recycled each year to meet the plant's cooling needs, making limited surface water and groundwater supplies available for other uses, such as municipal drinking water supplies. Effluent undergoes further treatment at Palo Verde's water reclamation facility, one of the world's largest advanced water treatment facilities. Treated water is stored in the plant's 85-acre and 45-acre reservoirs for use in the cooling towers.

#### **WELL AND PUMPING EQUIPMENT RELIABILITY PROGRAM »**

To ensure adequate and reliable water resources that are critical to power plant operations, we initiated a well and pumping equipment maintenance program. Currently, there are 47 wells in the APS fleet. In 2014, the well failure rate was approximately 10 percent. We set a goal to decrease the failure rate by 2 percent per year over a five-year period. Strategies to meet this goal include drilling new wells, replacing old equipment, testing and evaluating each well for efficiency, and monitoring performance trends in order to respond before failure occurs. Many well failures were caused by lubrication problems. To address this issue, in 2016 we began installing automatic lubrication systems on our wells that detect low lubrication and prevent potential damage. As a result of these measures, we experienced just one well failure in 2016, putting us well ahead of our goal. In addition, we spent approximately \$3 million in 2016 on a capital replacement program to identify wells most likely to fail and prioritize replacement.

We also have developed well field operations plans for our larger power plants, which achieve more-efficient use of higher quality groundwater, decreased water consumption and more strategic use of water. Plans are in place for the Cholla, Redhawk and West Phoenix power plants.

Our Water Resource Management team has established an extensive data collection reporting and dashboard system that tracks water use and performance. This information is used to evaluate company performance and plan for future improvements that maximize the efficient use of water.

#### **AQUIFER STORAGE AND RECOVERY »**

Arizona has been storing excess water in the ground since the 1990s as a contingency supply to supplement surface water supplies during times of shortage. The Arizona Water Banking Authority, established to increase the utilization of the state's Colorado River entitlement, has stored 3.4 million acre-feet in Arizona's aquifers since 1996. APS recognizes the benefits of aquifer storage and recovery (ASR) and has investigated multiple sites at strategic locations that could support generation facilities. Potential sources of water for use at an ASR site include brackish groundwater, reclaimed water and remediation water. APS will continue to evaluate alternative sources of reliable water in support of our generation resources.

#### **ENVIRONMENTAL IMPACT »**

As we do in all aspects of our operations, APS works to minimize the impact of our water usage on the environment. We have committed more than \$500,000 per year for the next 25 years to protect endangered fish in the San Juan River, where we withdraw water for cooling at our Four Corners Power Plant near Farmington, New Mexico.

### **KYL WATER INSTITUTE »**

APS has committed financial support to the Kyl Center for Water Policy, a research, analysis and collaboration entity at the Morrison Institute for Public Policy at Arizona State University. The Kyl Center works to promote sound water policy and stewardship in Arizona. Through our participation in the Kyl Center, we actively engage in discussion of the water economy, water-energy nexus, water rights, drought, water costs and policy solutions that are important to our customers, our company and our state.

### **COLLABORATION »**

APS works closely on water issues with federal and state agencies and governments, local community members and Native American tribes. We collaborate with organizations including Sandia National Laboratories, EPRI, the U.S. Department of Energy and Idaho National Laboratory.

APS is participating in a critical watersheds project with four national laboratories and the U.S. Bureau of Reclamation to evaluate possible impacts of climate change on water supply demands and energy operations in the Colorado River Basin. The team is developing strategies to ensure that adequate power could be produced in the event of a reduction in water supplies.

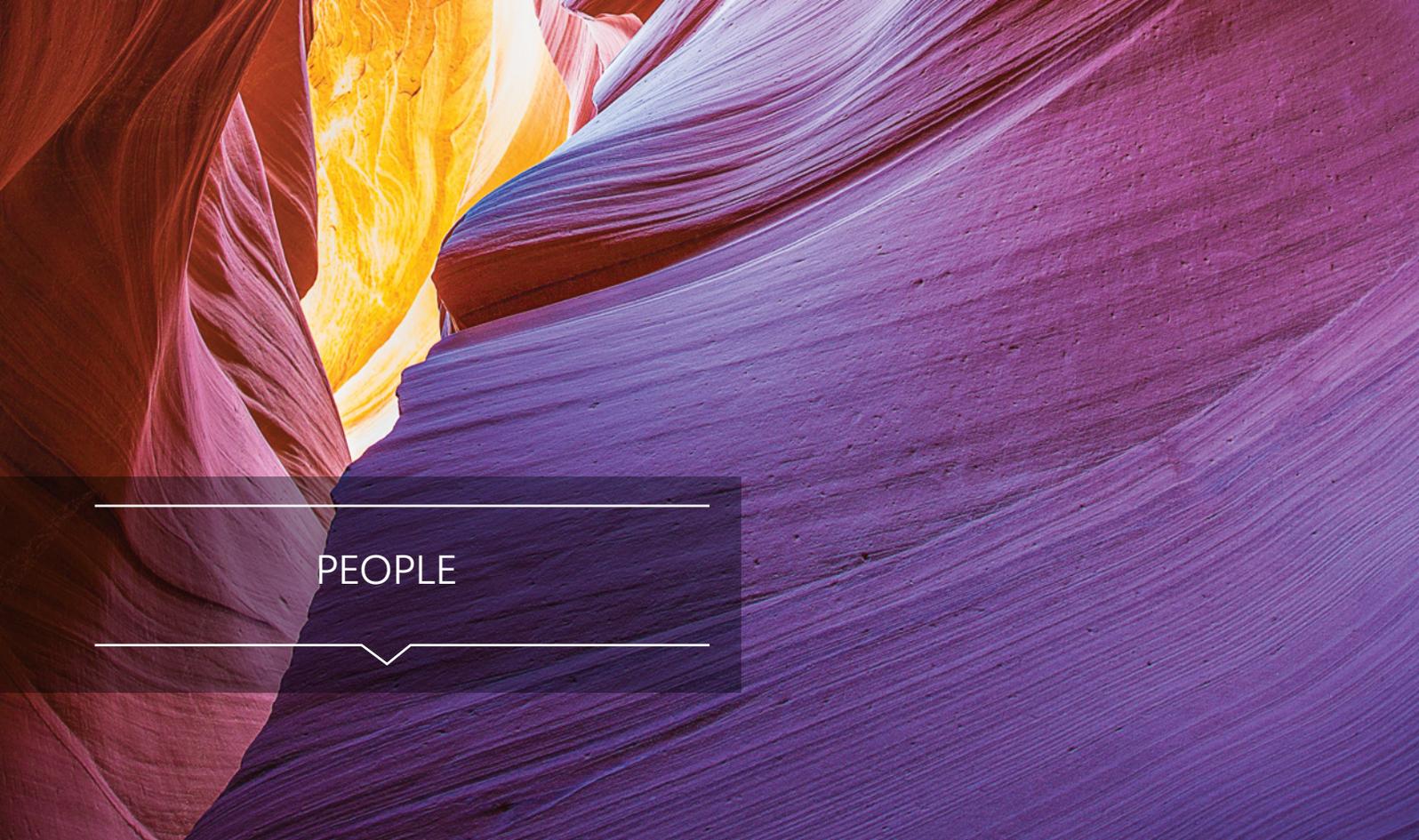
APS works with Arizona's two other largest electric utilities, Salt River Project and Tucson Electric Power, to collect data on the total water used for all power generation statewide. Currently less than 3 percent of the Arizona water budget is used for power generation, below the national average. The power sector in Arizona is aware that efficient use of water is important to all water users in our state.

