Pinnacle West Capital Corporation - Water Security 2022

W0. Introduction

W0.1

(W0.1) Give a general description of and introduction to your organization.

Pinnacle West Capital Corporation (“the Company”), an energy holding Company based in Phoenix, has consolidated assets of about $19 billion, about 6,300 megawatts of generating capacity and 6,200 employees in Arizona and New Mexico. Through its principal subsidiary, Arizona Public Service Company (APS), the Company provides retail electricity service to nearly 1.3 million Arizona homes and businesses. This report contains forward-looking statements based on current expectations, including statements regarding our earnings guidance and financial outlook and goals. These forward-looking statements are often identified by words such as “estimate,” “predict,” “may,” “believe,” “plan,” “expect,” “require,” “intend,” “assume,” “project,” "anticipate," "goal," "seek," "strategy," "likely," "should," "will," "could," 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 Pinnacle West or APS. A discussion of some of these risks and uncertainties is contained in the Pinnacle West/APS 2021 Form 10-K and the Form 10-Qs for the quarters ended March 31, 2022, and June 30, 2022, and on our website, at PinnacleWest.com, which you should review carefully before placing any reliance on our disclosures set forth in this report. We assume no obligation to update any forward-looking statements, even if our internal estimates change, except as may be required by applicable law.

W-EU0.1a

(W-EU0.1a) Which activities in the electric utilities sector does your organization engage in?

Electricity generation
Transmission
Distribution

W-EU0.1b

(W-EU0.1b) For your electricity generation activities, provide details of your nameplate capacity and the generation for each technology.

	Nameplate capacity (MW)	% of total nameplate capacity	Gross electricity generation (GWh)
Coal – hard	1927	20	10630.35
Lignite	0	0	0
Oil	92	1	1.33
Gas	3578	37	10112.36
Biomass	0	0	0
Waste (non-biomass)	0	0	0
Nuclear	3938	40	31629.82
Fossil-fuel plants fitted with carbon capture and storage	0	0	0
Geothermal	0	0	0
Hydropower	0	0	0
Wind	0	0	0
Solar	245	3	623.27
Marine	0	0	0
Other renewable	0	0	0
Other non-renewable	0	0	0
Total	9779	100	52997.14

W0.2

(W0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date
Reporting year	January 1 2021	December 31 2021

W0.3

(W0.3) Select the countries/areas in which you operate.

United States of America

W0.4

(W0.4) Select the currency used for all financial information disclosed throughout your response.

USD

W0.5

(W0.5) Select the option that best describes the reporting boundary for companies, entities, or groups for which water impacts on your business are being reported.

Companies, entities or groups over which operational control is exercised

W0.6

(W0.6) Within this boundary, are there any geographies, facilities, water aspects, or other exclusions from your disclosure?

Yes

W0.6a

(W0.6a) Please report the exclusions.

Exclusion	Please explain
Commercial office buildings and facilities not associated with power generation	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. However, APS does monitor and track water usage in these facilities. In 2021, water consumption at commercial office building and facilities not associated with power consumption was 59.63 megaliters, representing only his was 0.0007% of total Company water consumption; the majority of water consumption is for power generation.
Douglas Power Plant	The Douglas power plant is excluded from our water consumption calculations because water consumption is minimal to support a net capacity of 16 MW. Water use at the Douglas plant in 2021 was 0.01 megaliters (3,000 gallons) and is considered de minimis to our overall water consumption for power generation

W0.7

(W0.7) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization.	Provide your unique identifier
Yes, an ISIN code	US7234841010

W1. Current state

W1.1

(W1.1) Rate the importance (current and future) of water quality and water quantity to the success of your business.

	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of good quality freshwater available for use	Vital	Neutral	Good quality freshwater is important to the current and continued success of APS. Freshwater is the primary water supply at seven of the nine APS-owned power plants, representing 4,381 MWe of generating output capacity. Freshwater is primarily used in direct plant operations to generate electricity and is therefore considered "vital" to our business. Without freshwater, generating the power required to satisfy consumer energy demands would not be possible. Future water dependency in our direct operations is expected to remain “vital” because it will remain our primary water supply for electricity generation. APS also relies on freshwater to supply indirect uses. Our value chain utilizes freshwater for domestic use and potable water at plants, manufacturing processes, and other indirect operational uses. The importance of water for indirect use is considered "neutral" because our value chain has access to freshwater where applicable and top spend suppliers have low risk of water impacts. Future water dependency in our value chain is expected to remain “neutral.” While there will always be a need for some use of freshwater in our value chain, the Company works with suppliers to increase water use efficiency. APS recognizes the importance of freshwater to future business and has implemented plans to reduce freshwater consumption by over 85% by the year 2035, over 2014 baseline levels. This aligns to APS's commitment to provide 100% clean, carbon- free electricity by 2050. To achieve this vision, APS plans increase renewable energy sources (such as wind generation and PV solar sources) and increases energy efficiency programs to accomplish. The energy efficiency programs help reduce water consumption, as a lower power demand requires less water to produce.
Sufficient amounts of recycled, brackish and/or produced water available for use	Vital	Neutral	Recycled water is primarily used as cooling water in our direct operations to generate electricity at the Palo Verde Nuclear Generating Station and Redhawk power plant. Therefore, recycled water is the main water supply at two out of nine APS power plants, representing 5026 MWe of generating output capacity. Recycled water is considered “vital” to current and future direct operations at the Palo Verde Nuclear Generating Station and the Redhawk power plant because other sources of water are not available in sufficient quantities to support generation at these plants. These generating stations are located in desert watersheds where freshwater resources are limited. Recycled water offers a renewable and reliable water source critical to power generation that is not substantially impacted by the current drought conditions experienced in the area. The importance of recycled water for direct operations will likely increase in the future due to increasing demand and competition for scarce water resources in the arid Southwest. Recycled water is also used in our value chain (indirect uses) to produce the commodities and chemicals needed to support power generation. Future water dependency in our value chain is not anticipated to change, based on continuous engagement with suppliers. Delivery of recycled water to our plants is currently supplied via contracts in sufficient quantities to meet demands through 2050. The importance of recycled water for indirect uses is currently considered "neutral" because our value chain has access to sufficient amounts of recycled, ocean, brackish and/or fresh water where applicable. In 2021, 73% of APS plants’ water usage was recycled treated effluent. By 2035, we anticipate that approximately 95% of the water used at APS power plants will be recycled treated effluent, a renewable and relatively drought-proof supply.

W1.2

(W1.2) Across all your operations, what proportion of the following water aspects are regularly measured and monitored?

	% of sites/facilities/operations	Please explain
Water withdrawals – total volumes	100%	APS measures and monitors 100%of our water withdrawals. The Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix and Yucca power plants' water use is measured by direct metering from plant personnel and is submitted to Water Resource Management, and monthly reports are compiled and evaluated. 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. Because water use is vital for power production, it is important to track actual water usage as a baseline for water goal setting and to meet water conservation targets.
Water withdrawals – volumes by source	100%	APS measures and monitors 100%of water withdrawals by source. Water withdrawals are measured by direct metering at each plant and the data is submitted to the Water Resource Management team. Measurement is performed daily or as needed to support operational and/or regulatory requirements, then provided to management in monthly progress and metric target reports. This information is reported to the Arizona Department of Water Resources and the New Mexico State Engineer. It is important to understand the source of the water withdrawal to identify potential watershed impacts and as a baseline for goal setting. In 2021, 73% of APS withdrawals was treated effluent (recycled), 14% was surface water, and 13% was groundwater. By 2035, APS anticipates that approximately 95% of all withdrawals will be renewable and comparatively drought-proof treated effluent, 5% will be groundwater, and less than 1% will be surface water.
Entrained water associated with your metals & mining sector activities - total volumes [only metals and mining sector]	<Not Applicable>	<Not Applicable>
Produced water associated with your oil & gas sector activities - total volumes [only oil and gas sector]	<Not Applicable>	<Not Applicable>
Water withdrawals quality	100%	APS measures and monitors water quality at the Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix, and Yucca power - plants to ensure that water chemistry will have no adverse impact on generation or on water delivery or treatment infrastructure. Tests are performed daily, or as needed, to support operational and/or regulatory requirements. This information is measured by direct analysis in on-site labs or is sent to contract labs. The data is then recorded in databases and reported to the Arizona Department of Environmental Quality on frequencies as dictated by plant-specific permits.
Water discharges – total volumes	100%	APS measures and monitors 100%of water discharge volumes at the Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix, and Yucca power plants. A portion of the blowdown water is treated then recycled and reused at the plants and nearby agricultural areas. The remainder is discharged to a sanitary sewer, discharged to a river, or is discharged into evaporation ponds. Measurement is performed daily to support operational and/or regulatory requirements. Information is collected through direct metering and is provided to Water Resource Management, then provided to management in monthly progress and metric target reports. This information is reported on an annual basis to the Arizona Department of Water Resources, quarterly to the Arizona Department of Environmental Quality and monthly to the New Mexico State Engineer for compliance purposes. Accurate measurement of discharge data is needed to calculate and report water consumption.
Water discharges – volumes by destination	100%	APS measures and monitors 100%of water discharge volumes by destination at all nine APS power plants. A portion of the blowdown water is treated then recycled and reused at the plants and nearby agricultural areas. The remainder is discharged to a sanitary sewer, discharged to a river, or is discharged into ponds. This information is collected daily through direct metering and is provided to Water Resource Management then provided to management in monthly progress and metric target reports. We report this information annually to the Arizona Department of Water Resources, quarterly to the Arizona Department of Environmental Quality and monthly to the New Mexico State Engineer for compliance purposes. Tracking the volume discharged by destination provides data regarding potential impacts on the Phoenix AMA and the San Juan watershed. Discharge quantity to the San Juan River is important because it provides critical flows to support endangered fish species.
Water discharges – volumes by treatment method	100%	APS measures and monitors 100% of our water discharge volumes at our power plants by treatment method. A portion of our blowdown water is treated then recycled and reused at the plants and nearby agricultural areas. The remainder is discharged to a sewer, river, or ponds. Measurement is performed daily or as needed. This information is collected through direct metering and is provided to Water Resource Management where reports are compiled and evaluated in monthly progress and metric target reports. We report this water discharge volume on an annual basis to the New Mexico State Engineer, quarterly to the Arizona Department of Environmental Quality, and USEPA Region IX for compliance purposes. APS treatment methods are identified in procedures at each power plant to optimize and encourage recycling when possible. Discharge volume, water quality, discharge locations, and impacts to the watershed are accurately recorded and reported as required in site-specific permits.
Water discharge quality – by standard effluent parameters	100%	APS measures and monitors 100% of our water discharge quality data at all plants that discharge to waters of the U.S. or to publicly owned treatment works to ensure effluent quality standards are met. In some cases, water quality is measured daily. A portion of our blowdown water is treated and reused at the plants and nearby agricultural areas. The remainder is discharged to a sanitary sewer, discharged to a river, or is discharged into evaporation ponds. Discharges to municipal publicly owned treatment works are reported to the Cities of Tempe and Phoenix, Arizona. Additional wastewater discharges are reported to, the Arizona Department of Environmental Quality (ADEQ) and or Four Corners discharge data are reported to USEPA Region IX, (as to Four Corners discharges) must meet federal for compliance requirements.
Water discharge quality – temperature	100%	APS monitors water temperature at each plant that has a surface water discharge permit with a requirement to do so (either for direct discharge or via a publicly owned treatment works) . Water temperature is measured continuously with an autoanalyzer at APS's Four Corners Power Plant in accordance with the facility's National Pollutant Discharge Elimination System (NPDES) permit issued by USEPA Region IX. At our West Phoenix Power Plant, temperature is monitored on a weekly basis per the facility's wastewater discharge permit issued by the City of Phoenix.
Water consumption – total volume	100%	APS measures and monitors 100%of our water consumption by total volume at the Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix, and Yucca power plants. This information is collected daily through direct metering and is provided to Water Resource Management, then provided to management in monthly progress and metric target reports. This information is also reported on an annual basis to the Arizona Department of Water Resources and monthly to the New Mexico State Engineer for compliance purposes. Other water uses, such as in office buildings and service centers, are served by a municipal provider. APS's Facilities department monitors water consumption in office buildings and service centers. In 2021, APS plants total water consumption was approximately 128,000 megaliters. By 2035, we estimate total water consumption will be approximately 98,000 megaliters, a reduction of over 20%.
Water recycled/reused	100%	APS measures 100% of water that is recycled/reused at Redhawk, West Phoenix, Palo Verde (PVGS) , Cholla and Four Corners (4C). Water use is measured at West Phoenix and Redhawk, which utilize a zero-liquid discharge (ZLD) system. Redhawk recycles 100% and West Phoenix recycles 95-100% of water used. PVGS is a ZLD facility, recycling 95% of water used. Cholla is a ZLD facility that uses a cooling lake and towers; 95% of Cholla's water is recycled. 4C uses a cooling lake with a water recirculating system. Of the water withdrawn from the San Juan River, 20% is returned back to the River. The remaining water is routed through the plant's cooling-water recirculation system, where approximately 99% of the water withdrawn from the River is recirculated for cooling. Cycles of concentration are monitored on a daily basis. This information is collected through direct metering , it is reported monthly to management, monthly to the NM State Engineer. and annually to the ADWR.
The provision of fully-functioning, safely managed WASH services to all workers	100%	APS provides fully functioning WASH services available to all workers and directly measures and monitors 100% of water withdrawals at all nine power plants. The Ocotillo and West Phoenix Power Plants utilize drinking water provided by the Cities of Tempe and Phoenix, respectively. APS plants that have their own permitted drinking water systems are operated by licensed operators and receive routine inspections from regulators. Drinking water is tested daily or as required by the Safe Drinking Water Act and local ordinance. Water quality tests, such as chlorine residual and other analyses, are performed on-site to confirm compliance with MCLs are submitted on schedules identified in permits to Certified Laboratories. Backflow prevention assemblies are tested annually. Annual reports from Arizona plants are sent to the Arizona Department of Environmental Quality to document compliance with Safe Drinking Water Act provisions. Four Corners reports are sent to USEPA Region IX.

