

Module: Introduction**Page: W0. Introduction**

W0.1**Introduction****Please give a general description and introduction to your organization**

Pinnacle West Capital Corporation is an energy holding company based in Phoenix, AZ with a focus on the business of its primary subsidiary, the Arizona Public Service Company (APS). APS is an investor-owned, vertically integrated power company that generates and delivers reliable electric power and related services to approximately 1.2 million customers located in Arizona. To meet the energy demand of our customers, APS owns and operates a fleet of generation resources, including nuclear, coal, natural gas, and renewable (solar and wind) generation. Additionally, APS owns and operates a transmission and distribution system that is necessary to deliver the power to our customers.

Water is vital for APS to meet its core business objectives. As a result, APS has a Water Resource Management department whose sole purpose is to ensure a sufficient quality and quantity of water is available to meet the current and future needs of our generating stations. The vision of the Water Resource Management department is to secure and maintain a sustainable and cost-effective supply of water to enable reliable energy production for APS customers. The Department's mission is to develop and implement a strategic water resource management program that will provide APS timely and reliable information to manage APS's water resources portfolio in support of the safe and efficient generation of electricity for the long term. This is accomplished through the acquisition of water supplies, alternative supplies, and conservation by the efficient use of water, research and technology, groundwater models, a well and pumping reliability program, water supply contingency initiatives and well field management plans.

W0.2**Reporting year****Please state the start and end date of the year for which you are reporting data**

Period for which data is reported

Fri 01 Jan 2016 - Sat 31 Dec 2016

W0.3

Reporting boundary

Please indicate the category that describes the reporting boundary for companies, entities, or groups for which water-related impacts are reported

Companies, entities or groups over which operational control is exercised

W0.4

Exclusions

Are there any geographies, facilities or types of water inputs/outputs within this boundary which are not included in your disclosure?

Yes

W0.4a

Exclusions

Please report the exclusions in the following table

Exclusion	Please explain why you have made the exclusion
Commercial Office buildings and facilities not associated with power	The facilities are excluded because the amount of water used in office buildings is immaterial in comparison to the amount of water used in power generation and the water is provided from sources that are not at risk of shortages.

Exclusion	Please explain why you have made the exclusion
generation	However, APS does monitor and track water usage in these facilities.

Further Information

Module: Current State

Page: W1. Context

W1.1

Please rate the importance (current and future) of water quality and water quantity to the success of your organization

Water quality and quantity	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of good quality freshwater available for use	Vital for operations	Important	Without a sufficient amount of good quality water, generating the power required to meet customer's energy demands would not be possible. Large amounts of water are needed for nuclear, gas and coal generation for cooling water make-up, boiler make-up and domestic uses. Sufficient amounts of good quality fresh water are important because fresh water is the primary water supply at seven out of nine APS power plants representing 4,462 MW of generating capacity, including the West Phoenix Power Plant (997 MW), Cholla Power Plant (647 MW), Four Corners Power Plant (1540 MW), Ocotillo Power Plant (330 MW), Saguaro Power Plant ((189 MW), Sundance Power Plant (420 MW) and Yucca Power Plant (339 MW).
Sufficient amounts of recycled, brackish and/or produced water available for use	Vital for operations	Important	Recycled water (treated wastewater from the City of Phoenix) is vital to the operation of the Palo Verde Nuclear Generating Station and to the Red hawk Power Plant. Since APS generation resources are located in a desert, recycled water, a renewable and relatively drought-proof supply is a critical resource to meet production needs. In 2016, recycled water made up 74 percent of APS total water use fleet wide. Without sufficient amounts of adequate quality reclaimed water, a significant portion of our power generation would not be possible unless a different source of water

Water quality and quantity	Direct use importance rating	Indirect use importance rating	Please explain
			was available. The importance of recycled water will likely increase in the future due to increased competition for scarce water resources in the arid Southwest.

W1.2

For your total operations, please detail which of the following water aspects are regularly measured and monitored and provide an explanation as to why or why not

Water aspect	% of sites/facilities/operations	Please explain
Water withdrawals- total volumes	76-100	APS measures and monitors 100 percent of our water withdrawals. Power plant water use is measured by direct metering and monthly reports are compiled and evaluated. In some cases this is performed daily or as needed to support operational and/or regulatory requirements. This information is provided to management in monthly progress reports and metric target reports. Other water needs, such as in office buildings, service centers, etc. are met by a municipal provider. Because water use is vital for power production, it is important to track actual water usage as a baseline for water goal setting and water conservation purposes.
Water withdrawals- volume by sources	76-100	APS measures and monitors 100 percent of water withdrawals and identifies the water withdrawals by source. Fleet wide, the plants use a combination of recycled water, groundwater and surface water, all of which are measured by direct metering. In some cases measurement is performed daily or as needed to support operational and/or regulatory requirements. This information is provided to management in monthly progress and metric target reports. This information is also reported on annual basis to the appropriate agencies for compliance purposes. It is important to understand the source of the water withdrawal to identify potential watershed impacts and as a baseline for goal setting.
Water discharges- total volumes	76-100	APS measures and monitors 100 percent of water discharge volumes. A portion of the blowdown water is treated then recycled and reused at the plants. The remainder is discharged to a sanitary sewer, discharged to a river or is discharged into evaporation ponds. Measurement is performed as needed to support operational and/or regulatory requirements. This information is provided to management in

Water aspect	% of sites/facilities/operations	Please explain
		monthly progress and metric target reports. This information is also is reported on an annual basis to the appropriate agencies for compliance purposes. Accurate measurement of discharge data is required to calculate water consumption.
Water discharges- volume by destination	76-100	APS measures and monitors 100 percent of water discharge volumes by destination. A portion of the blowdown water is treated then recycled and reused at the plants. The remainder is discharged to a sanitary sewer, discharged to a river or is discharged into evaporation ponds. This information is provided to management in monthly progress and metric target reports. This information is also is reported on an annual basis to the appropriate agencies for compliance purposes. Tracking the volume discharged by destination provides data regarding potential impacts on watersheds.
Water discharges- volume by treatment method	76-100	APS measures and monitors 100 percent of our water discharge volumes by treatment method. A portion of our blowdown water is treated then recycled and reused at the plants. The remainder is discharged to a sanitary sewer, discharged to a river or is discharged into evaporation ponds. Measurement is performed daily or as needed. This information is provided to management in monthly progress and metric target reports. This information is also is reported on annual basis to the appropriate agencies for compliance purposes. APS treatment methods are identified in procedures at each power plant in order to optimize and encourage recycling when possible. Discharge volume, water quality, discharge locations, and impacts to the watershed are accurately recorded.
Water discharge quality data- quality by standard effluent parameters	76-100	APS measures and monitors 100 percent of our water discharge quality data to ensure effluent quality standards are met. A portion of our blowdown water is treated then recycled and reused at the plant, is discharged to a sanitary sewer, discharged to a river or is discharged into evaporation ponds. In some cases measurement is done daily. This information is provided to management and used throughout the company and is reported to the appropriate agencies. This information is measured and monitored to ensure consistent water quality parameters for power production. Water discharge quality consistent with each type of discharge is closely monitored to ensure environmental commitments are met.
Water consumption- total volume	76-100	APS measures and monitors 100 percent of our water consumption. Power plant uses are all measured by direct metering and monthly reports are compiled and evaluated This information is provided to management in monthly progress and metric target reports. This information is also is reported on annual basis to the appropriate agencies for compliance purposes. Other water uses, such as in office buildings, service centers, etc. are served by a municipal provider. APS Facilities Department monitors water consumption in office buildings and service centers.
Facilities providing fully-functioning WASH services for all workers	76-100	APS measures and monitors 100 percent of water withdrawals and provided facilities with fully-functioning WASH services for all workers.