APS maintains shortage sharing agreement with all water users of the San Juan River. This multilateral agreement includes our Four Corners Power Plant, the Navajo Nation, municipalities, industrial operations and agricultural irrigators. The agreement assures that all parties will share equally in any water shortages on the river. We also work with the U.S. Bureau of Reclamation, providing them data and projections of future use allowing the agency to create models project shortages.

## 2017 AND BEYOND »

Ensuring sustainable, cost-effective water supplies for energy production is an ongoing priority for APS. Highlights for 2017 include:

- Continue to meet benchmarks established in our Tier 1 metric to reduce consumption of non-renewable water resources at our power plants
- Begin construction of new, less water intensive units at the Ocotillo Power Plant and ultimately retire older steam units
- Promote existing water conservation strategies at APS plants and continue to seek opportunities to improve water use efficiency
- Continue to participate in research projects that promote improved water efficiency, conservation and drought preparedness
- Track possibility of shortages on the Colorado River and ensure that our strategies remain valid
- Continue to monitor changes in the regional water market, ensuring that APS takes advantage of opportunities that may develop
- Enhance data management and data sharing capabilities



## PEOPLE

The people who work at APS, our suppliers, community partners and customers all play a part in building a sustainable energy future for Arizona.

The APS workforce of 6,300 dedicated employees strengthens our company with its skill, experience and diverse perspectives. Respect and inclusion are core APS values, and we know that a diversity of backgrounds, viewpoints and ideas is essential to success.

Our efforts to support and empower our employees have been widely recognized. *Forbes* included APS on its 2016 list of America's Best Employers. Veterans are about 20 percent of our workforce, helping APS earn the designation of a Military Friendly® employer by *GI Jobs Magazine* for the third straight year.

Promoting diversity in our suppliers also is an ongoing objective. Our industry-leading Supplier Diversity and Development program has spent more than \$2 billion with diverse businesses since 1992.

Technology is giving customers more options with their energy. We strive to provide tools (including a new app with billing, outage information and energy usage data) and resources (such as new energy efficiency programs) to help them better manage their service.

Supporting the communities where our employees live and work is important to APS. Our 2016 investment in the community, including grants, scholarships and in-kind donations from APS and the APS Foundation, totaled more than \$10 million. In addition, our employees volunteered 120,000 hours, a value of about \$2.8 million to our nonprofit partners. APS employees also sit on the boards of some 300 Arizona nonprofit organizations.

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RANKING IN LARGEST CORPORATE  
PHILANTHROPISTS BY  
PHOENIX BUSINESS JOURNAL

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\$48  
MILLION

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PROPOSED EXPANDED LIMITED-  
INCOME DISCOUNT PROGRAM

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5,000 JOBS AND MORE THAN  
\$1 BILLION CAPITAL INVESTMENT

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IN APS SERVICE TERRITORY

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ALMOST \$370 MILLION

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SPENT WITH DIVERSE SUPPLIERS IN 2016

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## **TALENT STRATEGY »**

APS places significant focus on attracting, developing and rewarding a skilled workforce. To attract and retain top talent, APS provides a robust total rewards program that includes competitive compensation and retirement plans, health plans and accounts, income protection plans, a wellness program and a generous paid time off plan. A formal professional development program helps to retain talent by offering tuition reimbursement, online education and leadership training. APS also rewards employees through a pay-for-performance incentive plan.

For these and other reasons, APS employees have an average tenure of 13 years. At the same time, 26 percent of our workforce is currently retirement eligible, and an additional 15 percent will become eligible in the next five years. APS has prepared for future retirements with a formal workforce planning initiative to assist each business unit in meeting its human capital needs.