W1.2b

(W1.2b) What are the total volumes of water withdrawn, discharged, and consumed across all your operations, and how do these volumes compare to the previous reporting year?

	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Total withdrawals	131658	About the same	The total withdrawals at the Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix, and Yucca Power plants for 2021 (131,658 megaliters/year) were about the same as in 2020 (137,114 megaliters/year). This was because total generation for 2021 (51,023,699 MWh) was only 3.6% lower than 2020 (52,943,631 MWh), and therefore water consumption was about the same. (Year-to-year changes less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower". Year-to-year changes over 15% are considered "much higher"/"much lower".) Future withdrawals in the next five years are projected to be lower based on plant retirements and/or shifts in generation resources.
Total discharges	3010	Much lower	The total discharge at the Four Corners, Ocotillo, and West Phoenix Power Plants were much lower in 2021 (3,010 megaliters/year) than in 2020 (4,835 megaliters/year). The discharges were much lower than last year for the plants that have a discharge component. This was primarily due to lower generation at West Phoenix and Ocotillo, compared to last year, and to improved water intensity at Four Corners. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower". Year-to-year changes over 15% are considered "much higher"/"much lower". Future discharges in the next five years are projected be much lower, based on shift in generation from Four Corners to other plants.
Total consumption	128648	About the same	The total consumption at the Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix, and Yucca Power Plants for 2021 (128,648 megaliters/year) were about the same as in 2020 (132,279 megaliters/year) due to generation being about the same. Our reported volumes of water of are calculated by the following formula: 128,648 (total consumption) = 131,658 (total withdrawals) – 3,010 (total discharges). Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower." Future consumption in the next five years is projected to be lower based on plant retirements and/or shift in generation resources.

W1.2d

(W1.2d) Indicate whether water is withdrawn from areas with water stress and provide the proportion.

	Withdrawals are from areas with water stress	% withdrawn from areas with water stress	Comparison with previous reporting year	Identification tool	Please explain
Row 1	No	<Not Applicable>	<Not Applicable>	Other, please specify	APS requires each plant to demonstrate the water availability and pumping capacity to support 100% of plant generating capacity during the summer run, the period of greatest potential stress. All of our plants have access to freshwater that meet the demands of generation. APS holds more than sufficient rights at each plant and has infrastructure to deliver water to each plant. For example, the Palo Verde Generation Station and Redhawk Power Plant use treated effluent, which is considered a drought-resistant supply, because water conservation during a drought is primarily to reduce outdoor water use, not indoor water use. Indoor water use is what supplies effluent to water treatment facilities that provide water to Palo Verde and Redhawk. Our contracted supply of treated effluent is of adequate quantity and quality for the generation needs of these plants through 2050. 73% of all APS power plant water consumption was treated effluent in 2021. The remaining 27% is groundwater or surface water is protected by water rights, contracts, and agreements. Although drought continues in the western U.S. and in the Colorado River Basin, APS supported the Lower Colorado River Drought Contingency Plan endorsed by Arizona, Nevada, California, and Mexico, resulting in more water being stored in Lake Mead and protecting the region against serious future water shortages. In 2021, U.S. Secretary of the Interior declared the first-ever Tier 1 shortage on the Colorado River. Even in the event of a more severe water shortage declaration on the Colorado River, APS power plants will not be impacted due to water rights, contracts, agreements, and reliance on essentially drought-proof treated effluent.

W1.2h

(W1.2h) Provide total water withdrawal data by source.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water, including rainwater, water from wetlands, rivers, and lakes	Relevant	22048	Much lower	The total fresh surface water for 2021 (22,048 megaliters/year) was much lower (16% decrease) than 2020 (26,198) megaliters/year) due to improved water withdrawal efficiency (2021 was 611 gal/MWh and 2020 was 723 gal/MWh). Although generation increased at plants that rely on fresh surface water in 2021, water storage practices helped decrease fresh surface water withdrawals. Fresh surface water is relevant to the Company because 14%of our total water usage in 2021 was fresh surface water, but this will drop to less than 1% when we exit from Four Corners in 2031. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower."
Brackish surface water/Seawater	Not relevant	<Not Applicable>	<Not Applicable>	None of APS's operations withdrew water from brackish surface water/seawater sources. Thus, the total withdrawal made from this source is not applicable. We do not anticipate that brackish surface/seawater will be relevant in the future, as our operations withdraw from other water sources such as groundwater and third-party sources.
Groundwater – renewable	Not relevant	<Not Applicable>	<Not Applicable>	There are no renewable groundwater sources available for use at APS's power plants, therefore no withdrawals were made. This was the case for the previous year as well, and as such it is not applicable. We do not anticipate groundwater - renewable resources will be relevant in the future, as our operations withdraw from other water sources, such as fresh surface water and third-party sources.
Groundwater – non-renewable	Relevant	16046	Much lower	Overall, in 2021, 16,046 megaliters were consumed compared to 20,202 megaliters in 2020. Less power was generated at Cholla in 2020, resulting in lower groundwater – non-renewable consumption. Groundwater – non-renewable is relevant to the Company because 13%of our total water usage in 2021 came from groundwater – non-renewable resources and, in the future, we anticipate our usage of groundwater – non-renewable to decrease with retirement of Cholla Units 1 and 3 in 2025. 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."
Produced/Entrained water	Not relevant	<Not Applicable>	<Not Applicable>	None of APS's operations withdrew water from produced/entrained water sources. This is the case for the previous year as well; thus, it is not applicable. We do not anticipate produced/entrained water will be relevant in the future as our operations withdraw from other water sources, such as fresh surface water and third-party sources.
Third party sources	Relevant	93564	About the same	For purposes of this report, recycled water (also known as reclaimed water) use is reported under third party sources. In 2021, recycled water use (93,564 megaliters/year) was about the same as in 2020 (90,714 megaliters), because generation totals were about the same for plants that utilize recycled water. Third party sources are relevant to the Company because 73% of our total water usage in 2021 came from third party sources, and in the future, we do not anticipate our usage of third-party sources to change. Third-party source water is provided under contracts that ensure adequate cooling water is available to meet generation needs through 2050. 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."

W1.2i

(W1.2i) Provide total water discharge data by destination.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water	Relevant	2512	Much lower	A much lower amount of water was returned to the environment in 2021 (2,512 megaliters/year) compared to 2020 (4,325 megaliters/year), primarily at the Four Corners Power Plant. The amount returned was much lower, although generation at Four Corners was higher than the previous year. Water intensity at Four Corners was lower, resulting in lower water consumption and less water returned to the San Juan River. Return of water to the San Juan River from the Four Corners Power Plant is important because it supports critical flows needed to support endangered fish in the river. Generation projections indicate that future water use will be 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."
Brackish surface water/seawater	Not relevant	<Not Applicable>	<Not Applicable>	There were no discharges to brackish surface water/seawater. We do not anticipate discharging to brackish surface water/seawater within the next 5 years, as there are no plans to source water volume from brackish surface water/seawater sources.
Groundwater	Not relevant	<Not Applicable>	<Not Applicable>	APS does not directly discharge to groundwater and has no plans to in the foreseeable future; however, there are relatively negligible though difficult to quantify losses from water transmission and storage impoundments at our facilities.
Third-party destinations	Relevant	498	About the same	The amount of water discharged to the city sewer at the West Phoenix and Ocotillo Power Plants in 2021 (498 megaliters) was about the same as in 2020 (510 megaliters/year), due to continued outage for repairs of the ZLD system at West Phoenix in 2021. Water discharges through the city sewer supply are relevant to the Company, because two of our nine APS power plants discharge water into the city sewer system, and at West Phoenix Power Plant, this water can be recycled when the ZLD equipment is operating properly. 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."

W1.2j

(W1.2j) Within your direct operations, indicate the highest level(s) to which you treat your discharge.

	Relevance of treatment level to discharge	Volume (megaliters/year)	Comparison of treated volume with previous reporting year	% of your sites/facilities/operations this volume applies to	Please explain
Tertiary treatment	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	APS discharges from three plants: Four Corners, West Phoenix, and Ocotillo. Tertiary treatment is not employed at any of these plants because primary treatment processes result in water quality that meets the discharge limits in the respective permits.
Secondary treatment	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	APS discharges from three plants: Four Corners, West Phoenix, and Ocotillo. Secondary treatment is not employed at any of these plants because primary treatment processes result in water quality that meets the discharge limits in the respective permits. .
Primary treatment only	Relevant	3010	Much lower	100%	The amount of water that was discharged to the environment from the Four Corners Power Plant or to a sanitary sewer from the Ocotillo and West Phoenix Power Plants in 2021 (3,010 megaliters/year) was much lower compared to 2020 (4,835 megaliters/year). Water intensity was lower at Four Corners in 2021 (611 gal/MWh compared to 723 gal/MWh in 2020), resulting in lower water consumption and less water returned to the San Juan River. Primary treatment processes employed at Four Corners, Ocotillo, and West Phoenix include: oil-water separators/equipment (at each plant) and a sedimentation tank (at Four Corners Power Plant) to treat bottom ash transport water. These unit processes remove oil, grease and suspended solids to achieve discharge limits in the respective permits. Generation projections indicate that future water use and discharges will be about the same. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to-year changes over 15%are considered "much higher"/"much lower."
Discharge to the natural environment without treatment	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	APS treats water using primary treatment processes (i.e., sedimentation and oil water separation) prior to discharge to the natural environment in accordance with discharge permit requirements (relevant to Four Corners Power Plant).
Discharge to a third party without treatment	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	No APS plants discharge to a third party without treatment. Primary treatment of all water happens on-site prior to discharge. This is to comply with local discharge permit requirements.
Other	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	There are no other discharges that are not addressed above.