Water withdrawals: for the reporting year, please provide total water withdrawal data by source, across your operations

Source	Quantity (megaliters/year)	How does total water withdrawals for this source compare to the last reporting year?	Comment
Fresh surface water	19975	Lower	Water use was lower due to decreased generation at the Four Corners Power Plant. The decrease in generation was due to extended plant outages that allowed repairs and installation of new equipment, including selective catalytic reduction emissions control equipment.
Brackish surface water/seawater	0	About the same	None of APS's operations withdrew water from brackish surface water/seawater sources. The total withdrawal made from this source is thus not applicable.
Rainwater	2261	This is our first year of measurement	Rainwater was captured in the cooling water reservoirs at the Four Corners Power Plant and the Cholla Power Plant, and in water storage reservoirs at the Palo Verde Nuclear Generating Station and used for generation. This data was first identified and reported in 2016.
Groundwater - renewable	0	About the same	There are no renewable groundwater sources available for use at APS power plants, therefore no withdrawals were made. This was the case for the previous year as well, thus it is not applicable.
Groundwater - non-renewable	16972	Lower	More power was generated in 2016 at the Redhawk Power Plant, Ocotillo Power Plant, Sundance Power Plant, Yucca Power Plant, and West Phoenix Power Plant, however, less groundwater was used. Less groundwater was used because there was a shift in generation from more water intensive plants (Cholla) to less water intensive plants (Redhawk, West Phoenix, Sundance, Yucca) and water efficiency measures were successfully employed.
Produced/process water	0	About the same	None of APS's operations withdrew water from produced/process water sources. This is the case for the previous year as well, thus it is not applicable.
Municipal supply	0	About the same	None of APS's operations withdrew from municipal supply. This is the case for the previous year as well, thus it is not applicable.
Wastewater from another organization	92988	About the same	Combined power generated by Palo Verde Generating Station and Redhawk Power Plant was slightly higher in 2016; however, the effluent use was approximately the same. This was because most of the increased generation was at Redhawk, which uses substantially less water per megawatt hour generated.
Total	132196	Lower	Overall, less power was generated in 2016, therefore less water was used. Also, less water was used because there was a shift in APS generation mix to less water intensive generation

Source	Quantity (megaliters/year)	How does total water withdrawals for this source compare to the last reporting year?	Comment
			(less coal, more natural gas) and water efficiency measures were successfully employed.

W1.2b

Water discharges: for the reporting year, please provide total water discharge data by destination, across your operations

Destination	Quantity (megaliters/year)	How does total water discharged to this destination compare to the last reporting year?	Comment
Fresh surface water	4222	Higher	More water was returned back to the environment in 2016.
Brackish surface water/seawater	0	About the same	There were no discharges to brackish surface water/seawater.
Groundwater	0	About the same	There were no discharges to groundwater.
Municipal/industrial wastewater treatment plant	234	Higher	Slightly more water was discharged to the city sewer at West Phoenix due to equipment failure and an extended outage of the Zero Liquid Discharge system.
Wastewater for another organization	0	About the same	There are no discharges of wastewater for another organization.
Total	4456	Higher	Total water discharged. More water was discharged at Four Corners in order to maintain optimum water quality in Morgan Lake, the cooling water lake. More water was discharged to the city sewer at West Phoenix due to equipment failure and an extended outage of the ZLD system.

W1.2c

Water consumption: for the reporting year, please provide total water consumption data, across your operations

Consumption (megaliters/year)	How does this consumption figure compare to the last reporting year?	Comment
127739	Lower	There was a 7.7 percent decrease in water use from 2015 to 2016. Overall, less power was generated in 2016 than in 2015 resulting in less water use. Lower water use was also attributed to a shift in APS generation mix to less water intensive generation (less coal, more natural gas) and water efficiency measures were successfully employed.

W1.3

Do you request your suppliers to report on their water use, risks and/or management?

Yes

W1.3a

Please provide the proportion of suppliers you request to report on their water use, risks and/or management and the proportion of your procurement spend this represents

Proportion of suppliers %	Total procurement spend %	Rationale for this coverage
1-25	26-50	<p>1) Methods of engagement i) Suppliers: Annually, APS engages our top tier suppliers in a sustainability survey, with questions on how they are managing environmental impacts in their operations, including greenhouse gas emissions, energy and water usage, waste, and materials management. 2) Strategy for prioritizing engagements i) Suppliers: Within APS' supply chain, we prioritize our top tier suppliers, our most critical and strategic suppliers and those with whom we spend significant dollars. APS evaluates these suppliers using key performance indicators such as safety, quality and operations, and supplier diversity. 3) Measures of success i) Suppliers: APS defines success in two ways: a year over year increase in supplier response rate to the survey, and a year over year improvement in performance across the key performance indicators. 4) How this information is used i) Information gathered during annual EUISSCA survey is shared with Supply Chain Leadership to develop awareness of our supplier's performance. In the future, information will be used to drive Supplier Relationship Management quarterly discussions. 5) How suppliers are incentivized to report i) We incentivize suppliers to share their water performance through our Supplier of the Year Awards.</p>

W1.3b

Please choose the option that best explains why you do not request your suppliers to report on their water use, risks and/or management

Primary reason	Please explain
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W1.4

Has your organization experienced any detrimental impacts related to water in the reporting year?

No

W1.4a

Please describe the detrimental impacts experienced by your organization related to water in the reporting year

Country	River basin	Impact driver	Impact	Description of impact	Length of impact	Overall financial impact	Response strategy	Description of response strategy
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W1.4b

Please choose the option below that best explains why you do not know if your organization experienced any detrimental impacts related to water in the reporting year and any plans you have to investigate this in the future

Primary reason	Future plans
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Further Information

Module: Risk Assessment

Page: W2. Procedures and Requirements

W2.1

Does your organization undertake a water-related risk assessment?

Water risks are assessed

W2.2

Please select the options that best describe your procedures with regard to assessing water risks

Risk assessment procedure	Coverage	Scale	Please explain
Comprehensive company-wide risk assessment	Direct operations and supply chain	All facilities	The Executive Vice President and Chief Financial Officer is responsible for enterprise risk management and chairs the Executive Risk Committee. This Committee is responsible for ensuring that the Board receives timely information concerning the Company's material risks and risk management processes. The Executive Risk Committee provides the Board with a list of the Company's top risks on an annual basis. Risks encompass a broad range of topics such as availability and cost of water resources and exposures in the supply chain. Each Business Area executive is responsible for identifying significant risks and planned mitigations in his/her business plan. Each Business Area Executive is also responsible for supporting the Company's Enterprise Risk Management process by assigning a Risk Coordinator to surface and report Business Area risks which have the potential to impact achieving Company objectives. Risks (including water risk) are reported to shareholders, the public, and other stakeholders through Pinnacle West's Annual Form 10-K and Corporate Responsibility Report, and to regulators via annual reporting. In addition, a corporate water quantity policy was established with risk criteria, including shortages due to drought, infrastructure issues, regulatory/legal limits and costs of water. Risk is assessed quarterly and reported to corporate executives/ officers on the strategic options roadmap.

W2.3

Please state how frequently you undertake water risk assessments, at what geographical scale and how far into the future you consider risks for each assessment

Frequency	Geographic scale	How far into the future are risks considered?	Comment
Six-monthly or more frequently	Facility	>6 years	APS files Integrated Resource Plans every two-three years with the Arizona Corporation Commission that address water risks for the next 15 years. Risk assessments are performed annually by the USBR and partners, including APS, at Navajo Reservoir and in the San Juan River. These assessments identify potential for drought-related shortages and involve models developed by the Colorado Basin River Forecast Center.

W2.4

Have you evaluated how water risks could affect the success (viability, constraints) of your organization's growth strategy?

Yes, evaluated over the next 10 years

W2.4a

Please explain how your organization evaluated the effects of water risks on the success (viability, constraints) of your organization's growth strategy?

Water Resource Management evaluates water risk to growth by performing watershed and individual plant water risk audits, then compiles these risks into categories that are summarized quarterly and provided to APS executives. Strategies are developed to mitigate possible risk and are implemented to ensure success. Strategies include provision of primary and alternate water supplies or strategies at each power plant, conducting water audits, and implementing conservation strategies.

W2.4b

What is the main reason for not having evaluated how water risks could affect the success (viability, constraints) of your organization's growth strategy, and are there any plans in place to do so in the future?