Our succession planning ensures we are prepared to fill executive and other key leadership roles with capable, experienced employees. Formal development opportunities for APS employees include a variety of training courses aimed at improving knowledge, skills and business acumen. In 2016, APS developed and implemented a three-tiered leadership training program that prepares emerging, current and experienced leaders to advance within the company.

Talent pipelines also help sustain our skilled workforce needs. These pipelines encompass several apprentice programs and rotational programs, including our pre-apprentice and engineering rotational programs. Our recruiters

target specific colleges and programs of study that we have identified as talent pipelines.

In 2016, APS added to its pipeline program when the Western Maricopa Education Center (West-MEC) celebrated the grand opening of a new campus built in partnership with the City of Buckeye, Estrella Mountain Community College and the Palo Verde Nuclear Generating Station. The new West-MEC Southwest Campus provides programs and career training for secondary education, post-secondary education and industry certifications. Programs of study include sustainable energy and industrial technology. APS and other industry partners are involved in curriculum development and provide equipment for simulations and training.

Our intern program is another source of top talent. In 2016, APS employed 64 interns, many of whom will return to the company as full-time employees. We achieved an acceptance rate of more than 90 percent on offers made to eligible interns in 2016.

## **EMPLOYEE ENGAGEMENT »**

In 2014, APS invited feedback through an employee engagement survey administered by a third party. This engagement survey allowed us to gather honest opinions, identify opportunities for improvement and compare our performance to other companies.

In response to the 2014 survey results, the company launched enterprise-wide initiatives focused on improving communication between employees and management as well as removing obstacles that prevent job success. Other initiatives driven by the survey gave employees more access to leadership and improved meeting efficiency. APS also created an Employee

Engagement Council that focused on employee recognition and career development.

APS repeated the survey in 2016, and 71 percent of employees responded. Results showed that APS improved in every category, and that employees overall are more engaged than they were in 2014. The two enterprise-wide areas of focus selected based on the 2016 results aim to streamline processes and approvals, and improve leader visibility and communications.

Union Local No. 08 and the International Brotherhood of Electrical Workers (IBEW) Local 387. Three-year collective bargaining agreements are in place with members of the USPA Local 8 until May 31, 2017, and with members of the IBEW Local 387 until April 1, 2018. APS expects to continue to have a positive, collaborative working relationship with its union members in pursuit of our common goal of delivering safe, efficient and reliable energy to meet the needs of our customers.

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**Results from the 2016 Employee Engagement Survey showed APS improved in every category, and that employees overall are more engaged than they were in 2014.**

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**DIVERSITY AND INCLUSION »**

APS is committed to diversity and inclusion, and we recognize that diversity of demographics, background and cultural perspective are key drivers for the success of our workforce. The Executive Diversity Council drives this commitment with an emphasis on diversity among employees, in the workplace and in our involvement in the community, as well as an increased focus on attracting diverse talent.

**UNION CONNECTIONS »**

Maintaining long-term relationships with APS union members is important to our success. Approximately 25 percent of APS employees are covered by collective bargaining agreements with two labor unions: the United Security Professionals of America (USPA) International

**EMPLOYEE NETWORK GROUPS »**

Employee Network Groups at APS promote engagement, inclusion and leadership opportunities. These self-organized, voluntary groups are formed around the basis of a common attribute, such as experience in the utility industry, gender, ethnicity or race, but all are open to all employees.

Our nine employee network groups build business acumen through presentations by senior leaders, provide mentoring and networking opportunities for members, and offer leadership development and other learning opportunities. The groups also foster cultural awareness and appreciation with events such as the Native American Heritage Month celebration organized by the Native American Network Organization

and the Hispanic Heritage Festival sponsored by the Hispanic Organization for Leadership Advancement.

Members of each group also are active as volunteers and business ambassadors to the community in a variety of charitable initiatives, such as the Veteran Engagement, Transition & Retention Network employees who participate in the Packages from Home program, the support of the Fresh Start Women’s Foundation by Women in Search of Excellence; and the Lesbian, Gay, Bisexual & Transgender Alliance’s involvement with the Phoenix Gay Chamber.

APS currently sponsors the following Employee Network Groups (listed with their mission statements):



- Hispanic Organization for Leadership Advancement (HOLA)—Promote a culture of inclusiveness and community stewardship across APS, as well as develop high-performing Hispanic leaders in pursuit of operational excellence and continuous self-improvement.



- Lesbian, Gay, Bisexual & Transgender (LGBT) Alliance—Build a community at APS to further support diversity and provide opportunities for members to achieve their professional and personal best through culture, communications, commerce and careers.



- Native American Network Organization (NANO)—Attract and develop Native American talent by providing professional development opportunities, assisting in recruiting and retention, and community development.



- NextGen—To educate, unite and engage individuals in the utility industry through professional development, community outreach efforts and networking, all in support of the APS Core (Strategic Framework).



Network for Urban Engagement

- Network for Urban Engagement (NUE)—Create a collaborative and highly engaged network of African-American employees that promote the interests of NUE, its strategic initiatives and the values of APS.



- Veteran Engagement, Transition & Retention Network (VETRN)—Develop opportunities benefiting our honored Arizona veterans, and strive to promote the service to our country, leadership skills and achievements of veterans in the organization.



- Women in Search of Excellence (WISE)—Build a community at APS to further develop women as they achieve their personal and professional excellence.



- Palo Verde Young Generation in Nuclear (PVYGN)—Unite young professionals for the purpose of strengthening its community by focusing on the success of nuclear technology.