W1.3

(W1.3) Provide a figure for your organization's total water withdrawal efficiency.

	Revenue	Total water withdrawal volume (megaliters)	Total water withdrawal efficiency	Anticipated forward trend
Row 1	3803840	131658	28.8918257910647	Future revenue is expected to be about the same, or to increase 1-2%/year. Future water withdrawals will decrease as plant retirements occur and more renewable energy that requires less water is added to the generation mix. Therefore, increases in revenue and decreases in water withdrawal will result in increases in water withdrawal efficiency.

W-EU1.3

(W-EU1.3) Do you calculate water intensity for your electricity generation activities?

Yes

W-EU1.3a

(W-EU1.3a) Provide the following intensity information associated with your electricity generation activities.

Water intensity value (m3)	Numerator: water aspect	Denominator	Comparison with previous reporting year	Please explain
2.51	Total water consumption	MWh	About the same	The water intensity value is the average of the Cholla, Four Corners, Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, West Phoenix, and Yucca Power Plants in 2021. Generation from 2020 (52,943,631 MWh) to 2021 (51,023,699 MWh) was 3.6% lower overall, and water intensity was about the same (2.49 cubic meters per MWh in 2020 compared to 2.51 cubic meters per MWh in 2021). The slight increase in average water intensity was due primarily to the overall increase in power generation at Palo Verde, which has higher water intensity than other APS plants. Water intensity is used internally to track progress towards achieving t APS goals to reduce water intensity of power served to APS customers and is expected to decrease approximately 50% from 2020 levels by 2035 as outlined in our Integrated Resource Plan. We plan to achieve this goal by retiring older, more water-intensive units and replacing them with more water efficient units, relying more on renewable energy that uses minimal water, and implementing water conservation plans at all power plants. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to-year changes over 15%are considered "much higher"/"much lower."

W1.4

(W1.4) Do you engage with your value chain on water-related issues?

Yes, our suppliers

W1.4a

(W1.4a) What proportion of suppliers do you request to report on their water use, risks and/or management information and what proportion of your procurement spend does this represent?

Row 1

% of suppliers by number

1-25

% of total procurement spend

26-50

Rationale for this coverage

Annually, APS engages our suppliers representing approximately 29% of the Company's total spend in a sustainability survey. They primarily provide materials and services to our power plants, and the transmission and distribution of our energy. They are a part of key suppliers who are identified through a rigorous segmentation process that includes assessing spend, risk analysis, category strategy alignment and criticality to APS operations. Suppliers are incentivized to implement sustainable internal practices because our bid evaluations give additional credit to the suppliers that 1) have a formal environmental management system; 2) engage their value chain in water risk and climate change strategies; 3) set sustainability goals or targets; and 4) consider a lifecycle perspective in products /services. For example, a project critical to the expansion of APS operations has incorporated supplier environmental sustainability maturity questions to develop a better understanding of opportunities to measure environmental impacts.

Impact of the engagement and measures of success

We define success in two ways: a year over year increase in supplier response to our sustainability survey, and a year over year improvement in performance across the key performance indicators. Suppliers are requested, through surveys, to provide information such as their water-risk management, implemented controls, improvement plans, and measurement processes to address environmental-related issues, including water. We use the information from supplier surveys to identify suppliers and classify their risk profiles based on their water risk management practices. This helps us identify which suppliers to engage with further on water-related issues. In addition, success stories are celebrated through our Supplier of the Year nomination process for an environmental sustainability award that is presented each year. Survey results revealed that almost 82% of our key suppliers have implemented controls, improvement plans, and measurement processes to address key environmental priorities such as water conservation and usage. In addition, nearly 87% of our key suppliers' report on key issues and progress towards environmental goals.

Comment

W1.4b

(W1.4b) Provide details of any other water-related supplier engagement activity.

Type of engagement
Innovation & collaboration

Details of engagement
Encourage/incentivize innovation to reduce water impacts in products and services
Encourage/incentivize suppliers to work collaboratively with other users in their river basins
Educate suppliers about water stewardship and collaboration
Other, please specify (Requirements for water related targets are included in supplier selection mechanism)

% of suppliers by number
1-25

% of total procurement spend
26-50

Rationale for the coverage of your engagement
Annually, APS engages our suppliers representing approximately 29% of the Company's total spend in a sustainability survey. They primarily provide materials and services to our power plants, and the transmission and distribution of our energy. They are a part of key suppliers who are identified through a rigorous segmentation process that includes assessing spend, risk analysis, category strategy alignment and criticality to APS operations. Suppliers are incentivized to implement sustainable internal practices because our bid evaluations give additional credit to the suppliers that 1) have a formal environmental management system; 2) engage their value chain in water risk and climate change strategies; 3) set sustainability goals or targets; and 4) consider a lifecycle perspective in products /services. For example, a project critical to the expansion of APS operations has incorporated supplier environmental sustainability maturity questions to develop a better understanding of opportunities to measure environmental impacts.

Impact of the engagement and measures of success
APS's Supplier Relationship Management program is utilized to effectively manage supplier engagements. Successful supplier discussions have led to a number of improvements in the use of sustainable best practices in construction projects. Suppliers are incentivized in bid evaluations with a 2.5% weighting factor if they identify sustainability goals, including water targets. As a measure of success, survey results revealed almost 82% of our key suppliers have implemented controls, improvement plans and measurement processes to address key environmental priorities such as greenhouse gas emission reduction. Since APS started engaging with suppliers through the sustainability survey in 2018, the number of key suppliers with water related targets and mitigation plans has increased by 6%. Many of these suppliers have increased water-related efficiencies and, as such, our costs associated with these suppliers has decreased by roughly 2%. APS works with suppliers to make sure they understand the value we place on water stewardship and collaboration with other users in their river basins, and we advise them that engagement in this area will improve our perspective of their sustainable business practices.

Comment

W2. Business impacts

W2.1

(W2.1) Has your organization experienced any detrimental water-related impacts?
No

W2.2

(W2.2) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for water-related regulatory violations?
No

W3. Procedures

W-EU3.1

(W-EU3.1) How does your organization identify and classify potential water pollutants associated with your business activities in the electric utilities sector that could have a detrimental impact on water ecosystems or human health?

APS identifies and classifies potential water pollutants associated with the power industry through internal monitoring of existing pollutants and ensuring that all treatment system discharges comply with NPDES permit limits, Pre-treatment Local Limits and/or Aquifer Protection Permit Limits (Arizona), as applicable. We adhere to Clean Water Act requirements to identify and treat, if present, discharge of conventional pollutants (BOD, TSS, pH, oil and grease), 65 Priority Pollutants, and 126 Priority Toxic Pollutants. Four APS power plants have permitted discharges. The West Phoenix Power Plant has a permitted discharge to the City of Phoenix sanitary sewer, and discharges are regulated under their industrial pre-treatment program. Samples of the discharge are taken by APS and reported to demonstrate compliance with permit limits. Additional compliance samples are taken by the City of Phoenix to confirm compliance. West Phoenix has a permitted discharge to the Salt River Project's irrigation Lateral Canal and is regulated under the Arizona Pollutant Discharge Elimination System ("AZPDES") permit. Samples of the discharge are taken by APS and reported to ADEQ to demonstrate compliance with permit limits. The Ocotillo Power Plant has a permitted discharge to the City of Tempe sanitary sewer, and discharges are regulated under their industrial pre-treatment program. Samples of the discharge are taken by APS and reported to demonstrate compliance with permit limits. Additional compliance samples are taken by the City of Tempe to confirm compliance. The Four Corners Power Plant has a NPDES permit that places limits on discharges from Morgan Lake to Chaco Wash. Annual inspections are conducted by USEPA Region IX and compliance samples are collected. APS also collects compliance samples and reports results to confirm compliance. The Yucca Power Plant has a discharge to the United States Bureau of Reclamation Main Outlet Drain Extension (MODE) Canal that has water quality limits. Samples are collected and reported by APS to confirm compliance. The four plants that have permitted discharges measure success by demonstrating 100%compliance with all permitted discharges. For example, at Four Corners, the discharge to Chaco Wash has a temperature limit for discharge; therefore, success would be to demonstrate that no discharge occurred that would exceed the required temperature limit. If a higher than allowed temperature effluent was discharged, it could impact endangered fish in the San Juan River, particularly sensitive larvae, or juvenile life stages. In Arizona, APS protects groundwater by acquiring Aquifer Protection Permits from ADEQ for plants that could contaminate groundwater, such as those with impoundments. Water related impacts also vary across our value chain. Five APS power plants are zero liquid discharge plants, including Palo Verde, Redhawk, Cholla, Saguaro, and Sundance; therefore, no pollutants are discharged to surface water resources that may be detrimental to water systems or human health. Annually, APS engages our top suppliers in a sustainability survey through which we request information related to wastewater minimization, ecosystems impact, and hazardous waste storage and transportation practices. It is our goal to influence our suppliers to implement policies and procedures that closely align with our water pollution prevention policies. This is assessed through our annual supplier sustainability survey that covers water-risk management, implemented controls, improvement plans and measurement processes to address environmental related issues, including water. APS expects its suppliers to adhere to environmental regulations and APS water management principles consistent with our Supplier Code of Conduct. If a supplier fails to comply with these requirements, APS may terminate the engagement.

W-EU3.1a

(W-EU3.1a) Describe how your organization minimizes the adverse impacts of potential water pollutants associated with your activities in the electric utilities sector on water ecosystems or human health.

Potential water pollutant	Description of water pollutant and potential impacts	Management procedures	Please explain
Coal combustion residuals	Coal combustion residuals have potential to contaminate groundwater and surface water, possibly impacting aquatic and terrestrial habitats. The Four Corners Power Plant has a NPDES permit to discharge to Chaco Wash and ultimately to the San Juan River in New Mexico. Both permitted and unpermitted discharges of coal combustion residuals could adversely impact two endangered fish species in the San Juan River. The Cholla Power Plant does not have a discharge permit. However, unpermitted or uncontrolled discharges could result in damage to critical habitat of a threatened fish.	Compliance with effluent quality standards Measures to prevent spillage, leaching, and leakages Emergency preparedness Other, please specify (Interceptor trenches to remove pollutants from environment)	Four Corners has a discharge permit with limits on discharges that could result in environmental harm, and control measures have been implemented that enable compliance. Success is measured by compliance with all discharge limits as required in our NPDES permit. Spill Prevention Control and Countermeasures ("SPCC") ("") plans are implemented at all APS power plants, primarily to prevent oil or ash spills and minimize possible environmental impacts. These SPCC plans are recorded with local emergency management agencies and are exercised on regular frequencies to confirm effectiveness. Emergency preparedness is another activity undertaken by APS plants. This includes coordination with local environmental, police and regulatory agencies on issues such as spill response or public safety issues. For example, APS has many regulated dams that provide containment for evaporation ponds, water storage reservoirs and ash ponds. These regulated dams are regularly inspected to confirm compliance with safety standards. If a pond at the Four Corners or Cholla Power Plants were found to be leaking possible Coal Combustion Residuals ("CCR"), additional monitoring would be implemented. If necessary, corrective action would be implemented to stop any CCR releases and restore the aquifer water quality. APS has announced plans to cease generation at Cholla in 2025 and at Four Corners in 2031; in both cases, groundwater monitoring will be required for at least 30 years after closure to ensure aquifer protection.

W3.3

(W3.3) Does your organization undertake a water-related risk assessment?