Main reason	Current plans	Timeframe until evaluation	Comment
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W2.5

Please state the methods used to assess water risks

Method	Please explain how these methods are used in your risk assessment
<p>Other: Acquisition of water supplies and alternative supplies, Conservation by the efficient use of water, Research and Technology, Groundwater models, well and pumping equipment reliability program, Water supply contingency initiative, and Well field management plans</p>	<p>Acquisition of water supplies and alternative supplies: Since there is an increasing demand and continued pressure on water supplies in the arid Southwest, APS identifies future needs and acquires water to meet the needs of future generation. The diminishing supply of water resources combined with population growth in the region increases the importance of securing backup supplies for each generating plant. Options for investing in future water supplies are constantly evaluated, and include water storage and recovery plans and acquiring groundwater rights. Initiatives are currently under way that will conserve non-renewable groundwater, including early retirement of water-intensive coal units, development of well field operations plans that reduce water consumption, and further implementation of renewable energy, distributed generation, and Energy Efficiency programs. Research and technology: With the increased emphasis on conservation of water resources in the Southwest, APS has committed to utilize alternative cooling technologies when possible at future generating stations to reduce consumptive use of water, or to use alternative water such as brackish groundwater supplies (advanced technologies/ treatment strategies employed). Groundwater models: APS has contracted with various hydrologic consultants to develop groundwater flow models to help identify impacts of withdrawals on the aquifer and to employ more strategic use of water. Models are also used to identify regional water withdrawal impacts by multiple entities and to confirm that APS withdrawals are done both locally and regionally in a sustainable manner. Well and pumping equipment reliability program: This program was developed to evaluate and maintain critical components of the water supply including groundwater production wells and well infrastructure. Water supply contingency initiative: Primary and secondary water supplies or strategies have been</p>

Method	Please explain how these methods are used in your risk assessment
	identified for all nine APS owned/operated power plants. Well field management plans: These plans are implemented at APS largest plants and will result in more efficient use of higher quality groundwater, decreased water consumption, and more strategic use of water resources.

W2.6

Which of the following contextual issues are always factored into your organization's water risk assessments?

Issues	Choose option	Please explain
Current water availability and quality parameters at a local level	Relevant, included	APS has numerous agreements and contracts with local communities regarding current and future water supplies. Examples of such agreements are the San Juan River Shortage Sharing Agreement that ensures that all water users would share proportionally in drought-related cuts to water supply. Another example is the Joseph City Severance and Transfer agreement that provides a contingent supply of surface water to the Cholla Power Plant in the event that sufficient groundwater was not available. APS is committed to work with these entities to ensure continued efficient water use and has made plans for shortages that will ensure a reliable supply of water is available.
Current water regulatory frameworks and tariffs at a local level	Relevant, included	One important aspect of risk assessment at APS is complying with local, state and federal regulatory requirements. APS works with the Arizona Department of Water Resources on state regulations of groundwater and surface water, the Arizona Department of Environmental Quality on water quality regulations, and the New Mexico State Engineers Office on water supplies in New Mexico. Regulatory issues such as developing legislation, rules, or guidance documents are tracked and reported quarterly or more frequently if needed. Plans are in place to proactively participate in the regulatory process, to provide comments, and address each developing issue to ensure there is no adverse impact to the water supplies needed to support generation.
Current stakeholder conflicts concerning water resources at a local level	Relevant, included	APS participates in a number of groups throughout the state that are working to resolve water resource conflicts and issues. Examples include the Governor's Water Augmentation Council, the Groundwater Users Advisory Council, the Kyl Center for Water Policy, and the San Juan River Basin Recovery Implementation Program. APS also participates in a critical watershed project at the Four Corners power plant with four national laboratories and the U.S. Bureau of Reclamation to evaluate possible climate

Issues	Choose option	Please explain
		change impacts on water supplies used for power generation. The study's title is "Climate Change Impact and Decision Support for Energy Development Planning Under Changing Water Supply Conditions."
Current implications of water on your key commodities/raw materials	Relevant, included	In 2016, APS asked its 100 top tier suppliers to report their water management through the Electric Utility Industry Sustainable Supply Chain Alliance (EUISSCA) Sustainability Survey. These suppliers represent about 31% of total spend. APS suppliers invited to respond were selected based on prioritizing top tier suppliers, the most critical and strategic suppliers and those with whom APS spends significant dollars. Responding suppliers may state whether their company operates in a region that is currently or projected to be a water-scarce region and if their company's production/service/generation process rely on water availability.
Current status of ecosystems and habitats at a local level	Relevant, included	APS participates on the Biology Committee and Coordinating Committee of the San Juan River Basin Recovery Implementation Program to assist in recovery efforts associated with the endangered Colorado Pikeminnow and Razorback Sucker. APS provides funding for stocking programs, non-native fish removal, protecting and augmenting fish habitat, monitoring endangered fish populations, prohibiting expansion of non-native fish species (fish traps), constructing an in-stream fish passage and evaluating temperature modification studies. APS also participates in the Coconino Plateau Water Advisory Committee, modeling Coconino Aquifer withdrawals and protecting the critical habitat of the Little Colorado Spinedace. APS also works with water users and environmental stakeholders to evaluate potential impacts/mitigation of groundwater pumping on spring flows that provide critical habitat for threatened fish populations.
Current river basin management plans	Relevant, included	The Arizona Department of Water Resources (ADWR) develops Management Plans for the five Active Management Areas in Arizona that regulate groundwater. These plans are updated every 10 years and APS has worked with ADWR to provide clarification on current and future Management Plan requirements including endorsing changes to address different types of generating facilities.
Current access to fully-functioning WASH services for all employees	Relevant, included	All APS workers have full access to fully functioning WASH services at all APS facilities.
Estimates of future changes in water availability at a local level	Relevant, included	In Arizona, water availability at the local level will always be an issue. APS continuously monitors water availability to each of its plants and service centers to ensure there will always be a safe and reliable supply of water. Water shortages along the Colorado River and the Salt River System have potential to directly and indirectly impact the APS fleet. APS has developed models that predict availability of water and also uses models developed by others for this purpose. Water supplies to support generation are currently sufficient to meet all demands. Contingent supplies are available at each plant. There is no identified risk at any APS power plant that does not have a viable contingency. The Colorado and Salt River systems and local groundwater conditions are monitored and assessed on a continuous basis.
Estimates of future potential regulatory changes at a local level	Relevant, included	Arizona water laws and federal water laws pertaining to the Colorado River are complex and changes to those laws could have a direct impact to APS and its fleet. Future potential regulatory changes could include completion of the surface water adjudication process in Arizona and New Mexico, changes to the Arizona Groundwater Management Act that could impact how APS withdraws and uses groundwater and