- Palo Verde Women in Nuclear (PV-WiN) — Promote an environment in which all employees are able to succeed while working to encourage public awareness about nuclear energy.

**CUSTOMER VALUE »**

More than ever before, our customers are empowered to engage in managing their energy usage. We are continually working to find new and better ways to meet our customers’ needs.

In 2016, we provided our customers with options for managing their energy and responding to peak demand when the Arizona Corporation Commission approved the continuation of our energy efficiency programs and the implementation of new and expanded measures.

We also introduced a mobile app that allows customers to conveniently manage their energy accounts from mobile devices and gives them more control over their energy usage. The new app provides the ability to check energy usage, sign up for outage alerts, report outages, pay bills and find payment locations. It joins our suite of customer resource tools, including an online interactive outage map and our notification center, where customers can sign up for email or text alerts when their bills reach a certain amount, when outages are resolved or when payments are due.

For the second year in a row, APS ranked fifth among large western region utilities in the J.D. Power Electric Utility Residential Utility Customer Satisfaction Study. APS ranked 14th out of the nation’s 53 large investor-owned utilities in the study.

In the 2016 rate review proposal submitted to the Arizona Corporation Commission, we outlined a \$12 million expansion of our limited-income discount program to a total of \$48 million. Approximately 85,000 customers currently receive the limited-income rate discount, and we are working to expand the program to reach more eligible customers.

APS also provides funding for limited-income home weatherization in partnership with

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This past year, we introduced a mobile app that allows customers to manage their energy accounts from mobile devices and gives them more control over their energy usage.

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community action agencies throughout Arizona. This weatherization program enables qualified customers to make their homes more energy efficient. In 2016, we allocated more than \$2 million to help with limited income weatherization projects around the state.

APS customers can join us in giving back to our communities by making tax-deductible contributions when they pay their energy bill. Through Project SHARE, customers can authorize a donation to be added to their monthly bill, which we match dollar-for-dollar. This low income assistance fund is administered by the Salvation Army. In 2016, customers and APS donated \$55,000 through Project SHARE.

#### PHILANTHROPY AND VOLUNTEERISM »

APS is actively involved in the communities we serve. We partner with nonprofit organizations and community groups across the state to build a stronger, healthier Arizona. Our efforts include financial support, board service and volunteer assistance.

In 2016, APS donated more than \$10 million to worthwhile causes. This includes our corporate giving, which funds organizations that contribute to the vitality of Arizona, with an emphasis on civic and economic development, human services, environment, education and arts and culture.

Our total giving in 2016 includes \$2.9 million awarded by the APS Foundation to nonprofit organizations. The APS Foundation focuses its giving on helping educators increase content knowledge in STEM (science, technology, engineering and math) subjects and improve their ability to transfer this knowledge effectively to students. A workforce proficient in STEM

**MORE THAN**

**\$10  
MILLION**

DONATED BY APS TO  
WORTHWHILE CAUSES IN 2016

**120,000**

VOLUNTEER HOURS LOGGED BY  
APS EMPLOYEES IN 2016

**MORE THAN**

**\$2.5  
MILLION**

PLEGGED BY EMPLOYEES  
TO THE COMMUNITY SERVICES  
FUND IN 2016

skills is critical to attract and retain high quality businesses and industries in Arizona. In addition, for more than a decade, APS and the Phoenix Suns have partnered to promote STEM education in Arizona schools by offering \$50,000 in mini-grants for hands-on projects focused on STEM subjects.

APS in October 2016 was ranked as the top company on the inaugural Phoenix Business Journal list of largest corporate philanthropists. The publication called APS “the brightest star on a list full of companies practicing outstanding corporate citizenship.”

APS also received the Governor’s Arts Award from the Arizona Citizens for the Arts nonprofit organization. We supported artists and arts organizations across the state with \$900,000 in donations during the year. A roundtable discussion with key members of the Arizona arts community provided input on how we, together with other Arizona businesses, can strengthen our position as leading arts advocates and develop a plan for promoting the arts as an economic development driver.

APS is a proud supporter of America’s veterans, particularly assisting veterans as they transition to the workforce. Our giving included a \$10,000 donation to the Prescott U.S. Vets facility, which offers culinary workforce development. APS recognizes that other employers need to share this commitment, so we have held symposiums to help other companies strengthen their support for veteran employment.

We create opportunities for our nonprofit partners to focus on their own development and build stronger organizations. In 2016, APS hosted a collaborative workshop that connected community, economic development and

nonprofit organizations in Navajo County with resources to help maximize their fundraising efforts and deliver on their organizations’ missions. The event also featured a session with members of the Snowflake-Taylor Chamber of Commerce. In addition, APS hosted breakfast workshops during the year that furnished our nonprofit partners with free professional development in crucial skills such as creating succession plans for senior management and crafting, sharing and pitching their stories.

APS employees, in addition to the volunteer hours, support their communities by contributing a portion of their paychecks to the company’s annual Community Services Fund that benefits United Way and other local nonprofit agencies. Employees pledged more than \$2.5 million in 2016. The company matched that pledge with an additional \$1.25 million (50 cents for every dollar donated).

## **ECONOMIC DEVELOPMENT »**

Our Economic Development department has worked with state, regional and community partners to attract, expand and grow business and industry in the state of Arizona for the past 25 years. In addition to supporting these partners and existing customers, the department also focuses on community and entrepreneurial support to further create a solid foundation for businesses to invest and scale within the state.