Yes, water-related risks are assessed

W3.3a

(W3.3a) Select the options that best describe your procedures for identifying and assessing water-related risks.

Value chain stage
Direct operations
Supply chain

Coverage
Full

Risk assessment procedure
Water risks are assessed as part of an established enterprise risk management framework

Frequency of assessment
More than once a year

How far into the future are risks considered?
More than 6 years

Type of tools and methods used
Enterprise risk management
International methodologies and standards
Databases
Other

Tools and methods used
Environmental Impact Assessment
Internal company methods
External consultants
Other, please specify (Water Resource Management Business Plan and Environmental Management System (EMS) based on ISO 14001 principles at all Power Plants)

Contextual issues considered
Water availability at a basin/catchment level
Water quality at a basin/catchment level
Stakeholder conflicts concerning water resources at a basin/catchment level
Implications of water on your key commodities/raw materials
Water regulatory frameworks
Status of ecosystems and habitats
Access to fully-functioning, safely managed WASH services for all employees

Stakeholders considered
Customers
Employees
Investors
Local communities
NGOs
Regulators
Suppliers
Water utilities at a local level

Comment

W3.3b

(W3.3b) Describe your organization's process for identifying, assessing, and responding to water-related risks within your direct operations and other stages of your value chain.

The Enterprise Risk Management (ERM) department facilitates the establishment and implementation of governance over and process(es) related to for the identifying, assessing and reporting material risks inherent to the Company's business, including water related risks. Risks are identified, defined, assessed, and prioritized based on the likelihood and impact of their occurrence. Due to the complexity of operational, financial, and regulatory environments, APS has numerous risk objectives and obligations, which are addressed by policies, controls, processes and programs. Risks are identified, defined, assessed, and mitigated at an asset level. APS identifies and assesses water-related risks in a manner consistent with our overall enterprise risk management framework. The ERM process is one of the Company's efforts within this framework. The ERM process at APS is a formal process by which Business Units and the ERM group support the Executive Risk Committee (ERC) as it carries out responsibilities set forth in the ERC charter. This includes the following and includes, which can all be applied to water-related risks:

No less than annually, the ERC presents highly critical risks, including water risks, to the Board of Directors. No less than quarterly, or as often as the Chairperson determines to be necessary, the Business Unit, which is assigned ownership of the risk, with support from the ERM group, reviews and monitors relevant material organizational risks, with members, participants, and delegates of the ERC.

Business Units maintain an inventory of their most significant short-term, medium-term, and long-term risks and associated risk response plans. This includes significant risks on our direct operations as well as our upstream and downstream value chains. On an annual basis, Business Units record this information in a prescribed format, for analysis, categorization, and prioritization of risks to support development of an enterprise risk profile. Risk prioritization can include an assessment of likelihood, impact, risk direction, velocity, external evidence, feasibility and cost of mitigation. Quantitative correlation analysis is used for Company projects and business scenarios to provide probability distributions of cost contingencies and schedule uncertainties for multiple risk drivers. Additionally, the Company utilizes qualitative analysis through periodic risk workshops, focusing on risk drivers, potential consequences, and existing mitigation efforts. These types of sensitivity analyses are used to identify factors affecting the budget and timing of projects, leading to more effective and efficient mitigation strategies. Opportunities are prioritized based on their ability to assist in meeting or exceeding targets.

The ERM process receives input from and provides output to the execution and implementation of the Company's risk policies and controls, the business planning process and Business Units' specific risk management programs. However, the ERM process does not direct or control these policies, processes, or programs, as they are exclusively within the control and purview of the responsible Business Units.

Risks (including water risk) are reported to shareholders and other stakeholders through Pinnacle West's Form 10-K and Corporate Responsibility Report, and to regulators via annual reporting. Risk is assessed quarterly and reported to executives on the strategic options roadmap. Contextual issues considered in our risk assessment include water availability, quality and stakeholder water resource conflicts at a basin/catchment level, implications of water on key commodities/raw materials, water regulatory frameworks, status of ecosystems and habitats, and access to fully functioning WASH services for all employees. APS considers issues at the basin/catchment level to assess potential disruptions in water supplies essential for operations. We consider water regulatory frameworks to ensure compliance with existing and emerging regulations. Our operations have the potential to impact ecosystems and habitats. Therefore, it is critical for us to consider this risk and ensure we are doing everything we can to minimize impact. Our employees are essential to everyday operations. We consider fully functioning, safe WASH services essential to a safe work environment and evaluate these services in our risk assessment.

APS considers customers, employees, stakeholders, regulators, suppliers, and water utilities at a local level because these stakeholders either have the potential to influence our operations or have the potential to be impacted by our operations. These stakeholders also have potential to influence the availability of our key commodities and raw materials, which are both water-dependent and essential to our operations. Environmental Impact Assessments are performed annually by the United States Bureau of Reclamation and external consultants at Navajo Reservoir and in the San Juan River.

W4. Risks and opportunities

W4.1

(W4.1) Have you identified any inherent water-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes, only within our direct operations

W4.1a

(W4.1a) How does your organization define substantive financial or strategic impact on your business?

APS defines substantive financial or strategic impact to our direct operations and supply chain related to water risk in three ways. First, a physical disruption of a water supply that limited generation at any APS power plant for any period of time—even one day—would constitute a substantive financial impact on our business. We define substantive impact as any loss of generation capacity (i.e. less than 100%) due to insufficient water supply. If a vital piece of water infrastructure is damaged or becomes inoperable, generation output could be impacted or curtailed entirely, causing substantive financial or strategic harm to the Company and potentially impacting supply chain demand. Second, APS and/or supplier noncompliance with a permit or regulatory requirement could impact production and/or result in notices of violations, litigation and/or penalties, causing substantive harm. Finally, APS and/or supplier water allocation cuts due to water shortages could cause substantive financial or strategic impact to the Company. Loss of suppliers or materials provided by suppliers could significantly disrupt our operations and our ability to serve our customers. An example of a metric designed to reduce the probability of water infrastructure failure is our Well and Pumping Equipment Reliability Program. Well infrastructure failure could have a substantive financial impact and/or a production impact, as wells are needed at eight of our nine plants to provide essential water to support generation. To prevent this impact, the Well and Pumping Equipment Reliability Program created redundancy among the fleet, increased frequency of preventive maintenance activities, replaced existing wells with new wells, and increased the frequency of major well rehabilitations. The result was that well failures have decreased from 5 per year in 2015 to zero failures in 2021. Also, if a water shortage impacted an APS supplier, there could be substantive impacts to APS's operations. Water quality and quantity is vital to our direct operations and is considered neutral to our indirect operations.

W4.1b

(W4.1b) What is the total number of facilities exposed to water risks with the potential to have a substantive financial or strategic impact on your business, and what proportion of your company-wide facilities does this represent?

	Total number of facilities exposed to water risk	% company-wide facilities this represents	Comment
Row 1	9	100	Includes Palo Verde Nuclear Generating Station, Redhawk Power Plant, West Phoenix Power Plant, Ocotillo Power Plant, Sundance Power Plant, Saguaro Power Plant, Cholla Power Plant, Four Corners Power Plant, and Yucca Power Plant.

W4.1c

(W4.1c) By river basin, what is the number and proportion of facilities exposed to water risks that could have a substantive financial or strategic impact on your business, and what is the potential business impact associated with those facilities?

Country/Area & River basin

United States of America	Other, please specify (Phoenix Active Management Area (AMA))

Number of facilities exposed to water risk
4

% company-wide facilities this represents
26-50

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
76-99

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
71-80

Comment
Includes Palo Verde Nuclear Generating Station, Redhawk Power Plant, West Phoenix Power Plant and Ocotillo Power Plant

Country/Area & River basin

United States of America	Other, please specify (Pinal Active Management Area (AMA))

Number of facilities exposed to water risk
1

% company-wide facilities this represents
1-25

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
Less than 1%

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
Less than 1%

Comment
Sundance Power Plant

Country/Area & River basin

United States of America	Other, please specify (Tucson Active Management Area)

Number of facilities exposed to water risk
1

% company-wide facilities this represents
1-25

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
Less than 1%

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
Less than 1%

Comment
Saguaro Power Plant

Country/Area & River basin

United States of America	Other, please specify (Joseph City Irrigation Non-expansion Area (INA))

Number of facilities exposed to water risk
1

% company-wide facilities this represents
1-25

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
1-25

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
1-10

Comment
Cholla Power Plant

Country/Area & River basin

United States of America	Other, please specify (San Juan River Basin)

Number of facilities exposed to water risk
1

% company-wide facilities this represents
1-25

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
1-25

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
11-20

Comment
Four Corners Power Plant

Country/Area & River basin

United States of America	Other, please specify (Colorado River Basin)

Number of facilities exposed to water risk
1

% company-wide facilities this represents
1-25

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
Less than 1%

% company's global oil & gas production volume that could be affected by these facilities
<Not Applicable>

% company's total global revenue that could be affected
Less than 1%

Comment
Yucca Power Plant

W4.2

(W4.2) Provide details of identified risks in your direct operations with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Country/Area & River basin

United States of America	Other, please specify (AMAs, Colorado River, and San Juan River Basin)

Type of risk & Primary risk driver

Acute physical	Other, please specify (Physical Disruption of Water Supply)

Primary potential impact
Reduction or disruption in production capacity

Company-specific description
Well failure is a risk that could disrupt plant production and generate a substantive impact on APS's finances and/or strategy. APS owns and operates 43 production wells that provide cooling water and supplemental water to support generation at the Palo Verde, Redhawk, West Phoenix, Saguaro, Cholla, Yucca, Ocotillo, and Sundance plants. Potential well failures have been identified in previous years. In response, APS devised and implemented our Well and Pumping Equipment Reliability Program to identify and mitigate well failure risks. The program consists of well fleet expansion, creating redundancy to ensure an unexpected well failure does not impact plant operations; well closure/replacement capital projects ; improved preventative maintenance program ; identifying and stocking critical spare parts for equipment failure replacements; enhanced well efficiency testing and trending (increased frequency from once per year to once per month); rehabilitation of existing wells; and the addition of new equipment to increase well efficiency and reliability, such as Variable Frequency Drives and automated oilers. APS takes a proactive approach, which results in shorter down time and less expensive equipment replacement. As a result of implementing the APS Well and Pumping Equipment Program, well failures have decreased from 5 per year in 2015 to zero failures impacting plant operations in 2021. Declaration of shortages on the Colorado River (expected in 2022) will not have a substantive impact on Arizona power plants, as less than one percent of our Arizona water supply originates in the Colorado River. Instead, APS relies on treated effluent for 73% of total water consumption, a renewable and comparably drought-proof water supply. APS also has agreements with local Native American communities to access high-priority tribal water off the Colorado River for use at Sundance, if needed for contingency purposes. tribal water is the least susceptible to declared shortages on the Colorado River. In addition, APS continues to develop strategies that reduce water consumption (retiring older water intensive plants, increasing renewable energy that requires minimal water, and increasing energy efficiency, thereby eliminating need for energy that would have required water). We also continue to explore water-saving advanced cooling technologies and the potential for underground storage and recovery of water.

Timeframe
Current up to one year

Magnitude of potential impact
Low

Likelihood
Unlikely

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure - minimum (currency)
2500000

Potential financial impact figure - maximum (currency)
5000000

Explanation of financial impact
A well failure requiring the drilling and installation of a replacement well costs approximately $2.5 million ($2 million for drilling and $0.5 million for design and well development). Drilling and replacing two wells would cost twice that amount, therefore the upper range would be $2.5 million * 2 = $5 million. The Well and Pumping Equipment Reliability Program has reduced unplanned well failures from 5/year in 2015 to zero failures impacting plant operations in 2021. The cost for equipment and structural repairs on a well that has failed is approximately twice that of preventative maintenance, because of the expedited services and materials.