Issues	Choose option	Please explain
		regulatory changes in water quality standards that could impact cost and APS's ability to treat water. APS works with the Arizona Department of Water Resources, the Arizona Department of Environmental Quality, the New Mexico State Engineers Office and the Bureau of Reclamation to understand potential regulatory changes and to participate in and support development of new regulations that support a safe and reliable supply of water.
Estimates of future potential stakeholder conflicts at a local level	Relevant, included	Potential stakeholder conflicts are an important part of risk assessment. Future stakeholder conflicts over water between municipalities, agricultural and industrial users could restrict growth of one or more of these sectors. The stakeholder groups identified worked together to prevent or mitigate adverse impacts associated with water shortages. APS is committed to work with entities at the local level to avoid and resolve conflicts with stakeholders to ensure we all have a safe and reliable supply of water.
Estimates of future implications of water on your key commodities/raw materials	Relevant, included	Water shortages are not anticipated to have an impact on key commodities/raw materials needed to support electric generation.
Estimates of future potential changes in the status of ecosystems and habitats at a local level	Relevant, included	Water shortages could adversely impact endangered species critical habitats in the San Juan River in New Mexico and the Little Colorado River in Arizona. APS works with local stakeholders and environmental groups to develop plans that will remedy adverse impacts.
Scenario analysis of availability of sufficient quantity and quality of water relevant for your operations at a local level	Relevant, included	APS has contracted with various hydrologic consultants to develop groundwater flow models to help identify more strategic uses of water and to ensure that all withdrawals will have no adverse impacts. These models assess conditions based on a variety of different water use scenarios to help APS understand how different water use practices will affect other water users and the environment surrounding power plants.
Scenario analysis of regulatory and/or tariff changes at a local level	Relevant, included	One important aspect of risk assessment at APS is looking at different ways regulatory changes will affect plant operations and how APS can prepare for those changes and work with the entities to ensure a safe and reliable supply of water remains intact. APS works with the Arizona Department of Water Resources, the Arizona Department of Environmental Quality, the New Mexico State Engineers Office and have committed to numerous agreements and contracts with local communities regarding current and future water supplies.
Scenario analysis of stakeholder conflicts concerning water resources at a local level	Relevant, included	While planning for future water supply acquisition, APS looks at potential stakeholder conflicts and examines different scenarios to determine if those conflicts can be resolved while ensuring that sufficient water is available to meet each stakeholder's needs. APS evaluates alternative water supplies for the future such as poor quality groundwater that is currently underutilized in Arizona and is being considered for development by multiple entities. Scenarios have been developed to either independently pursue such water supplies or to work with one or more parties to jointly develop it.
Scenario analysis of implications of water on your key commodities/raw materials	Relevant, included	APS has not identified significant instances where water supply will impact key commodities/raw materials required to operate generating facilities. APS continues to monitor water and possible future impacts on commodities/raw material.

Issues	Choose option	Please explain
Scenario analysis of potential changes in the status of ecosystems and habitats at a local level	Relevant, included	APS participates in the Biology Committee and Coordinating Committee of the San Juan River Basin Recovery Implementation Program (SJRIP) to assist in recovery efforts associated with the Colorado Pikeminnow and Razorback Sucker. APS also participates in the Coconino Plateau Water Advisory Council Committee meetings, modeling Coconino Aquifer withdrawals and protecting the critical habitat of the Little Colorado Spinedace. APS participates in these groups because they perform scenario analysis on ecosystems and habitats that can be used by APS, and in return, APS develops and shares data that is mutually beneficial.
Other	Not evaluated	There are no other water issues for risk assessment.

W2.7

Which of the following stakeholders are always factored into your organization's water risk assessments?

Stakeholder	Choose option	Please explain
Customers	Relevant, included	Water risk assessments are performed to minimize risk to APS's ability to generate power in the interest of our customers. APS discusses water risk with suppliers of water such as those that produce the effluent that is purchased for use at power plants. Those suppliers are also APS customers, therefore it is mutually beneficial to jointly assess water risks that may impact us.
Employees	Relevant, included	At APS, employees are continually educated concerning water risks to the company. This is done by providing presentations to executive management, Directors, and employees that are interested in how APS manages water. Water Resource Management works directly with plant operators and chemical control specialists at the plants that operate water treatment and disposal systems. Water Resource staff meet monthly with plant managers, directors, GM's and VPs to discuss the status of water conservation initiatives and suggest actions that the plants can take to minimize water use. Water Resource Management conducts water use surveys of each plant and provides specific recommendations to reduce water consumption.
Investors	Relevant, included	APS discusses water risks with partners at all participant owned plants – Palo Verde, Cholla, Yucca and Four Corners. Decisions that reduce risk often involve cost, therefore, must be discussed with co-owner/investors. APS also reports to

Stakeholder	Choose option	Please explain
		investors through SEC filings (10-K and 10-Q), the Pinnacle West Corporate Responsibility Report and CDP Water questionnaire. APS risk assessments identify and eliminate risks that may interfere with plant operations and help APS to become a better steward of water resources.
Local communities	Relevant, included	APS participates with local communities throughout Arizona and in New Mexico to seek local solutions to water resource issues. APS participates in Community Advisory Panel meetings that occur near the Palo Verde NGS to ensure that the local community is aware of activities at Palo Verde, and to answer any questions that may develop. APS works on the San Juan RIP in New Mexico, participating in quarterly meetings to discuss local watershed issues and make the public aware of activities at the Four Corners Power Plant.
NGOs	Relevant, included	APS engages with NGOs concerning water risks associated with potential adverse environmental impacts at the Four Corners Power Plant and the Cholla Power Plant. Some NGO's include the Sierra Club, National Parks and Conservation Association, Environmental Defense Fund, and the Nature Conservancy.
Other water users at a local level	Relevant, included	APS engages with local water users in planning meetings such as the Groundwater Users Advisory Council, Governors Water Augmentation Council, and the Kyl Center for Water Policy. APS also interacts with local users on the San Juan River to maintain a shortage sharing agreement to be implemented following severe drought conditions.
Regulators	Relevant, included	APS engages with the Arizona Department of Water Resources concerning risk to water supplies in state-wide planning meetings such as the Groundwater Users Advisory Council. APS also engages with the New Mexico State Engineers concerning water supply conditions on the San Juan River, Navajo Reservoir, and shortage sharing.
River basin management authorities	Relevant, included	APS works with the U.S. Bureau of Reclamation concerning management of the water supply in Navajo Reservoir. APS participates in on-going environmental flows workshops designed to balance the needs between commercial, agricultural and environmental interest in the San Juan River Basin in New Mexico.
Statutory special interest groups at a local level	Relevant, included	APS works with statutory special interest groups as they are identified and, based on evaluation, may directly engage with the groups when appropriate. APS meets regularly with a variety of groups such as the Governors Water Augmentation Council, the Groundwater Users Advisory Council, the Kyl Center for Water Policy, and the San Juan RIP.
Suppliers	Relevant, included	We have worked with our suppliers to better understand our value-chain footprint. In 2016, APS asked its 65 top tier suppliers to report on their water management through the Electric Utility Industry Sustainable Supply Chain Alliance Sustainability Survey. Suppliers are selected based upon their ability to meet the needs of APS power plants while ensuring their products are not at risk of delivery due to water related issues. Responding suppliers may state whether their company operates in a region that is currently or projected to be a water-scarce region and if their company's production/service/generation process rely on water availability. We engage our suppliers through a variety of channels and communications. At a corporate level this includes the Corporate Responsibility section of our corporate website, our annual Corporate Responsibility Report and through multi-stakeholder roundtables. We also hold annual Supplier of the Year awards and hold an annual Key Supplier Forum. In addition, APS performs assessments of supplier risk (includes water treatment chemicals). Risk is evaluated by financial, terms and conditions, regional/natural disaster, environmental, health, safety, corporate responsibility, business resilience, quality, and service and capacity.
Water utilities at a local level	Relevant, included	Communication with local water utilities is essential to ensure that a sustainable water supply is available for use at Palo Verde NGS and the Redhawk Power Plant . APS meets regularly with representatives of the five municipalities that supply

Stakeholder	Choose option	Please explain
		water to the 91st Avenue WWTP (Phoenix, Scottsdale, Glendale, Mesa, and Tempe, Arizona), and ultimately is delivered to Palo Verde and Redhawk. APS also meets with representatives of Tolleson and Goodyear, as needed, to ensure that their discharges to the Palo Verde pipeline remain reliable and meet water quality goals.
Other	Relevant, included	APS meets with other electric utilities in Arizona to pool data that demonstrates to the public, the efficient use of water by the electric power industry in Arizona. Statewide efficiency of power plants, by type, is developed, water consumption is tracked over time, water intensity (efficiency) is trended, and this data is shared with state agencies, municipalities, and NGOs in a variety of local and statewide public meetings. In 2016, less than 2% of Arizona's statewide water budget was consumed by the electric industry.

W2.8

Please choose the option that best explains why your organisation does not undertake a water-related risk assessment

Primary reason	Please explain
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Further Information

Module: Implications

Page: W3. Water Risks

W3.1

Is your organization exposed to water risks, either current and/or future, that could generate a substantive change in your business, operations, revenue or expenditure?