## **BUSINESS ATTRACTION, RETENTION & EXPANSION »**

Our economic development team provides state, county, regional and municipal economic development agencies support on electrical infrastructure identification, rate analysis, project coordination, and project cost and timeline

estimates. In 2016, we worked with partners such as the Arizona Commerce Authority (ACA) and the Greater Phoenix Economic Council (GPEC) to create an estimated 5,000 new jobs and drive more than \$1 billion in capital investment in APS service territory. Collectively, these projects will add approximately 40 new megawatts of power to the APS system when they come online.

Highlights for 2016 include Huhtamaki North America locating in Goodyear bringing 250 new jobs and \$119 million in capital investment; Cardinal Glass locating in Buckeye with 100 new jobs and \$40 million in capital investment; and Farmers Insurance locating in Phoenix with 1,000 new jobs and \$24 million in capital investment.

In rural communities, electric vehicle manufacturer Lucid Motors is locating in Casa Grande, contributing an initial 700 employees to the area and more than \$700 million in capital investment. Rose Acre Farms is under construction near Bouse, Arizona, with one of the largest egg producing facilities in the nation bringing 120 much-needed jobs to La Paz County. The economic development department also worked extensively with another egg producer this year still considering Navajo County for investment.

#### **COMMUNITY SUPPORT »**

APS partners with metropolitan and rural economic development organizations around the state to identify unique community assets that shape long-term economic sustainability. The APS team provides both technical and financial assistance that helps communities identify and leverage assets that will promote a diversified economy and business growth.

In addition to working with the ACA and GPEC, we participate in boards and commissions across Arizona such as Access Arizona, Arizona Association for Economic Development and East Valley Partnership.

**ECONOMIC DEVELOPMENT STRATEGIC PLANNING** – APS offers economic development strategic planning assistance to rural economic development organizations and individual communities.

This effort, known in the past as Focus Future, was created to help communities think strategically, align planning tools and build consensus among all stakeholders to develop





an executable action plan that ultimately identifies job creation and a diverse tax base, leading to greater economic wealth. We completed two economic development strategic plans in 2016 with the Town of Payson and the Greater Prescott Regional Economic Partnership (GPREP).

#### **DATA RESOURCE: ARIZONA PROSPECTOR –**

APS funds a web-based data resource tool that supports community economic development efforts. Arizona Prospector provides up-to-date municipal and regional data on labor force, demographics, wages, consumer spending, key industries, transportation and education. This website also provides information on available office, industrial and retail buildings and land parcels.

This information offers site selection consultants and potential business prospects a comprehensive look at many of the key factors considered when locating or expanding a business. It is available to all communities to use in their own recruitment and retention efforts.

#### **ENTREPRENEURIAL SUPPORT »**

The entrepreneurial industry is experiencing dramatic growth in Arizona, representing opportunities for job advancement and progression in many of the state's key business sectors. Over the last decade, supporting this group has become a critical part of statewide economic development efforts. APS financially supports entrepreneurial-focused organizations and events such as Arizona Business Incubation Association, Northern Arizona Center for Entrepreneurial Technology and Seed Spot. By doing so, APS has the opportunity to significantly advance the state's entrepreneurship ecosystem, helping grow an idea or concept into

a successful business and enabling a start-up to become profitable, hire employees and assume commercial real estate space.

#### **DIVERSE SUPPLIERS »**

APS regards supplier diversity as an integral and sustainable element of our business. The majority of our diverse suppliers are Arizona-based, so it is also an economic development opportunity. A diverse roster of suppliers strengthens our business and provides an opportunity to gain innovative ideas from suppliers that reflect our customer base. Adding diverse suppliers to the APS sourcing mix increases competition and drives innovation as well as value.

The APS Supplier Diversity and Development (SDD) program exceeded \$300 million in spend with diverse suppliers for the third consecutive year, reaching almost \$370 million in 2016. Since its inception in 1992, the SDD program has spent more than \$2 billion with diverse businesses.

Relationships with ethnic chambers of commerce, third party certification agencies and organizations that represent and advocate for diverse businesses support our efforts to maintain diversity in our suppliers. These groups help us identify and certify potential vendors as well as provide important feedback regarding the SDD program and its processes. Among the certifications that we recognize for diversity purposes are ethnic minorities, women-owned businesses, service-disabled veteran-owned businesses and veteran-owned businesses.

The Women's Business Enterprise Council-West (WBEC-West) named APS the 2016 Corporation of the Year. APS is a founding

member of WBEC-West, which promotes women-owned businesses seeking to engage with corporations. This award underscores the value our supplier diversity program delivers to women-owned businesses in Arizona.

APS also received the 2017 Corporate Advocate of the Year from the National Center for American Indian Enterprise Development. The award recognizes a commitment to growing opportunities for American Indian and Alaska Native owned companies and bettering the economy of Indian Country for future generations to come. Over three years we have spent more than \$656 million with Native American businesses and Tribal affiliations, and support Native Americans through scholarships, home weatherization programs and employment opportunities.

APS takes a proactive approach to developing diverse suppliers. Our Diverse Supplier Training Program (DSTP) is a nine month course that provides diverse business owners with the knowledge and skills to be successful working with the utility industry. APS is one of the few utilities with a training program of this type, which is taught by internal employees, subject matter experts and external small business specialists. The program is enhanced and updated each year, ensuring that content remains relevant. Graduates from this program are better prepared to do business with APS and other public utilities, and many have been successful working with other industries. Seven of our top 50 diverse suppliers are DSTP graduates. APS has spent more than \$36 million with DSTP graduates since 2013 when the program refocused to concentrate on suppliers that offer goods or services specifically to the utility industry. In 2016, we graduated the 18th DSTP class and kicked off class 19.