Primary response to risk

Other, please specify (Well and Pumping Equipment Reliability Program)

Description of response
Potential well failures have been identified in previous years. In response, APS devised and implemented the Well and Pumping Equipment Reliability Program to identify and mitigate well failure risks. The program consists of the following components: well fleet expansion, creating redundancy to ensure an unexpected well failure does not impact plant operations; well closure/replacement capital projects (typically for wells greater than 50 years old); an improved preventative maintenance program (monthly and annual maintenance at each site); identifying and stocking critical spare parts for equipment failure replacements; enhanced well efficiency testing and trending (increased frequency from once per year to once per month); rehabilitation of existing wells; and the addition of new equipment to increase well efficiency and reliability, such as Variable Frequency Drives and automated oilers.

Cost of response
350000

Explanation of cost of response
The Well and Pumping Equipment Reliability Program includes annual O&M expenditures for rehabilitation ($350,000 based on operational experience). Of the $350,000, $200,000 is pump and motor repairs and $150,000 is instrumentation modification repairs. Pump and motor repairs ($200,000) + instrumentation modification repairs ($150,000) = $350,000.

Country/Area & River basin

United States of America	Other, please specify (AMAs, Colorado River and San Juan River Basin)

Type of risk & Primary risk driver

Regulatory	Lack of transparency of water rights

Primary potential impact
Reduction or disruption in production capacity

Company-specific description
If a permit requirement is exceeded, a notice of violation could be issued that may include monetary fines and substantive changes in our business practices. In an extreme case, there is a risk of injunction to cease generation and correct the cause of the violation. To avoid this risk, APS implemented an initiative to focus on building a comprehensive, controlled and structured body of Company policies, processes and procedures. This action was to ensure APS has documented its regulatory requirements in a manner that facilitates regulatory compliance. There are multiple requirements that need to be tracked; therefore, referring to these documents helps new and existing employees to ensure that permit requirements are tracked properly and not exceeded. For example, the Ocotillo, Palo Verde, Redhawk, Saguaro, Sundance, and West Phoenix Power plants have annual groundwater allotments (water rights) that cannot be exceeded. APS is required to monitor and report each plant's annual groundwater use. As part of these requirements, Ocotillo Power Plant holds a Type 2 grandfathered water rights (Number 58-114047.0002) in the Phoenix Active Management Area, with a withdrawal limit of 2680 megaliters (2173 acre-feet) per year. In 2021, APS reported withdrawals from the Ocotillo Power Plant of 589 megaliters (477.52 acre-feet), demonstrating compliance. Similar water rights are held at other plants. If overdrawn, APS would be subject to penalties as identified above. A Company procedure was written to detail how to properly calculate and report groundwater usage to the state, as required by statute.

Timeframe
Current up to one year

Magnitude of potential impact
Low

Likelihood
Unlikely

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure - minimum (currency)
100

Potential financial impact figure - maximum (currency)
10000

Explanation of financial impact
Fines can range from $100 to $10,000 per violation per day, depending on the nature of violation. The most likely penalty would be for a permit violation, such as failure to submit a report on time. A single violation could result in a fine of $100 to$10,000, depending upon the severity and duration of the violation.

Primary response to risk
Other, please specify (Processes, procedures, and policies)

Description of response
APS understands permit limits and conditions and tracks regulatory commitments in the Enviance database. This ensures that such commitments are understood and completed, as required. The Enviance database is an especially useful tool for tracking reporting deadlines. All reporting requirements have been entered into the Enviance system, which reminds APS when a deadline is approaching. This allows Water Resource Management adequate time to compile and report the required information on time. Examples of reporting deadlines we track in Enviance include Arizona Department of Water Resources annual reports for all our water rights within the active management areas, New Mexico Office of the State Engineer's report for Four Corners Power Plant water use, and the United States Bureau of Reclamation reporting for Yucca Power Plant.

Cost of response
200000

Explanation of cost of response
Database maintenance and support costs are approximately $200,000/year. This is based on charges from our IT department for support that can vary from year to year, depending on the reliability of the database and whether new modules are required. Routine maintenance costs are approximately $100,000, and development of an enhanced module costs an additional $100,000 ($100,000 + $100,000 = $200,000).

Country/Area & River basin

United States of America	Other, please specify (AMA, Colorado River and San Juan Basin)

Type of risk & Primary risk driver

Regulatory	Statutory water withdrawal limits/changes to water allocation

Primary potential impact
Reduction or disruption in production capacity

Company-specific description
A significant risk is the potential for the U.S. Bureau of Reclamation to declare a formal water shortage on the Colorado River, based on the levels in Lake Mead; and/or surface water disputes impacting access to water resources relied upon to support generation at APS power plants. In the event of a water shortage, insufficient water supplies may limit our ability to produce the power needed to meet customer demand, impacting reliable service for our customers and a potential loss of revenue. APS mitigates the risk of water shortages by maintaining contingent water supplies, investigating water storage, and acquiring groundwater rights for use in shortage circumstances. For example, APS's Cholla Power Plant developed a severance and transfer agreement with the Joseph City Irrigation Company to develop a contingent surface water supply to the plant's groundwater supply. APS has also investigated the possibility of acquiring land for storing water in underground storage facilities for use when other supplies are threatened by drought. APS works with state and local government agencies as well as water providers in Arizona and other states to manage these risks. Due to possibility of drought, surface water supplies are the most at-risk water supply and are managed closely. APS has agreements to mitigate drought conditions at plants that rely on surface water and has acquired permits that exceed the water needed to support maximum generation. Treated effluent is the most drought proof supply we have, which provided 73%of our water supply in 2021.

Timeframe
4-6 years

Magnitude of potential impact
Low

Likelihood
Unlikely

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure - minimum (currency)
500000

Potential financial impact figure - maximum (currency)
1500000

Explanation of financial impact
APS has purchased water contingency contracts to deal with shortages that cost $500,000 - $1,500,000/year. The Cholla Power plant provides annual in-kind services to the Joseph City Irrigation Company (JCIC) to offset these costs. In-kind services include providing power for three of JCIC's wells and performing necessary maintenance at no cost. The actual amount will vary from year to year, depending on how many hours the wells were operated and when scheduled maintenance is due. Examples of wells recently repaired under the JCIC contract are Well P-34 for a cost of $31,000.00 and JCIC East Well for a cost of $23,000.00. These relatively shallow wells are typically less costly to repair than deeper wells (APS has wells up to 2000 feet deep). Costs can be much higher depending on the amount of rework that is required, i.e., pump replacement, motor replacement, shaft repair, casing cleaning, electrical repair, or total well replacement that can exceed $1,000,000. Minimum potential financial impact figure + cost of providing power to JCIC wells ($200,000) + maintenance of shallow wells ($50,000) + replacing small wells ($250,000) = $500,000 Maximum potential financial impact figure = cost of providing power to JCIC wells ($200,000) + maintenance on deep wells ($100,000) + replacing deep wells ($1,200,000) = $1,500,000.

Primary response to risk
Develop drought emergency plans

Description of response
We are mitigating the risk of statutory water withdrawal limits and changes to water allocation that could adversely impact APS operations through participation in regional strategic planning activities (Colorado River Basin Drought Contingency Plan), provision of primary and secondary water supplies at power plants, and creation of severance and transfer agreements (Cholla). APS has purchased water contingency contracts that cost $500,000 to $1,500,000/year to deal with shortages. APS has agreements to mitigate drought conditions at plants that rely on surface water and has acquired permits that exceed the water needed to support generation at maximum capacity. Treated effluent is the most drought-proof supply we have, which provided 73%of our water supply in 2021. APS is also investigating water storage and groundwater rights acquisition for use during declared water shortages as a risk mitigation strategy. APS has evaluated the possibility of storing water in underground storage facilities for use when other supplies are threatened by drought. Additionally, we collaborate with state and local government agencies and work water providers in Arizona and neighboring states to manage these risks.

Cost of response
1500000

Explanation of cost of response
Contracts for contingent water supplies, agreements to provide wells, pipeline maintenance agreements range from $500,000 - $1,500,000 a year. An example at Cholla of the low-cost range would be electrical cost ($200,000) + maintenance ($100,000) + minor well rehabilitation ($200,000) = $500,000. An example of the upper cost range would be electrical cost ($200,000) + maintenance ($100,000) + total well replacement ($1,200,000) = $1,500,000.

Country/Area & River basin

United States of America	Other, please specify (AMAs, Colorado River and San Juan River Basin)

Type of risk & Primary risk driver

Acute physical	Other, please specify (Change in precipitation patterns and extreme variability in weather patterns)

Primary potential impact
Other, please specify (Increased capital expenditures)

Company-specific description
One of the largest physical risks driven by change in physical climate parameters is water supply, which may result in increasing capital expenditures to address this risk. Since water can be a scarce resource in the Southwest, any change in precipitation or extended droughts driven by climate change bring with it inherent risks for APS and could materially impact on our business and operations. However, since its inception over a century ago, APS has been diligent and forward-looking in its efforts to find and secure sufficient water for current and future power generation. APS has an entire business unit, Water Resource Management, dedicated to assessing and addressing our current and future water needs. In 2021, water risk is considered in our Enterprise Risk Management (ERM) process based on assessments conducted by the business unit manager and the ERM group. The risk is recorded and monitored to determine the magnitude of the risk and the associated mitigated measures. In 2021, this risk is considered moderate as the financial impact, may range from $5 million to $25 million. 2021 was one of the driest monsoon seasons on record for the region, further expanding extreme and exceptional drought conditions. In the Western U.S., water resources and availability are long-term issues, and full drought recorder requires several years of above average precipitation to replenish reservoirs or aquifers. One potential drought-related project could result in expenditures of $2-3 million in capital costs. If drought results in lost access to surface water due to a shortage declaration on the Colorado River, agricultural users near the Sundance Power Plant could revert to pumping groundwater. This new groundwater pumping could lower the water table to levels that could require APS to drill a new, deeper well at a cost of $2-3 million.

Timeframe
4-6 years

Magnitude of potential impact
Medium-high

Likelihood
Likely

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure - minimum (currency)
2000000

Potential financial impact figure - maximum (currency)
3000000

Explanation of financial impact
The financial implication related to drought is difficult to precisely quantify. However, one potential drought-related projects could result in expenditures of $2 million - $3 million in capital costs. If drought results in loss of surface water due to a shortage declaration on the Colorado River, agricultural users near the Sundance Power Plant could revert to pumping groundwater. This new groundwater pumping could lower the water table to levels that require drilling a new, deeper well at a cost of $2 million - $3 million.

Primary response to risk
Other, please specify (Created Water Resource Management Department to address current and future risk associated with drought and extreme weather)

Description of response
Water Resource Management staff manages existing water infrastructure, planned improvements, water contracts, capital projects, maintenance, and develops drought response strategies.

Cost of response
1500000

Explanation of cost of response
Because water supplies are so integral to the operations at APS, we have an entire Water Resource Management (“WRM”) department comprised of six employees, with an operations and maintenance budget of approximately $1.5 million a year. The budget is primarily personnel costs, about $1 million, and about $500k for outside services contracts to support the business. This management team assesses and manages current as well as future risk associated with drought and extreme weather. ($1 million + $0.5 million = $1.5 million) APS has identified both primary water supplies and contingencies for each power plant in order to ensure reliable long-term operation, even in times of possible shortage, such as extended drought. APS owns and operates 43 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 many factors, examples include but are not limited to pumping equipment failure, electrical/mechanical issues, and well casing problems. These failures disrupt scheduled maintenance plans, result in unplanned/unbudgeted costs, and could result in loss of water necessary to support generation. The reliability rate in 2015 was 90%, equating to 5 unplanned failures. In 2021, the reliability rate increased to 100%. It is WRM’s goal to achieve 98% reliability, or better, in future years.