Yes, direct operations only

W3.2

Please provide details as to how your organization defines substantive change in your business, operations, revenue or expenditure from water risk

APS defines substantive change to our business related to water risk in three ways. First, a physical disruption of a water supply constitutes a substantive and disruptive change. If a vital piece of infrastructure is damaged or becomes inoperable, output could be impacted or generation could be curtailed entirely. Second, noncompliance with a permit or regulatory requirement could impact production and/or result notices of violations and penalties. Finally, allocation cuts related to water shortages would impact production.

W3.2a

Please provide the number of facilities* per river basin exposed to water risks that could generate a substantive change in your business, operations, revenue or expenditure; and the proportion of company-wide facilities this represents

Country	River basin	Number of facilities exposed to water risk	Proportion of company-wide facilities that this represents (%)	Comment
United States of America	Other: Phoenix Active Management Area (AMA)	4	91-100	Includes Palo Verde Nuclear Generating Station, Redhawk Power Plant, West Phoenix Power Plant and Ocotillo Power Plant
United States of America	Other: Pinal Active Management Area (AMA)	1	91-100	Sundance Power Plant
United States of America	Other: Tucson Active Management Area (AMA)	1	91-100	Saguaro Power Plant
United States of	Other: Joseph City Irrigation Non-	1	91-100	Cholla Power Plant

Country	River basin	Number of facilities exposed to water risk	Proportion of company-wide facilities that this represents (%)	Comment
America	expansion Areas (INA)			
United States of America	Other: San Juan River Basin	1	91-100	Four Corners Power Plant
United States of America	Other: Colorado River Basin	1	91-100	Yucca Power Plant

W3.2b

For each river basin mentioned in W3.2a, please provide the proportion of the company's total financial value that could be affected by water risks

Country	River basin	Financial reporting metric	Proportion of chosen metric that could be affected	Comment
United States of America	Other: Phoenix Active Management Area (AMA)	% generation capacity	91-100	Includes Palo Verde Nuclear Generating Station, Redhawk Power Plant, West Phoenix Power Plant and Ocotillo Power Plant
United States of America	Other: Pinal Active Management Area (AMA)	% generation capacity	91-100	Sundance Power Plant
United States of America	Other: Tucson Active Management Area (AMA)	% generation capacity	91-100	Saguaro Power Plant
United States of America	Other: Joseph City Irrigation Non-expansion Areas (INA)	% generation capacity	91-100	Cholla Power Plant
United States of America	Other: San Juan River Basin	% generation capacity	91-100	Four Corners Power Plant
United States of America	Other: Colorado River Basin	% generation capacity	91-100	Yucca Power Plant

W3.2c

Please list the inherent water risks that could generate a substantive change in your business, operations, revenue or expenditure, the potential impact to your direct operations and the strategies to mitigate them

Country	River basin	Risk driver	Potential impact	Description of potential impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
United States of America	Other: Active Management Area (AMA), Colorado River and San Juan Basin	Other: Physical Disruption of water supply	Plant/production disruption leading to reduced output	Reduced water supplies could result in the loss of generation.	Current-up to 1 year	Probable	Low	Other: Well and Pumping Equipment Reliability Program	Moderate cost increase	Well Failure is a risk that could generate a substantive change in our business. To mitigate this risk, we established a Well and Pumping Equipment Reliability Program in 2015. The program includes monitoring and testing of groundwater wells, pump testing, and well infrastructure

Country	River basin	Risk driver	Potential impact	Description of potential impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										inspection (including pumps and motors, meters and lubrication systems.)
United States of America	Other: Active Management Area (AMA), Colorado River and San Juan Basin	Other: Exceedance of Permit Requirements	Other: Reduction of generation and potential NOV	Reduced water supplies will result in the loss of generation	Current-up to 1 year	Unlikely	Low	Other: Process, procedures, and policies, and initiatives	Minimal cost increase	If a permit requirement is exceeded a notice of violation could be issued that may include monetary fines and changes in our business practices that could generate a substantive change in our business. To avoid this APS's 3P initiative focuses on building a comprehensive, controlled and structured body of the company's policies, processes and

Country	River basin	Risk driver	Potential impact	Description of potential impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										procedures. This tool is used to ensure APS has documented its regulatory requirements in a manner that allows for regulatory compliance.
United States of America	Other: Active Management Area, Colorado River Basin and San Juan River Basin	Regulatory-Statutory water withdrawal limits/changes to water allocation	Plant/production disruption leading to reduced output	Reduced water supplies will result in loss of generation	Current-up to 1 year	Probable	Low	Other: Alternative water supplies and contingency plans	Moderate cost increase	Another significant risk is the potential declaration of water shortages in the southwest. Risk is mitigated by participating in the San Juan Shortage Sharing Agreement. APS also developed a severance and transfer agreement with the Joseph City Irrigation Company and

Country	River basin	Risk driver	Potential impact	Description of potential impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										<p>the Cholla Power Plant to develop a surface water supply contingency to the groundwater supply. APS mitigates the risk of water shortages by investigating storing water and acquiring groundwater rights for use in shortage circumstances. APS has investigated the possibility of acquiring land for storing water in underground storage facilities for use when other supplies are threatened by drought. APS engages with Electric Power</p>

Country	River basin	Risk driver	Potential impact	Description of potential impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										Research Institute under their P-185 water management program. It includes cooling technologies, water treatment technologies and specific power generation effluent treatment technologies.

W3.2d

Please list the inherent water risks that could generate a substantive change in your business operations, revenue or expenditure, the potential impact to your supply chain and the strategies to mitigate them

Country	River basin	Risk driver	Potential impact	Description of potential impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
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W3.2e

Please choose the option that best explains why you do not consider your organization to be exposed to water risks in your direct operations that could generate a substantive change in your business, operations, revenue or expenditure

Primary reason	Please explain
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W3.2f

Please choose the option that best explains why you do not consider your organization to be exposed to water risks in your supply chain that could generate a substantive change in your business, operations, revenue or expenditure

Primary reason	Please explain
Other: More research must be conducted	We have worked with our suppliers to better understand our value-chain footprint. In 2016, APS asked its 65 top tier suppliers to report on their water management through the Electric Utility Industry Sustainable Supply Chain Alliance Sustainability Survey. Suppliers are selected based upon their ability to meet the needs of APS power plants while ensuring their products are not at risk of delivery due to water related issues. Responding suppliers may state whether their company operates in a region that is currently or projected to be a water-scarce region and if their company's production/service/generation process rely on water availability. Based on supplier responses, no water risks exist in our supply chain. However, more research and assessments must be conducted in this space to fully understand water risk in APS's supply chain.

W3.2g

Please choose the option that best explains why you do not know if your organization is exposed to water risks that could generate a substantive change in your business operations, revenue or expenditure and discuss any future plans you have to assess this

Primary reason	Future plans
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Further Information

Page: W4. Water Opportunities

W4.1

Does water present strategic, operational or market opportunities that substantively benefit/have the potential to benefit your organization?

Yes

W4.1a

Please describe the opportunities water presents to your organization and your strategies to realize them

Country or region	Opportunity	Strategy to realize opportunity	Estimated timeframe	Comment
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Country or region	Opportunity	Strategy to realize opportunity	Estimated timeframe	Comment
Company-wide	Other: Water Savings with reduced coal generation and an increase in natural gas and solar generation	Natural gas and solar generation is more water efficient than coal generation 5-10 years	>6 years	APS's closure of coal units (820 megawatts retired since 2013) has resulted in the reduction of water consumption by approximately 20%. APS plans to retire an additional 767 megawatts of coal by 2025, which is projected to further reduce water consumption at the Cholla Power Plant to less than 10% of current consumption. Shift in load from coal to natural gas will result in significant water savings as the water intensity (gallons/megawatt hour) at gas plants is less than half of the coal plant water intensity. Continued development of renewable energy such as PV solar and wind will reduce fleet wide water intensity. When combined with reduction in coal generation plus the retirement of steam units at Ocotillo (replaced with more efficient combustion turbines), APS expects fleet wide water intensity reductions of 20% by 2025.
Company-wide	Other: Water Investment	Investments to meet future generation needs	Current-up to 1 year	APS investment in water for the future includes purchase of effluent under contracts through 2050 for Palo Verde and Redhawk, to be extended if needed. It also includes purchase of long term storage credits from the Gila River Indian Community to supply high priority water to the Sundance Power Plant.
Company-wide	R&D	Alternative cooling technologies	Current-up to 1 year	Retirement of steam units at Ocotillo and replacement with more efficient combustion turbines, cooled by hybrid cooling will reduce water consumption significantly. Water intensity will improve from 1000 g/mwh to 140 g/mwh.
Company-wide	Other: Well Pumping and Reliability Program	Infrastructure maintenance and repair	Current-up to 1 year	APS established a Well and Pumping Equipment Reliability Program in 2015 that encompasses critical components of the water supply, including groundwater wells, well testing and inspection, pump testing, well infrastructure inspection (including pumps and motors, meters and lubrication systems). Expected improvements in reliability of 2%/year are being tracked.
Company-wide	Other: Well Field Management Plans	Well pumping plans	Current-up to 1 year	In 2015, Well Field Management Plans were developed for a portion of the fleet and are being implemented, tested, and revised. These plans will result in more efficient use of higher quality groundwater, decreased water consumption, and more strategic use of water resources.