In 2016, APS continued its partnerships with Arizona State University and the Business Mentor Team. The partnership with ASU allows DSTP participants to hear from professors of the W.P. Carey School of Business on subjects such as finance, negotiation and business strategy. The Business Mentor Team is an outside group of individuals, many of whom have been business owners themselves, that provides mentorship to the DSTP participants during the program. Mentors focus on each individual participant's needs and areas for improvement.

In 2017, APS will introduce an SDD Advocates program to support the company's SDD goals throughout each business unit. We also will launch a Supplier and Diverse Supplier of the Year Award program to recognize our top-performing suppliers.

#### **SUSTAINABLE SUPPLY CHAIN »**

APS participates in the Electric Utility Industry Sustainable Supply Chain Alliance (EUISSCA), which allows us to gain insight from our peer utilities. In 2016, APS took a leadership role in developing a supplier scorecard based on responses to the annual EUISSCA supplier sustainability survey. EUISSCA could then turn survey responses into further discussions with strategic suppliers about making positive triple bottom line impacts.

EUISSCA established new takeaways and initiatives, including a voluntary standard for construction services aimed at repackaging and recycling unused materials from job sites. Many materials are scrapped at job sites due to a surplus or damage. Repackaging unused materials allows APS to restock the materials in our warehouse, reduce the amount of waste at our job sites and reuse materials we have already paid for.

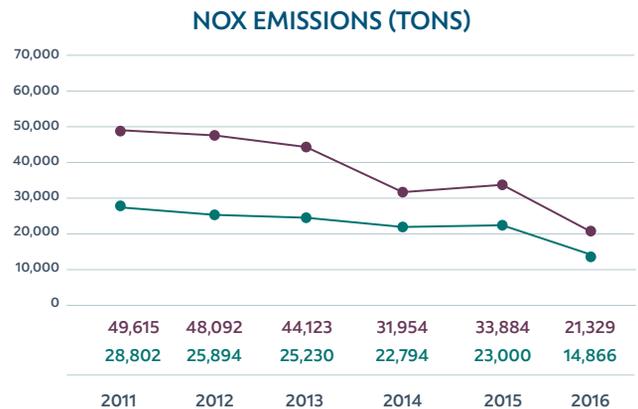
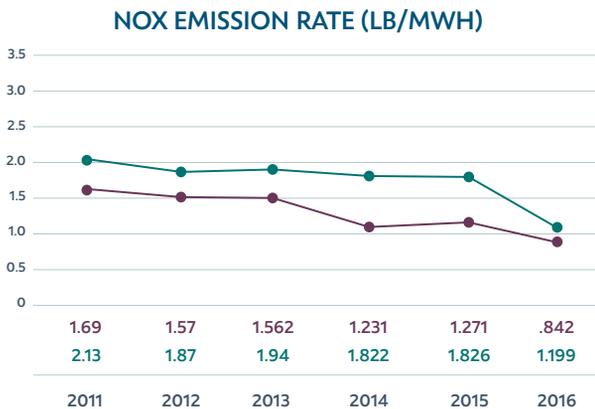
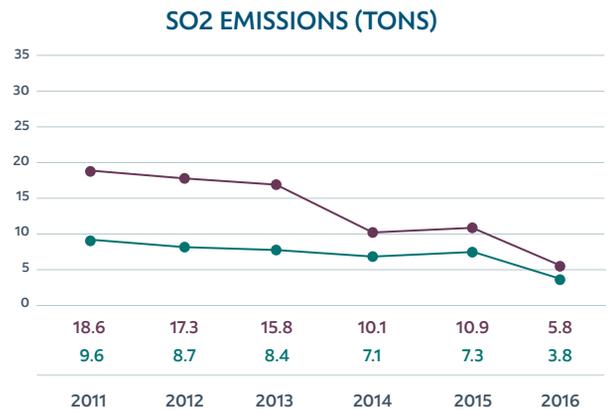
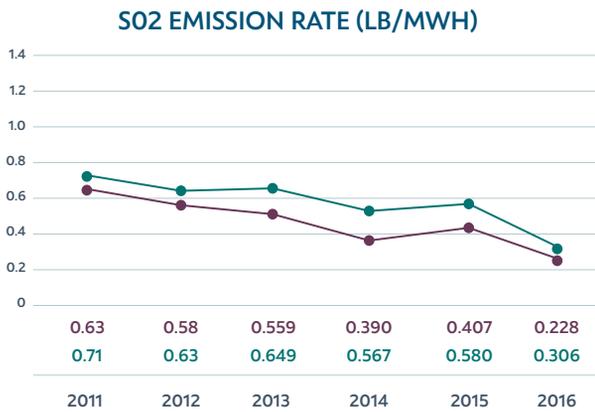
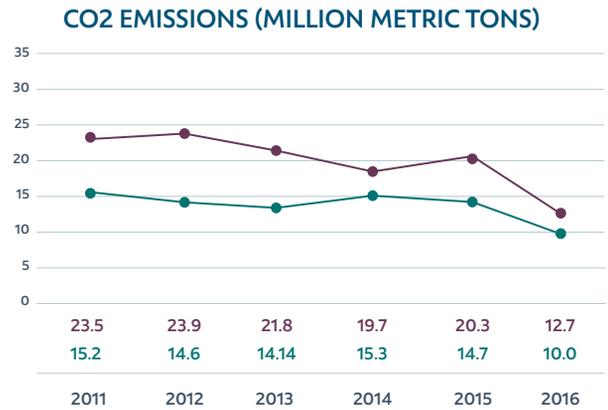
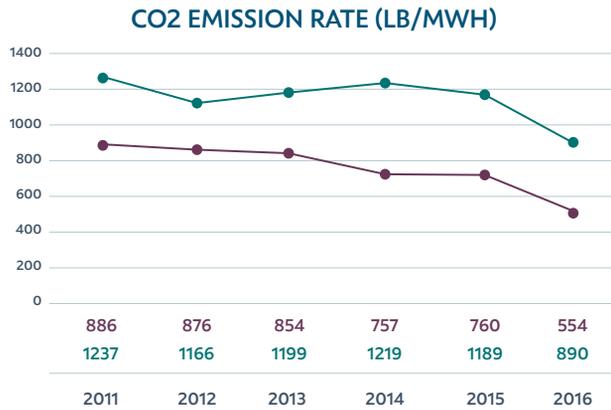
## 2017 AND BEYOND »