W4.2c

(W4.2c) Why does your organization not consider itself exposed to water risks in its value chain (beyond direct operations) with the potential to have a substantive financial or strategic impact?

	Primary reason	Please explain
Row 1	Evaluation in progress	At this time, we do not consider our value chain as exposed to water risks with the potential to have a substantive financial or strategic impact. Our Electric Utility Industry Sustainable Supply Chain Alliance (“EUISSCA”) survey indicates some minor supply chain risks, but no water risks with potential for substantive impact. Further evaluation of this status is currently in progress and is expected to conclude at the end of 2022. APS considers risks such as severe water stress due to climate change in our upstream operations, which could put critical inputs to our operations at risk. We are also considering reputational and legal risks associated with our operations' impact on water resources. If APS is found to be polluting water resources due to improper water treatment practices, this could pose a potential risk to our reputation and continued operations. On a quarterly basis, we engage with our key suppliers to discuss current performance, including risks identified and mitigation plans. Further, in major projects, we collaborate with suppliers to discuss water capacity and quality expectations as well as planning for future demand. We did not find substantive water risks through analysis via the EUISSCA survey. In 2021, survey results revealed that almost 82% of our key suppliers have implemented controls, improvement plans and measurement processes to address key environmental priorities such as water conservation and usage. In addition, nearly 87%of our key suppliers’ report on key issues and progress towards goals, including environmental goals.

W4.3

(W4.3) Have you identified any water-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes, we have identified opportunities, and some/all are being realized

W4.3a

(W4.3a) Provide details of opportunities currently being realized that could have a substantive financial or strategic impact on your business.

Type of opportunity

Efficiency

Primary water-related opportunity

Improved water efficiency in operations

Company-specific description & strategy to realize opportunity

Natural gas and solar generation are more water efficient than coal generation. Accordingly, APS's closure of coal units at Cholla and Four Corners (820 megawatts retired since 2013) has resulted in the reduction of water consumption by approximately 20%. APS's coal-fired Cholla Power Plant is projected to retire in 2025, which is projected to further reduce water consumption to less than 10% of current consumption. Cholla Unit 4 (380 MWe of output capacity), owned by Pacificorp but operated by APS, was retired at the end of 2020 and Units 1 and 3 (387 MWe of output capacity) will be retired in 2025. Additionally, APS has announced we are exiting from coal-fired generation at the Four Corners Power Plant by 2031, seven years sooner than originally projected. APS operates Four Corners and owns 63% of its generation; the remainder is owned by PNM (13%), SRP (10%), TEP (7%), and NTEC (7%). The 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 coal plant water intensity. Furthermore, elimination of coal generation is part of our corporate strategic plan to eliminate all carbon emissions by 2050. Energy efficiency programs will reduce customer demand for energy, and continued development of renewable energy such as 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 for power provided to APS customers of approximately 50% from 2020 levels by 2035.

Estimated timeframe for realization

More than 6 years

Magnitude of potential financial impact

Low-medium

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

2500000

Potential financial impact figure – maximum (currency)

3500000

Explanation of financial impact

Reduced water consumption will reduce the need for well and pumping equipment maintenance and capital replacements proportional to reductions in water consumption. Estimated savings in O&M costs of $500,000/year would be possible, based on historical costs. APS evaluates the need for new infrastructure and includes such projects in the long-range forecast. Then, based upon reduced need for water due to more efficient plants, or retirement of older plants, certain of the capital projects could be eliminated. As plant retirements are planned, certain capital improvement projects could be eliminated without risk, such as the need for new wells and/or pipeline replacements, assuming existing infrastructure is maintained properly. A single new well could cost $2 million - $3 million based upon the complexity of the site (depth to water, geology), and pipeline replacement projects can easily exceed $1 million, based upon recent experience at the Ocotillo Power Plant. Reduction in water consumption would result in reduced maintenance resulting in O&M savings of $500,000/year and eliminating the need for a new well could save $2,000,000 - $3,000,000, or a total of $2,500,000 – 3,500,000. (Lower Range Savings) - O&M ($500,000) + New Well ($2,000,000) = 2,500,000. (Higher Range Savings) - O&M ($500,000) + New Well ($3,000,000) = $3,500,000.

Type of opportunity

Efficiency

Primary water-related opportunity

Improved water efficiency in operations

Company-specific description & strategy to realize opportunity

Alternative cooling technologies: APS retired the older, less efficient steam units at Ocotillo and replaced them with more efficient combustion turbines, cooled by hybrid cooling, which reduced the plant's water consumption significantly. Water intensity has improved from approximately 1,000 g/MWh to 201 g/MWh. Additional efficiencies will be achieved by retiring older water intensive steam units at Cholla by 2025 and replacing them with less water intensive generation sources, or with renewables and energy storage resources that use nominal quantities of water. We project a reduction in water intensity for power provided to APS customers of approximately 50% from 2020 levels by 2035. This reduction in water consumption will reduce the need for water pumping and treatment infrastructure.

Estimated timeframe for realization

More than 6 years

Magnitude of potential financial impact

Low-medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2500000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact
The potential financial impact is $500,000 per year between 2021 and 2026 and is the direct result of reduced water pumping, delivery, maintenance and treatment costs . As the quantity of water needed to support generation decreases, the costs of delivering water (acquisition, electricity, maintenance, equipment replacement) is decreasing. In addition, APS has successfully upgraded the quality of wells and pumping equipment for several years to the point that the need for on-going major maintenance/replacement is decreasing. A single planned outage for major maintenance for a well can cost $50,000 - $100,000, based upon recent well maintenance at the Cholla Power Plant. We currently have 43 wells and plan major maintenance approximately every 5 years but may extend the maintenance period to 6 years or more, depending on how many hours the wells are run.

Type of opportunity
Efficiency

Primary water-related opportunity
Improved water efficiency in operations

Company-specific description & strategy to realize opportunity
Infrastructure maintenance and repair: 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 and well infrastructure inspection (including pumps and motors, meters and lubrication systems). Expected improvements in reliability of 2 %/year are being tracked. In 2015, APS experienced 5 well failures in one year. With the implementation of the Well and Pumping Equipment Reliability Program, the 2021 failure rate was zero and is expected to be no more than one/year after 2021. We also perform well testing on all mission critical wells every year to gain information on their efficiency and reliability. This will ensure reliable access to water for uninterrupted power generation to supply our customers.

Estimated timeframe for realization
1 to 3 years

Magnitude of potential financial impact
Low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
150000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact
This program is expected to reduce unplanned well failures to one per year. In 2021, we experienced zero unplanned well failures. We expect to see a savings over 3 years of $150,000. A single planned well rehabilitation can cost $50,000 - $100,000; however, an unplanned failure can cost twice that amount. ($50,000/year * 3 years = $150,000). An example of a planned well repair was Cholla Well P-5R. The pump was replaced; however, no rework was needed on the well column or tube/shaft, and the well casing did not require cleaning. The total cost was $39,000.00, $13,000.00 for labor and $26,000.00 for materials. If this well had failed prior to scheduled repair, the damage could easily have been greater than to the pump alone. Cleaning the well casing would have cost $12,000.00, if needed. Well rehabilitation can vary considerably based on the size and depth of the well. APS has production wells that range from 300 feet below land surface to 2,000 feet below land surface, and the cost to repair deeper wells is higher.

Type of opportunity
Efficiency

Primary water-related opportunity
Improved water efficiency in operations

Company-specific description & strategy to realize opportunity
Management of pumping is important to ensure that the highest quality water possible is delivered to the plant and is used as efficiently as possible before water needs to be discharged for disposal. It also prevents or minimizes degradation of water quality in the well field area over time because poor quality water that surrounds the pumping area is not drawn toward the pumps as quickly when pumping is reduced. Use of higher quality water reduces treatment and equipment operation and maintenance costs. We have developed three well field operation plans to date, for the Cholla, West Phoenix and Redhawk Power Plants. These plans identify a well ranking system to prioritize which wells should run first, to ensure the best quality is used. This results in reduced water consumption as higher quality water can be cycled up more times prior to disposal. These plans are based on reviews of information such as well flow rate (gallons per minute), water quality (total dissolved solids), location, historical pumping, planned maintenance/evaluation schedules and number of years the well has been in service.

Estimated timeframe for realization
Current - up to 1 year

Magnitude of potential financial impact
Low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
100000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact

Improved efficiency at the three identified plants could reduce water consumption by 5 %/year. The cost of water at these plants is limited to the cost of pumping and treatment. Savings are achieved in reduced power costs and reduced need for major maintenance, as wells and pumping equipment are lasting longer due to shorter run times. For example, saving 5% of the water needed at the three plants could result in power savings ($50,000) + maintenance savings ($50,000) = $100,000.

W5. Facility-level water accounting

W5.1

(W5.1) For each facility referenced in W4.1c, provide coordinates, water accounting data, and a comparison with the previous reporting year.

Facility reference number
Facility 1

Facility name (optional)
Palo Verde Generating Station

Country/Area & River basin

United States of America	Other, please specify (Phoenix Active Management Area)

Latitude
33.395277

Longitude
-112.858333

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Nuclear

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
90626

Comparison of total withdrawals with previous reporting year
About the same

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
62

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
2225

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
88339

Total water discharges at this facility (megaliters/year)
1

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
90626

Comparison of total consumption with previous reporting year
About the same

Please explain
The Palo Verde Nuclear Generating Station produced about the same amount of power in 2021 as it did in 2020, resulting in about the same amount of recycled (e.g., reclaimed) water used. The 2021 consumption was 90,626 megaliters compared to 87,413 megaliters in 2020. Water use and generation go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. Palo Verde continued to be the single largest producer of electricity in the U.S. in 2021. Year-to-year changes of less than 5%are considered "about the same." Year-to-year changes between 5%and 15%are considered "higher"/"lower." Year-to-year changes over 15%are considered "much higher"/"much lower." Palo Verde is a ZLD facility with no discharge to surface water, groundwater, or third-party destinations. All water is evaporated or stored on site. However, for the purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for any minor leaks that may occur in the water distribution infrastructure.

Facility reference number
Facility 2

Facility name (optional)
Redhawk Power Plant

Country/Area & River basin

United States of America	Other, please specify (Phoenix Active Management Area)

Latitude
33.336229

Longitude
-112.840533

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Gas

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
5996

Comparison of total withdrawals with previous reporting year
About the same

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
770

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
5226

Total water discharges at this facility (megaliters/year)
0

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
1

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
5996

Comparison of total consumption with previous reporting year
About the same

Please explain
Redhawk Power Plant produced about the same amount of power in 2021 as it did in 2020, resulting in about the same reclaimed water and groundwater use. 2021 consumption was 5,996 megaliters compared to 5,884 megaliters in 2020. Water use and generation go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. Year-to-year changes of less than 5%are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to- year changes over 15%are considered "much higher"/"much lower." Redhawk is a zero liquid discharge facility with no discharge to surface water, groundwater, or third-party destinations. All water is evaporated or stored on site. However, for the

purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for any minor leaks that may occur in the water distribution infrastructure.

Facility reference number
Facility 3

Facility name (optional)
West Phoenix Power Plant

Country/Area & River basin

United States of America	Other, please specify (Phoenix Active Management Area)

Latitude
33.440277

Longitude
-112.162777

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Gas

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
4285

Comparison of total withdrawals with previous reporting year
Much lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
4285

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
421

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
0

Discharges to third party destinations
421

Total water consumption at this facility (megaliters/year)
3864

Comparison of total consumption with previous reporting year
Much lower

Please explain
Water use was much lower in 2021 due to much lower generation at the West Phoenix Power Plant. 2021 consumption was 3,864 megaliters compared to 4,677 megaliters in 2020. Water use and generation go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. There was an increase of water discharged in 2020 due to intermittent operation of the ZLD system. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15 are considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower."