Please choose the option that best explains why water does not present your organization with any opportunities that have the potential to provide substantive benefit

Primary reason	Please explain
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W4.1c

Please choose the option that best explains why you do not know if water presents your organization with any opportunities that have the potential to provide substantive benefit

Primary reason	Please explain
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Further Information

Module: Accounting

Page: W5. Facility Level Water Accounting (I)

W5.1

Water withdrawals: for the reporting year, please complete the table below with water accounting data for all facilities included in your answer to W3.2a

Facility reference number	Country	River basin	Facility name	Total water withdrawals (megaliters/year) at this facility	How does the total water withdrawals at this facility compare to the last reporting year?	Please explain
Facility 1	United States of America	Other: Phoenix Active Management Areas	Palo Verde Nuclear Generating Station	903089	About the same	About the same amount of power was generated at the Palo Verde Generating Station in 2016, and about the same amount of reclaimed water was used. Palo Verde continued to be the single largest producer of electricity in the US in 2016. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 2	United States of America	Other: Phoenix Active Management Areas	Red Hawk Power Plant	5844	Much higher	Much more power was generated at the Redhawk Power Plant in 2016 resulting in more reclaimed water and groundwater use. A decrease in natural gas cost resulted in shifting generation from coal-fired to natural gas-fired plants. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 3	United States of America	Other: Phoenix Active Management Areas	West Phoenix Power Plant	3541	Much higher	Water use was much higher in 2016 due to increased generation at the West Phoenix Power Plant associated with reduction in natural gas prices. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 4	United States of America	Other: Phoenix Active Management	Ocotillo Power Plant	523	Much higher	Water use was much higher in 2016 due to increased generation at the Ocotillo Power Plant, associated with reduction in natural gas prices. Year-to-year

Facility reference number	Country	River basin	Facility name	Total water withdrawals (megaliters/year) at this facility	How does the total water withdrawals at this facility compare to the last reporting year?	Please explain
		Areas				changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 5	United States of America	Other: Pinal Active Management Areas	Sundance Power Plant	196	Much higher	Much more power was generated at the Sundance Power Plant in 2016, associated with reduction in natural gas prices, resulting in much more water used. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 6	United States of America	Other: Tucson Active Management Areas	Saguaro Power Plant	25	Much lower	Power production at the Saguaro Power Plant was much less in 2016 resulting in decreased water use. Decommissioning of old steam Units at Saguaro is currently under way and improvements to well infrastructure will ensure a reliable water supply remains available to support current and future generation. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower".
Facility 7	United States of America	Other: Joseph City Irrigation Non-expansion Areas	Cholla Power Plant	9433	Much lower	Power production at Cholla was significantly less in 2016 resulting in a significant decrease in water consumption. Cholla generation was curtailed due to comparatively expensive cost of operation of this coal plant when natural gas-fired plants were available. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered

Facility reference number	Country	River basin	Facility name	Total water withdrawals (megaliters/year) at this facility	How does the total water withdrawals at this facility compare to the last reporting year?	Please explain
						"higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower."
Facility 8	United States of America	San Juan	Four Corners Power Plant	21665	Lower	Water use at the Four Corners Power Plant was lower in 2016 due to decreased generation. Four Corners is currently undergoing significant improvements in emissions control equipment, and three old steam Units were being demolished in 2016. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 9	United States of America	Other: Colorado River	Yucca Power Plant	660	Much lower	Power generation was about the same at Yucca, however, less water was used due to decreased operation of the water-intensive steam Unit. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".

Further Information

Page: W5. Facility Level Water Accounting (II)

W5.1a

Water withdrawals: for the reporting year, please provide withdrawal data, in megaliters per year, for the water sources used for all facilities reported in W5.1

Facility reference number	Fresh surface water	Brackish surface water/seawater	Rainwater	Groundwater (renewable)	Groundwater (non-renewable)	Produced/process water	Municipal water	Wastewater from another organization	Comment
Facility 1	0	0	89	0	2362	0	0	87857	Slightly less power was generated at the Palo Verde Generating Station in 2016, and less reclaimed water was used.
Facility 2	0	0	0	0	714	0	0	513	More power was generated at the Red Hawk Power Plant in 2016, resulting in more reclaimed water use.
Facility 3	0	0	0	0	3541	0	0	0	Water use was slightly higher in 2016 due to increased generation at the West Phoenix Power Plant.
Facility 4	0	0	0	0	523	0	0	0	Water use was slightly higher in 2016 due to increased generation at the Ocotillo Power Plant.
Facility 5	196	0	0	0	0	0	0	0	More power was generated at the Sundance Power Plant in 2016, therefore, more water was used.

Facility reference number	Fresh surface water	Brackish surface water/seawater	Rainwater	Groundwater (renewable)	Groundwater (non-renewable)	Produced/process water	Municipal water	Wastewater from another organization	Comment
Facility 6	0	0	0	0	25	0	0	0	Power production at the Saguaro Power Plant was less in 2016, therefore, less water was used.
Facility 7	0	0	216	0	9217	0	0	0	Generation was significantly lower in 2016 at the Cholla Power Plant therefore water consumption decreased dramatically.
Facility 8	19709	0	1956	0	0	0	0	0	Water use was lower in 2016 due to decreased generation at the Four Corners Power Plant.
Facility 9	70	0	0	0	590	0	0	0	Generation at Yucca increased in 2016 however water use decreased due to more reliance on gas turbines, and less steam Unit generation.

W5.2

Water discharge: for the reporting year, please complete the table below with water accounting data for all facilities included in your answer to W3.2a

Facility reference number	Total water discharged (megaliters/year) at this facility	How does the total water discharged at this facility compare to the last reporting year?	Please explain
Facility 1	0	About the same	Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 2	0	About the same	Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 3	165	Much higher	Much more water was discharged to the city sewer at West Phoenix due to equipment failure and an extended outage with the ZLD system. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 4	69	About the same	About the same amount of water was discharged to the city sewer at ocotillo due to normal cycles of concentration in the cooling towers. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 5	0	About the same	Sundance is a zero liquid discharge facility so no water was discharged. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 6	0	About the same	Saguaro is a zero liquid discharge facility so no water was discharged. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 7	0	About the same	Cholla is a zero liquid discharge facility so no water was discharged. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 8	4222	Higher	More water was returned back into the system at Four Corners in 2016. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 9	0	About the same	Yucca used slightly less water in 2016. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower".

Facility reference number	Total water discharged (megaliters/year) at this facility	How does the total water discharged at this facility compare to the last reporting year?	Please explain
			Year-to-year changes over 15% were considered "much higher"/"much lower".