APS will continue to cultivate success by maintaining strong engagement with our employees, customers, suppliers and community members. Highlights for 2017 include:

- Implementing action plans in response to the 2016 Employee Engagement Survey
- Enhancing our total rewards program
- Making continued enhancements to our leadership effectiveness programs
- Adding our new Customer Care & Billing system to the suite of tools that make it easier for customers to do business with us
- Continuing to emphasize STEM education and veterans in our corporate giving program, and helping to develop and promote arts organizations
- Creating a Corporate Council for Veterans Careers in partnership with other local companies and agencies, focused on helping veterans transition to the workforce
- Adding Supplier Diversity recognition and advocacy programs and increasing our diverse spend by \$8.5 million

# APPENDIX

- OPERATED
- OWNED

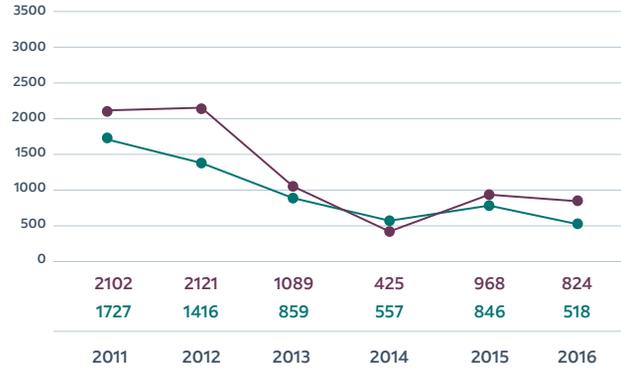


- OPERATED
- OWNED

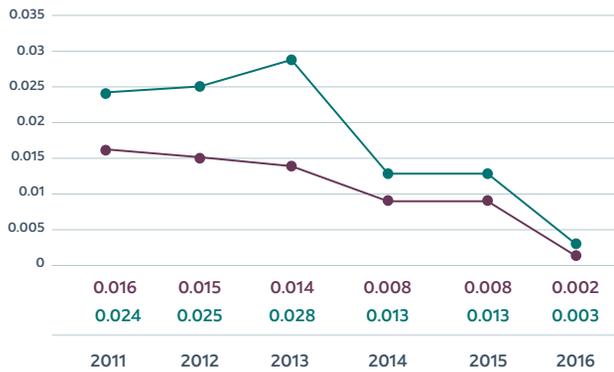
PM10 EMISSION RATE (LB/MWH)



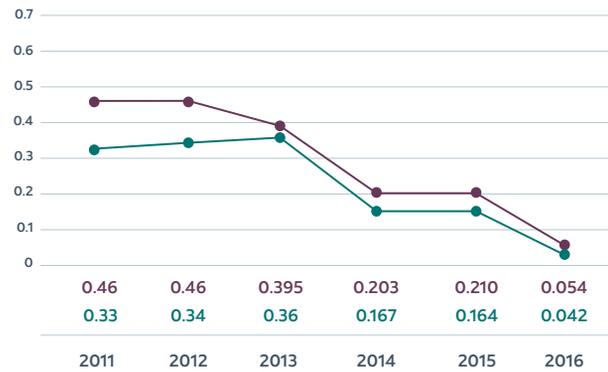
PM10 EMISSIONS (TONS)



MERCURY EMISSION RATE (LB/GWH)



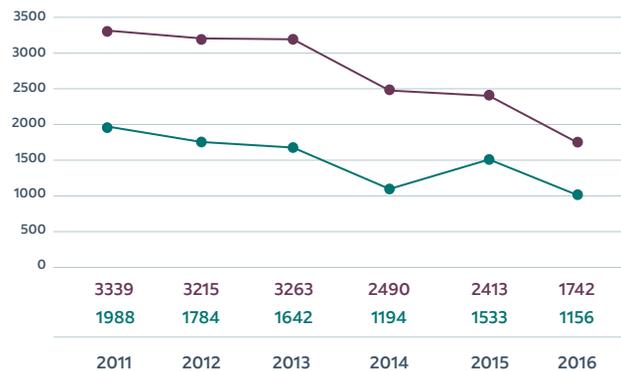
MERCURY EMISSIONS (TONS)



CO EMISSION RATE (LB/MWH)



CO EMISSIONS (TONS)