Facility reference number
Facility 4

Facility name (optional)
Ocotillo Power Plant

Country/Area & River basin

United States of America	Other, please specify (Phoenix Active Management Area)

Latitude
33.428888

Longitude
-111.910277

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Gas

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
589

Comparison of total withdrawals with previous reporting year
About the same

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
589

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
78

Comparison of total discharges with previous reporting year
Lower

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
0

Discharges to third party destinations
78

Total water consumption at this facility (megaliters/year)
511

Comparison of total consumption with previous reporting year
About the same

Please explain
Water use was about the same at the Ocotillo Power Plant in 2021, as generation was about the same. Water use and generation go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. 2021 consumption was 581 megaliters compared to 486 megaliters in 2020. The new GTs are 85%more water efficient than the old steam units. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower."

Facility reference number
Facility 5

Facility name (optional)
Sundance Power Plant

Country/Area & River basin

United States of America	Other, please specify (Pinal Active Management Area)

Latitude
32.927941

Longitude

-111.588993

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Gas

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
259

Comparison of total withdrawals with previous reporting year
Much lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
259

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
1

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
259

Comparison of total consumption with previous reporting year
Much lower

Please explain
Generation at Sundance was much lower in 2021, resulting in much lower water use. 2021 consumption was 259 megaliters compared to 348 megaliters in 2020. Water use and generation go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. Year-to-year changes of less than 5 % are considered "about the same." Year-to-year changes between 5 percent and 15 percent are considered "higher"/"lower." Year-to-year changes over 15 percent are considered "much higher"/"much lower." Sundance is a zero liquid discharge facility with no discharge to surface water, groundwater, or third-party destinations. All water is evaporated or stored on site. However, for the purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for any minor leaks that may occur in the water distribution infrastructure, as 0 does not assume disclosure.

Facility reference number
Facility 6

Facility name (optional)
Saguaro Power Plant

Country/Area & River basin

United States of America	Other, please specify (Tucson Active Management Area)

Latitude
32.553903

Longitude
-111.299829

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Gas

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
37

Comparison of total withdrawals with previous reporting year
Higher

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
37

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
1

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
37

Comparison of total consumption with previous reporting year
Higher

Please explain
Power production at the Saguaro Power Plant was lower in 2021, however water use was higher. 2021 consumption was 37 megaliters compared to 32 megaliters in 2020. Water use and generation usually go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. At Saguaro, however, in 2021, due to low generation and pumping extra water to keep the holding pond liner covered, water use increased while generation decreased. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower." However, for the purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for any minor leaks that may occur in the water distribution infrastructure, as 0 does not assume disclosure.

Facility reference number
Facility 7

Facility name (optional)
Cholla Power Plant

Country/Area & River basin

United States of America	Other, please specify (Joseph City Irrigation Non-expansion Area)

Latitude
34.940654

Longitude
-110.299623

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Coal - hard

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
7741

Comparison of total withdrawals with previous reporting year
Much lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
216

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
7525

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
1

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
7741

Comparison of total consumption with previous reporting year
Much lower

Please explain
Power production at Cholla was much lower in 2021 following the retirement of Unit 4, resulting in much lower water consumption. 2021 consumption was 7,741 megaliters compared to 11,369 megaliters in 2020. Water use and generation go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15 % are considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower." Cholla is a zero liquid discharge facility with no direct discharge to surface water, groundwater, or third-party destinations. All water is evaporated or stored on site. However, for the purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for minor leaks that may occur in the water distribution infrastructure and unquantified losses from unlined ponds, as 0 does not assume disclosure.

Facility reference number
Facility 8

Facility name (optional)
Four Corners Power Plant

Country/Area & River basin

United States of America	Other, please specify (San Juan River Basin)

Latitude
36.685009

Longitude
-108.479176

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Coal - hard

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
21511

Comparison of total withdrawals with previous reporting year
Much lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
21511

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable

0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
2512

Comparison of total discharges with previous reporting year
Much lower

Discharges to fresh surface water
2512

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
18999

Comparison of total consumption with previous reporting year
Much lower

Please explain
Generation was higher at the Four Corners Power Plant in 2021. 2021 consumption was 18,999 megaliters compared to 21,292 megaliters in 2020. Water use and generation usually go hand in hand at our power plants. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. 2021 water intensity at Four Corners was lower than 2020, reversing the expected consumption trend. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% are considered "higher"/"lower." Year- to-year changes over 15% are considered "much higher"/"much lower." For the purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for unquantified losses from current and former unlined ponds, as 0 does not assume disclosure.

Facility reference number
Facility 9

Facility name (optional)
Yucca Power Plant

Country/Area & River basin

United States of America	Other, please specify (Colorado River)

Latitude
32.719722

Longitude
-114.713333

Located in area with water stress
No

Primary power generation source for your electricity generation at this facility
Gas

Oil & gas sector business division
<Not Applicable>

Total water withdrawals at this facility (megaliters/year)
615

Comparison of total withdrawals with previous reporting year
Much lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
0

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
615

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
0

Total water discharges at this facility (megaliters/year)
1

Comparison of total discharges with previous reporting year
About the same

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
0

Discharges to groundwater
1

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
615

Comparison of total consumption with previous reporting year
Much lower

Please explain
Power generation and water consumption at Yucca was much lower in 2021. 2021 consumption was 615 megaliters compared to 778 megaliters in 2020. When generation increases, water use typically increases, and when generation goes down, water use typically goes down. Year-to-year changes of less than 5% are considered "about the same." Year-to-year changes between 5% and 15% were considered "higher"/"lower." Year-to-year changes over 15% are considered "much higher"/"much lower." Yucca is a zero liquid discharge facility with no discharge to surface water, groundwater, or third-party destinations. All water is evaporated or stored on site. However, for the purposes of disclosure, 1 megaliter was entered for discharge to groundwater to account for any minor leaks that may occur in the water distribution infrastructure.

W5.1a

(W5.1a) For the facilities referenced in W5.1, what proportion of water accounting data has been third party verified?

Water withdrawals – total volumes

% verified
76-100

Verification standard used
APS's water withdrawal data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

Water withdrawals – volume by source

% verified
76-100

Verification standard used
APS's water withdrawal data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements ('ISAE') 3000.

Please explain
<Not Applicable>

Water withdrawals – quality by standard water quality parameters

% verified
76-100

Verification standard used
APS's water discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

Water discharges – total volumes

% verified
76-100

Verification standard used
APS's water discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

Water discharges – volume by destination

% verified
76-100

Verification standard used
APS's water discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

Water discharges – volume by final treatment level

% verified
76-100

Verification standard used
APS's water discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

Water discharges – quality by standard water quality parameters

% verified
76-100

Verification standard used
APS's water discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

Water consumption – total volume

% verified
76-100

Verification standard used
APS's water discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000.

Please explain
<Not Applicable>

W6. Governance

W6.1

(W6.1) Does your organization have a water policy?
Yes, we have a documented water policy that is publicly available

W6.1a

(W6.1a) Select the options that best describe the scope and content of your water policy.

	Scope	Content	Please explain
Row 1	Company-wide	Description of business dependency on water Description of business impact on water Description of water-related performance standards for direct operations Description of water-related standards for procurement Reference to international standards and widely-recognized water initiatives Company water targets and goals Commitment to align with public policy initiatives, such as the SDGs Commitments beyond regulatory compliance Commitment to water-related innovation Commitment to stakeholder awareness and education Commitment to water stewardship and/or collective action Recognition of environmental linkages, for example, due to climate change	Water is critical to both generation and to upstream processes in our value-chain that facilitate our direct operations. APS's water policy is grounded in and guided by the APS Water Resources Principles (Principles). The Principles, which are publicly available, demonstrate our commitment to water stewardship and to transparency in our water management practices and strategies. The Principles address water impacts from all operations and detail the Company's water resources management strategies, including the acquisition of water supplies and alternative supplies, water conservation, research and technology, well and pumping reliability, water supply contingencies, and wellfield management plans. The Principles also address water-related innovation, such as water storage and recovery at our facilities. The Principles are designed to guide the Company's decisions regarding climate change impacts such as drought and to identify initiatives and opportunities for enhanced water security. The Principles align with our commitment to become 100% clean and carbon-free by 2050, as we become increasingly reliant on renewable energy resources that require minimal water. In addition, our water usage will decrease substantially when we exit our remaining coal-fired generation facilities at our Cholla and Four Corners Power Plants, in 2025 and 2031 respectively. The Principles also address water conditions more broadly across Arizona. We routinely engage with legislators, regulators and other stakeholders regarding state water policy issues, and we actively participate in the development of new water laws, regulations and policy. Water-related KPIs include targets for annual reductions in usage of non-renewable groundwater. Water stewardship is one of the Company's priorities, and we are committed to practices that go beyond regulatory compliance. For example, the Company has implemented and maintains an Environmental Management System (EMS) based on ISO 14001 principles. We updated the Supplier Code of Conduct to include the Principles to ensure supplier compliance and adherence when doing business with APS. In our bid review process, we evaluate responses from our suppliers against a sustainability weighting.

W6.2

(W6.2) Is there board level oversight of water-related issues within your organization?

Yes

W6.2a

(W6.2a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for water-related issues.

Position of individual	Please explain
Chief Executive Officer (CEO)	The Chairman of the Board, President and Chief Executive Officer of Pinnacle West and Chairman of the Board and Chief Executive Officer Arizona Public Service Company has the highest level of direct responsibility for water strategy and management within our organization. The CEO is responsible to ensure that the Company's Water Resources Principles are appropriately robust to enable us to accomplish our objectives, and that business operations are consistent with the Principles and other water-related environmental policies and plans. The CEO reviews material water strategies and issues throughout the year via the SEC reporting process, Investor Relations reports and presentations, and our Corporate Responsibility Report. Among the issues the CEO considers are the water-related impacts of climate change, drought preparedness and response, anticipated changes in water availability, the increasing costs of water, and Company planning for more water-efficient generation in the future. To support the Human Resources Committee's (HRC) request to develop a carbon reduction metric within to the Long Term Incentive Plan (LTIP), the CEO asked the Sustainability department business to develop some options. In 2021, the Director lead a cross-functional team from across the business to develop and evaluate options and make a recommendation to executive management, including the CEO and other officers. In 2021, our CEO recommended, and the HRC Board subsequently adopted, a new Clean Megawatts (MW) Installed metric that ties a portion of executive long-term incentive compensation to progress towards our Clean Energy Commitment interim milestones. The new Clean MW Installed metric establishes targets and measures performance related to the installation of clean, renewable or other carbon-free resources over a rolling three year average, commencing in 2022. This supports an overall reduction in water use as increased wind and PV solar generation will use minimal water.

W6.2b

(W6.2b) Provide further details on the board's oversight of water-related issues.

	Frequency that water-related issues are a scheduled agenda item	Governance mechanisms into which water-related issues are integrated	Please explain
Row 1	Scheduled - some meetings	Monitoring implementation and performance Overseeing acquisitions and divestiture Overseeing major capital expenditures Reviewing and guiding annual budgets Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding strategy Reviewing innovation/R&D priorities Setting performance objectives	The Board oversees the Company's overall business strategy, including its water strategies. In addition, the Board oversees the Company's risk management function, which encompasses (among other things) water-related risks. Each Board committee receives periodic presentations from management about their assigned risk areas. The Executive Risk Committee, comprised executive level leaders and chaired by the Chief Administrative Officer, are responsible for ensuring the Board receives timely information concerning the Company's material risks and management processes, including those related to water resources. The Finance Committee of the Board reviews and discusses with management the Company's allocation and management of capital and reviews the Company's annual operations and maintenance budget. The Human Resource Committee annually reviews the goals and performance of the officers of the Company and APS and approves corporate goals and objectives relevant to the compensation of the Chief Executive Officer. The Nuclear and Operating Committee receives regular reports from management and monitors the overall performance of Palo Verde and non-nuclear business functions of the Company and APS, including fossil energy generation, energy transmission and delivery, customer service and the Company's sustainability initiatives and strategy.