W5.2a

Water discharge: for the reporting year, please provide water discharge data, in megaliters per year, by destination for all facilities reported in W5.2

Facility reference number	Fresh surface water	Municipal/industrial wastewater treatment plant	Seawater	Groundwater	Wastewater for another organization	Comment
Facility 1	0	0	0	0	0	Zero liquid discharge facility
Facility 2	0	0	0	0	0	Zero liquid discharge facility
Facility 3	0	165	0	0	0	More water was discharged to the city sewer at West Phoenix due to failure and an extended outage with the ZLD system.
Facility 4	0	6	0	0	0	About the same amount of water was discharged into the sewer due to normal cycles of concentration in our cooling towers.
Facility 5	0	0	0	0	0	Zero liquid discharge facility
Facility 6	0	0	0	0	0	Zero liquid discharge facility
Facility 7	0	0	0	0	0	Zero liquid discharge facility
Facility 8	4222	0	0	0	0	In 2016, more water was returned back into the environment.
Facility 9	0	0	0	0	0	Discharge was slightly less in 2016

W5.3

Water consumption: for the reporting year, please provide water consumption data for all facilities reported in W3.2a

Facility reference number	Consumption (megaliters/year)	How does this compare to the last reporting year?	Please explain
Facility 1	90308	About the same	About the same amount of power was generated at the Palo Verde Generation Station in 2016, and about the same amount of reclaimed water was used. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 2	5844	Much higher	More power was generated at the Redhawk Power Plant in 2016, resulting in more reclaimed water use. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 3	3376	Much higher	Water use was much higher in 2016 due to increased generation at the West Phoenix Power Plant. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 4	454	Much higher	Water use was much higher in 2016 due to increased generation at the Ocotillo Power Plant. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 5	196	Much higher	Much more power was generated at the Sundance Power Plant in 2016 resulting in higher water use. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 6	25	Much lower	Much less power was generated at the Saguaro Power Plant in 2016 resulting in less water use. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 7	9433	Much lower	Significantly less power was generated at the Cholla Power Plant in 2016 resulting in significantly less water use. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were

Facility reference number	Consumption (megaliters/year)	How does this compare to the last reporting year?	Please explain
			considered "much higher"/"much lower".
Facility 8	17443	Much lower	Water use was much lower in 2016 due to decreased generation at the Four Corners Power Plant. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".
Facility 9	660	Much lower	More power was generated at the Yucca Power Plant in 2016, however less water was used. Year-to-year changes of less than 5% were considered "about the same". Year-to-year changes between 5% and 15% were considered "higher"/"lower". Year-to-year changes over 15% were considered "much higher"/"much lower".

W5.4

For all facilities reported in W3.2a what proportion of their water accounting data has been externally verified?

Water aspect	% verification	What standard and methodology was used?
Water withdrawals- total volumes	1-25	International Standard on Assurance Engagements 3000
Water withdrawals- volume by sources	1-25	International Standard on Assurance Engagements 3000
Water discharges- total volumes	1-25	International Standard on Assurance Engagements 3000
Water discharges- volume by destination	1-25	International Standard on Assurance Engagements 3000
Water discharges- volume by treatment method	Not verified	N/A

Water aspect	% verification	What standard and methodology was used?
Water discharge quality data- quality by standard effluent parameters	Not verified	N/A
Water consumption- total volume	1-25	International Standard on Assurance Engagements 3000

Further Information

Attachments

[https://www.cdp.net/sites/2017/83/14783/Water 2017/Shared Documents/Attachments/Water2017/W5.FacilityLevelWaterAccounting\(II\)/CDP Water Use and Discharge Verification Statement APS CY2016 vTR.pdf](https://www.cdp.net/sites/2017/83/14783/Water%202017/Shared%20Documents/Attachments/Water2017/W5.FacilityLevelWaterAccounting(II)/CDP%20Water%20Use%20and%20Discharge%20Verification%20Statement%20APS%20CY2016%20vTR.pdf)

Module: Response

Page: W6. Governance and Strategy

W6.1

Who has the highest level of direct responsibility for water within your organization and how frequently are they briefed?

Highest level of direct responsibility for water issues	Frequency of briefings on water issues	Comment
Board of individuals/Sub-set of the Board or other committee appointed by the Board	Scheduled - twice per year	Don Brandt, the Chairman of the Board, President and Chief Executive Officer of Pinnacle West and Arizona Public Service Company, has the highest level of direct responsibility for water within our organization. Mr. Brandt reviews material water issues twice per year via the SEC reporting process and Board of Director's Top Risk Report.

W6.2

Is water management integrated into your business strategy?

Yes

W6.2a

Please choose the option(s) below that best explains how water has positively influenced your business strategy

Influence of water on business strategy	Please explain
Other: Water Savings with reduced coal generation and an increase in natural gas and solar generation	APS Business Plan includes a Tier 1 water conservation metric (Tier 1 metrics provide the highest level of visibility, monitoring, and reporting within the company). The target of this metric is to reduce consumption of non-renewable resources by 8% in 2016, 10% in 2017, and 12% in 2018, compared to 2014 consumption. APS's business strategy to accomplish this goal includes reduction of coal generation and an increase in natural gas and solar generation, and an aggressive Well Pumping and Equipment Reliability program.
Other: Water Investment	Because of increasing demand and continued pressure on water supplies in the arid southwest, APS has invested in water to meet the needs of future generation. The diminishing supply of water resources and/or population growth that increases competition for limited water supplies increases the importance of backup supplies for each site. APS has invested in long term water supplies for Palo Verde, Red Hawk and Sundance to ensure that a predictable quantity is available long-term at a reasonable cost.
Other: Research and Technology	APS participates in industry-wide research, providing funding and leadership in Electric Power Research Institutes water committees. Supporting research and development of more efficient cooling and treatment technologies is a corporate business strategy.
Other: Well Pumping and Reliability Program	APS established a Well and Pumping Equipment Reliability program in 2015. The program includes monitoring and testing of groundwater wells, pump testing, and well infrastructure inspection (including pumps and motors, meters and lubrication systems). This program has improved well and pumping equipment reliability.
Other: Well Field Management Plans	In 2015, Well Field Management Plans were developed for a portion of the fleet and are being implemented, tested, and revised. These plans have resulted in more efficient use of higher quality groundwater, decreased water consumption,

Influence of water on business strategy	Please explain
	and more strategic use of water resources.
Other: Investment in staff/training	We have trained staff specialized in compliance and the APS Environmental Management System. Company employees receive environmental awareness training appropriate to their job functions, in keeping with our ISO 14001 certifications.
Other: Greater Supplier Engagement	We have worked with our suppliers to better understand our value-chain footprint. In 2016, APS asked its 65 top tier suppliers to report on their water management through the Electric Utility Industry Sustainable Supply Chain Alliance Sustainability Survey. Suppliers are selected based upon their ability to meet the needs of APS power plants while ensuring their products are not at risk of delivery due to water related issues. Responding suppliers may state whether their company operates in a region that is currently or projected to be a water-scarce region and if their company's production/service/generation process rely on water availability. We incentivize suppliers to share their water performance through our Supplier of the Year Awards.

W6.2b

Please choose the option(s) below that best explains how water has negatively influenced your business strategy

Influence of water on business strategy	Please explain
Increased capital expenditure	APS business strategy has been influenced by the rising cost of water. Long-term contracts have been initiated that provide reliable supply at a predictable cost for the life of three power plants, including Palo Verde, the largest power producer in the US for 25 consecutive years. A decision was made to apply for a water cost adjustor in the next rate case before the Arizona Corporation Commission. In addition, new and existing environmental regulations add costs to plant operations. Acquisition of supplies, treatment, and disposal of water are costs of doing business in the desert southwest that may not be the case for other generating facilities in other parts of the country.

W6.2c

Please choose the option that best explains why your organization does not integrate water management into its business strategy and discuss any future plans to do so

Primary reason	Please explain
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W6.3

Does your organization have a water policy that sets out clear goals and guidelines for action?

Yes

W6.3a

Please select the content that best describes your water policy (tick all that apply)

Content	Please explain why this content is included
Company-wide	The water policy guiding APS is the company's strategic water plan. This plan describes initiatives that have been developed to ensure APS secures and maintains a sustainable and cost-effective supply of water to enable reliable energy production for our customers. The plan is company-wide to address water impacts from all operations. It is made available to all employees to demonstrate APS commitment to water stewardship, raise awareness about water issues, and maintain transparency in internal communications. The plan details the main components of the water resource management program which encompass the acquisition of water supplies, alternative supplies, conservation by the efficient use of water, research and technology, groundwater models, well and pumping reliability program, water supply contingency initiative and well field management plans.