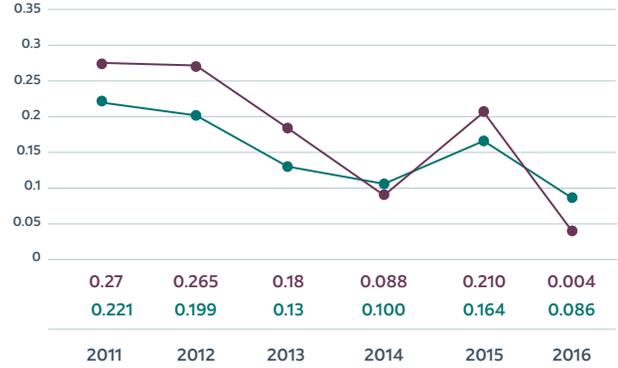


- OPERATED
- OWNED

**LEAD EMISSION RATE (LB/GWH)**



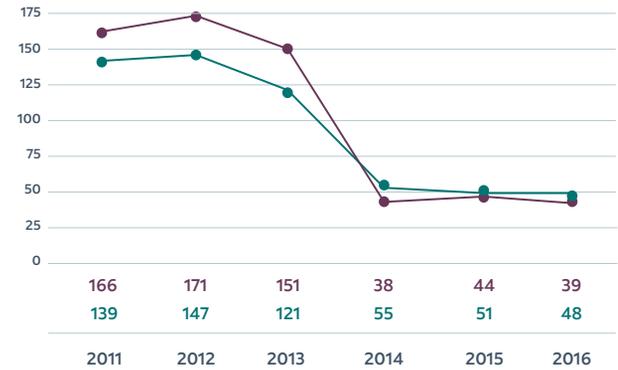
**LEAD EMISSIONS (TONS)**



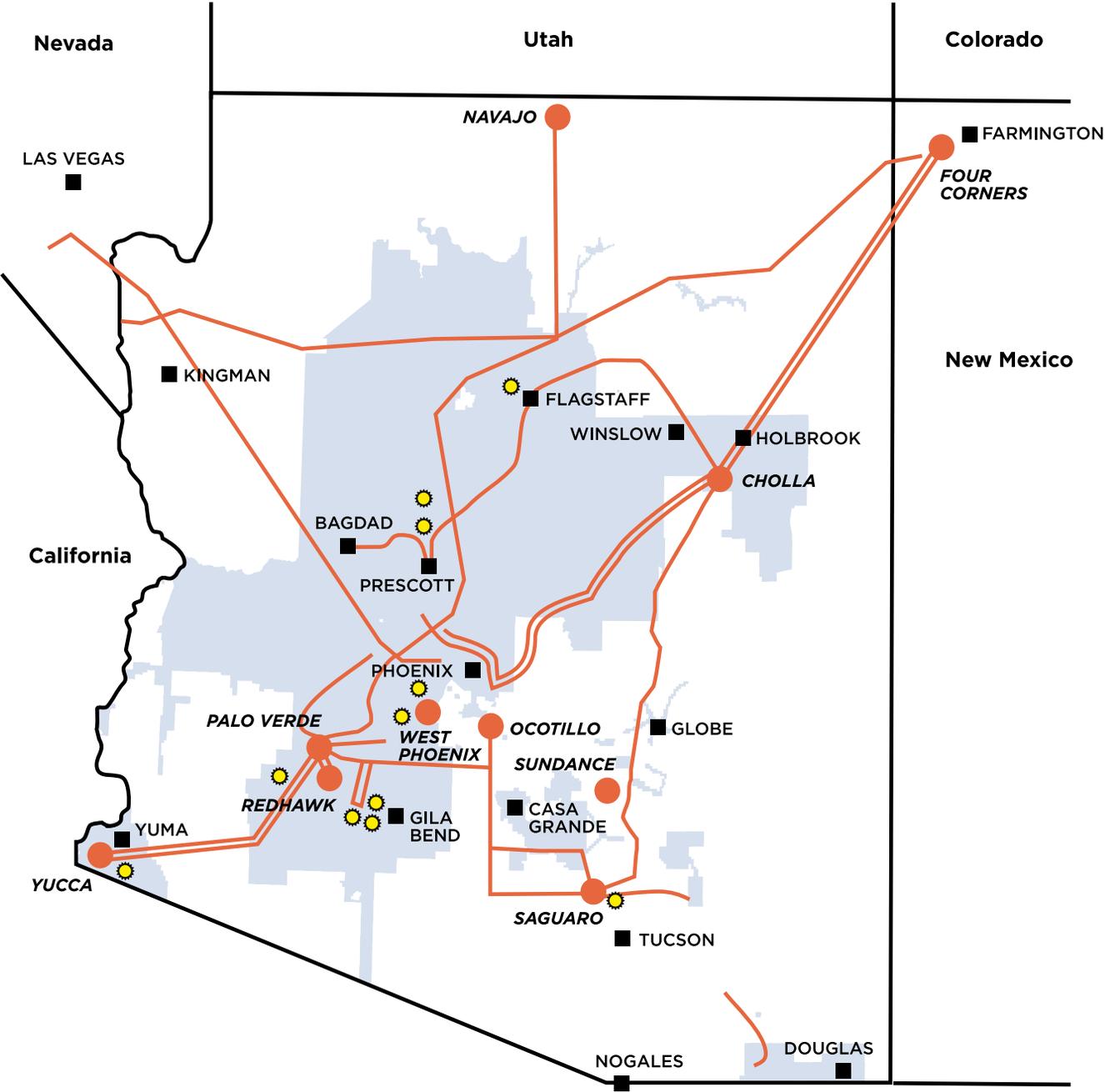
**VOC EMISSION RATE (LB/MWH)**



**VOC EMISSIONS (TONS)**



# APS SERVICE TERRITORY MAP



- APS Retail Electric Service Territory
- Major APS Power Plants
- Principal APS Transmission Lines
- ☀ APS Solar Power Plants

**CORPORATE RESPONSIBILITY  
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