W6.4

How does your organization's water-related capital expenditure (CAPEX) and operating expenditure (OPEX) during the most recent reporting year compare to the previous reporting year?

Water CAPEX (+/- % change)	Water OPEX (+/- % change)	Motivation for these changes
367	1.2	When compared to 2015, CAPEX increased by 367% in 2016. There were more capital projects in 2016 than in 2015 and capital spend increased from \$774,679 to \$2,845,166. OPEX expenditures by Water Resource Management were 1.2% higher in 2016 than in 2015.

Further Information

Page: W7. Compliance

W7.1

Was your organization subject to any penalties, fines and/or enforcement orders for breaches of abstraction licenses, discharge consents or other water and wastewater related regulations in the reporting year?

No

W7.1a

Please describe the penalties, fines and/or enforcement orders for breaches of abstraction licenses, discharge consents or other water and wastewater related regulations and your plans for resolving them

Facility name	Incident	Incident description	Frequency of occurrence in reporting year	Financial impact	Currency	Incident resolution
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W7.1b

What proportion of your total facilities/operations are associated with the incidents listed in W7.1a?

W7.1c

Please indicate the total financial impacts of all incidents reported in W7.1a as a proportion of total operating expenditure (OPEX) for the reporting year. Please also provide a comparison of this proportion compared to the previous reporting year

Impact as % of OPEX	Comparison to last year
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Further Information

Page: W8. Targets and Initiatives

W8.1

Do you have any company wide targets (quantitative) or goals (qualitative) related to water?

Yes, targets and goals

W8.1a

Please complete the following table with information on company wide quantitative targets (ongoing or reached completion during the reporting period) and an indication of progress made

Category of target	Motivation	Description of target	Quantitative unit of measurement	Base-line year	Target year	Proportion of target achieved, % value
Absolute reduction of water withdrawals	Water stewardship	In 2015, APS created a new Tier 1 water metric designed to reduce the quantity of non-renewable groundwater consumed. The goal to reduce consumption of non-renewable water by 8 percent in 2016 as compared to a 2014 baseline year. The 2017 goal is a 10 percent reduction and the 2018 goal is a 12 percent reduction. APS established these targets because 16 percent of the fleet's water demand is supplied from groundwater. Initiatives are underway to conserve groundwater, including early retirement of additional coal units, implementation of well field operations plans, and further development of implementation of Renewable Energy, Distributed Generation and Energy Efficiency programs.	% reduction of water sourced from groundwater	2014	2018	100%
Other: Water Intensity	Other: Intensity of water use in operations	APS plans to reduce fleet wide water intensity by 20 percent by 2025. This will be accomplished by retiring older water intensive units and replacing them with more efficient units, increasing use of solar photo-voltaic and wind, energy efficiency and implementing water conservation plans at all power plants.	Other: Gallons per megawatt hour	2014	2025	32%
Other: Increase Reliability of Well and Pumping Equipment	Other: Unanticipated failures of aging production wells and/or pipeline failures could threaten water required to support generation	APS owns and operates 44 production wells that provide cooling water and supplemental water to support generation at eight of nine power plants. Unplanned well and pumping equipment failures can occur as a result of pumping equipment failure, electrical/mechanical issues, well casing problems, or human performance errors. These failures disrupt scheduled maintenance plans, result in	Other: Well and Pumping Equipment Reliability	2014	2016	100%

Category of target	Motivation	Description of target	Quantitative unit of measurement	Base-line year	Target year	Proportion of target achieved, % value
		unplanned/unbudgeted costs, and could result in loss of water necessary to support generation. Water Resource Management (WRM) established a goal for 2016 of 94% reliability of well and pumping equipment and achieved 98%.				

W8.1b

Please describe any company wide qualitative goals (ongoing or reached completion during the reporting period) and your progress in achieving these

Goal	Motivation	Description of goal	Progress
Other: Well Water Quality	Other: Improve Efficiency and reduce water consumption	At Cholla, APS modelled water use, developed a well field operation plan and provided water conservation recommendations. APS also developed a plant operations plan that included evaluation of water quality at each well.	Plant well field staff have incorporated recommendations into Daily Operations Reports and are using the highest quality water available. Plant water use is less in 2016 than in 2015, however, it is primarily due to decreased generation. The model has enabled monitoring of the impacts of reduced groundwater pumping associated with reduced generation, showing that groundwater levels are rising across the wellfield and that water quality improvements have been measured, due to decreased pumping from lower levels in the aquifer.

W8.1c

Please explain why you do not have any water-related targets or goals and discuss any plans to develop these in the future

Further Information

Module: Linkages/Tradeoff

Page: W9. Managing trade-offs between water and other environmental issues

W9.1

Has your organization identified any linkages or trade-offs between water and other environmental issues in its value chain?

Yes

W9.1a

Please describe the linkages or trade-offs and the related management policy or action

Environmental issues	Linkage or trade-off	Policy or action
CCR Rules - The Coal Combustion Residual (CCR) rules require closure of unlined ponds three years after operations cease.	Linkage	APS is working to minimize the quantity of water sent to the impoundments to meet the coal combustion residual rules. Models have been developed to assist in this effort.
PM-10 - Palo Verde Nuclear Generating Station and Redhawk Power Plant are located in Maricopa County, Arizona; a non-attainment area for PM-10. Therefore, cooling tower emissions are limited. At the same time, the Arizona Department of Water Resources cooling tower water efficiency requirements require cycling up cooling tower circulation water prior to blowdown.	Linkage	APS more than meets the ADWR water conservation requirements of 15 cycles of concentration (currently 25 cycles achieved) and also meets the PM-10 requirements of the non-attainment area.
Water and energy are closely connected	Linkage	APS has been keenly aware of what the nation has come to know as the 'water-energy nexus' for many years i.e., that it takes water to generate

Environmental issues	Linkage or trade-off	Policy or action
		<p>power and it takes power to treat and deliver water. This is a well understood concept in the Arizona desert. Whether for creating steam to drive the turbines in coal-, natural gas- or nuclear-powered generating units or for cooling the equipment in combustion turbine units, all electric steam-generating plants use water. Since water is such a precious commodity in the desert Southwest, it is imperative that APS uses it as efficiently as possible. At the Ocotillo Power Plant, APS elected to replace two old steam units that are highly water intensive, with new combustion turbines that incorporate hybrid cooling, a technology that will result in an 80% decrease in water consumption. APS will continue to decrease water intensity as the renewable portfolio is expanded. To date, APS has a diverse portfolio of existing renewable resources totaling 2239 MW, including solar, wind, geothermal, biomass and biogas. APS's strategy to achieve its RES requirements includes executing purchased power contracts for new facilities, ongoing development of distributed energy resources and procurement of new facilities to be owned by APS. Finally, APS's energy efficiency programs reduce the energy needed by our customers, and reduce the need to supply water-intensive generation.</p>

Further Information

Module: Sign Off

Page: Sign Off

W10.1

Please provide the following information for the person that has signed off (approved) your CDP water response

Name	Job title	Corresponding job category
Mark A. Schiavoni	Executive Vice President and Chief Operating Officer	Chief Operating Officer (COO)

W10.2

Please indicate that your organization agrees for CDP to transfer your publicly disclosed data regarding your response strategies to the CEO Water Mandate Water Action Hub.

Note: Only your responses to W1.4a (response to impacts) and W3.2c&d (response to risks) will be shared and then reviewed as a potential collective action project for inclusion on the WAH website.

By selecting Yes, you agree that CDP may also share the email address of your registered CDP user with the CEO Water Mandate. This will allow the Hub administrator to alert your company if its response data includes a project of potential interest to other parties using water resources in the geographies in which you operate. The Hub will publish the project with the associated contact details. Your company will be provided with a secure log-in allowing it to amend the project profile and contact details.

Yes

Further Information

[CDP 2017 Water 2017 Information Request](#)