W6.2d

(W6.2d) Does your organization have at least one board member with competence on water-related issues?

	Board member(s) have competence on water-related issues	Criteria used to assess competence of board member(s) on water-related issues	Primary reason for no board-level competence on water-related issues	Explain why your organization does not have at least one board member with competence on water-related issues and any plans to address board-level competence in the future
Row 1	No, but we plan to address this within the next two years	<Not Applicable>	Important but not an immediate priority	In 2022, we added Sustainability as a board competence skill to gain more understanding of board competence related to environmental matters that can include water-related issues.

W6.3

(W6.3) Provide the highest management-level position(s) or committee(s) with responsibility for water-related issues (do not include the names of individuals).

Name of the position(s) and/or committee(s)

Chief Executive Officer (CEO)

Responsibility

Assessing future trends in water demand
Assessing water-related risks and opportunities
Managing water-related risks and opportunities

Frequency of reporting to the board on water-related issues

Quarterly

Please explain

The CEO reports directly to the Board of Directors and has the highest level of direct responsibility for water within our organization. The CEO reviews water issues and approves proposed changes to our enterprise water strategies four times per year via the SEC reporting process and Investor Relations' reports and presentations. The CEO is provided with reports from facility managers and executives concerning water targets, challenges and strategies, and he updates the Board as needed. Briefings to the CEO in 2021 included the status of the Lower Colorado River Basin Drought Contingency Plan that keeps water in Lake Mead to avoid future shortages on the Colorado River and protect Arizona citizens from water shortages.

W6.4

(W6.4) Do you provide incentives to C-suite employees or board members for the management of water-related issues?

	Provide incentives for management of water-related issues	Comment
Row 1	No, and we do not plan to introduce them in the next two years	

W6.5

(W6.5) Do you engage in activities that could either directly or indirectly influence public policy on water through any of the following?

Yes, direct engagement with policy makers
Yes, trade associations
Yes, funding research organizations

W6.5a

(W6.5a) What processes do you have in place to ensure that all of your direct and indirect activities seeking to influence policy are consistent with your water policy/water commitments?

During the first quarter of each calendar year, management reviews with the Corporate Governance and Public Responsibility Committee (CGPRC) of the Board of Directors its anticipated governmental affairs strategies for the year, including the priorities for the Company's political activities. During the year, management periodically reports to the CGPRC on the execution of Company strategy, including any significant activities not encompassed within the initial strategy discussion. Following each of its meetings, the CGPRC provides a summary to the Board of the matters involving political activities. At least annually, the CGPRC reviews our political participation policy and recommends to the Board any revisions it deems necessary. Some of the entities with whom we engage on water policy issues include the Arizona Department of Water Resources, the Arizona Department of Environmental Quality, the Groundwater Users Advisory Council, statutory special interest groups, the EPRI Water Research Center, the Governor's Water Augmentation Council, and the Kyl Center for Water Policy. If an entity's stated water security position is not consistent with our Water Resources Principles, we discuss internally and engage our Local, State, and Federal Affairs teams and collaborate to develop our internal policy position and a plan to support, stay neutral, or oppose the entity's stance, and we communicate that position to the entity.

W6.6

(W6.6) Did your organization include information about its response to water-related risks in its most recent mainstream financial report?

Yes (you may attach the report - this is optional)

W7. Business strategy

W7.1

(W7.1) Are water-related issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are water-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, water-related issues are integrated	11-15	One of our core objectives is to secure and maintain a reliable and cost-effective supply of water for APS power plants. The cost and sources of water are considered in all long-term purchase agreements. The specific water strategies for each APS power plant, and our broader strategies to increase renewable energy and energy efficiency for the next 15 years are identified in our Integrated Resource Plan (IRP). APS forecasts projected water consumption for 15 years for consistency with our Integrated Resource Planning process, and to enable us to anticipate and react to market changes and generation needs. Water strategies include Palo Verde Nuclear Generating Station and Redhawk Power Plant using treated effluent for cooling water, reducing our use of non-renewable groundwater for power generation, retiring older water-intensive units and replacing them with more efficient units (as was done when hybrid cooling technology was utilized in the new gas turbines at the Ocotillo Power Plant), and reducing fleet-level water intensity as we retire our older coal plants. Additionally, as APS expands its fleet of solar, wind and battery storage infrastructure our overall utilization and consumption of water resources will be substantially reduced.
Strategy for achieving long-term objectives	Yes, water-related issues are integrated	11-15	Our water strategy is defined in our APS Water Resources Principles and is designed to facilitate achievement of our long-term objectives. Our water strategy is focused on water investment, research and technology, water metrics/initiatives, the Well and Pumping Equipment Reliability Program, the Water Supply Contingency Initiative, water intensity, wellfield operations management plans and data collection. APS forecasts projected water consumption for 15 years for consistency with our Integrated Resource Planning process, and to enable us to anticipate and react to market changes and generation needs. Market changes include water pricing, customer growth, economic conditions, and drought, among other things. Generation needs are influenced by increasing demand for electricity, including for example from residential and commercial development and the growth of the electric vehicle industry.
Financial planning	Yes, water-related issues are integrated	11-15	APS's single largest water-related expenditure is our contract to purchase and utilize treated effluent at the Palo Verde Nuclear Generating Station. This contract extends through 2050, and APS has rights of first refusal to renegotiate and extend the contract, if needed. The contract establishes fixed costs through 2025 and provides limits on annual cost increases for the remaining 25 years. Water supplies are guaranteed through 2050 with a defined price ceiling. Capital costs for water infrastructure improvements are identified in the long-range forecast. Proposed well capital replacement projects are identified through the next 10 years, in order ensure the availability of needed capital. APS forecasts projected water consumption for 15 years for consistency with our Integrated Resource Planning process, and to enable us to anticipate and react to market changes and generation needs. Market changes include water pricing, customer growth, economic conditions, and drought, among other things. Generation needs are influenced by increasing demand for electricity, including for example from residential and commercial development and the growth of the electric vehicle industry.

W7.2

(W7.2) What is the trend in your organization's water-related capital expenditure (CAPEX) and operating expenditure (OPEX) for the reporting year, and the anticipated trend for the next reporting year?

Row 1

Water-related CAPEX (+/- % change)

0

Anticipated forward trend for CAPEX (+/- % change)

0

Water-related OPEX (+/- % change)

0

Anticipated forward trend for OPEX (+/- % change)

0

Please explain

Capital expenditures for wells are expected to be $2.5-4.0 million/year in future years. Operating expenses for well maintenance are expected to be $350,000/year. APS developed a well and pumping equipment reliability program in 2017, reducing the number of unplanned equipment failures from five per year in 2015 to zero failures in 2021. As a result, both capital and operating expenditures have levelled, rather than fluctuating from year to year. In 2019, APS implemented a new risk assessment process to identify wells that were no longer used and to prioritize them for abandonment. Eleven of the highest priority wells were immediately abandoned and in 2020, 28 additional wells were abandoned or modified to eliminate risk. In 2021, another 11 wells were abandoned or modified to eliminate risk. Ten to fifteen well abandonments per year are planned for future years.

W7.3

(W7.3) Does your organization use scenario analysis to inform its business strategy?

	Use of scenario analysis	Comment
Row 1	No, but we anticipate doing so within the next two years	APS is working to determine our future resource mix. Our stakeholders are providing us with inputs as we update our Integrated Resource Plan. Although a formal climate-related scenario analysis has not been used to inform our business strategy in the past, we have successfully implemented strategies for reducing the carbon intensity of our electricity generation through our IRP. In addition, the Company is currently soliciting proposals for climate-scenario analysis. In 2020, APS committed to a goal of delivering 100% clean, carbon free electricity by 2050, and we are developing strategies to retire or replace all carbon-based generation by that time. In 2021, the Sustainability department partnered with the Enterprise Risk Management department to perform a bow-tie risk assessment of climate change, for purposes of establishing potential causal links between sources of risk and consequences.

W7.4

(W7.4) Does your company use an internal price on water?

Row 1

Does your company use an internal price on water?

Yes

Please explain

As water supplies continue to contract and demand continues to rise, the cost of new water supplies and/or of extending existing water supply agreements are expected to escalate faster than the rate of inflation. The primary source of water for Central Arizona municipalities is Colorado River water delivered by the Central Arizona Project Canal, and the cost of municipal and industrial water is predicted to increase at a rate of 4 – 8%/year. Additionally, operation of the Water Reclamation Facility at Palo Verde, which treats effluent for use in the plant's operations, adds more than $1.60 per MWh, respectively, to the plant's operation and maintenance costs. These costs are expected to increase to over $2.50 per MWh by 2050, due to increasing costs. To offset these costs, APS is planning to increase reliance on technologies that reduce water use, such as wind and solar, and will expand energy efficiency programs that reduce the need for new, potentially water intensive generation.

W7.5

(W7.5) Do you classify any of your current products and/or services as low water impact?

	Products and/or services classified as low water impact	Definition used to classify low water impact	Primary reason for not classifying any of your current products and/or services as low water impact	Please explain
Row 1	Yes	Power generation that does not consume water	<Not Applicable>	Renewable power, including for example wind and PV solar generation, are examples of low water impact products that APS delivers to customers. Renewable resources in operation include 247 megawatts of facilities owned by APS, 736 megawatts of long-term purchased power agreements, and an estimated 1,235 megawatts of customer-sited, third-party owned distributed energy resources. APS plans to increase clean, carbon-free wind and PV solar generation by 200 MWe of output capacity in 2022.

W8. Targets

W8.1

(W8.1) Describe your approach to setting and monitoring water-related targets and/or goals.

	Levels for targets and/or goals	Monitoring at corporate level	Approach to setting and monitoring targets and/or goals
Row 1	Company-wide targets and goals Business level specific targets and/or goals Site/facility specific targets and/or goals	Targets are monitored at the corporate level Goals are monitored at the corporate level	The Company's approach to setting and monitoring water-related targets and goals is primarily based on three things: the impacts of climate change driven droughts within the State and region; the ongoing, Tier 1 drought declared by the U.S. Bureau of Reclamation and the associated imperative to conserve water to the greatest extent possible; and awareness of the Arizona Department of Water Resources' goals to reduce reliance upon groundwater, a non-renewable water supply that is at risk of depletion. In 2015, APS created a Tier 1 (our highest-level company metric) water metric designed to reduce the quantity of non-renewable groundwater consumed. The goal was to reduce the Company's total consumption of non-renewable groundwater by 8% in 2016, as compared to a 2014 baseline year. The 2021 target was 31% below 2014 levels, and we achieved 33%. APS established these targets because approximately 13 percent of the fleet's water demand in 2021 was supplied from groundwater, and this non-renewable supply is at risk of depletion. Initiatives are underway to conserve groundwater, including early retirement of additional coal units, implementation of well field operations plans, and further development and implementation of renewable energy, distributed generation, and energy efficiency programs. These initiatives were presented to, and approved by, APS management, including managers, directors, and vice presidents. APS plans to reduce the percentage of non-renewable groundwater relied upon by APS plants from 13% of our total water consumption in 2021 to approximately 5% in 2035.

W8.1a

(W8.1a) Provide details of your water targets that are monitored at the corporate level, and the progress made.

Target reference number
Target 1

Category of target
Other, please specify (Absolute reduction of water withdrawals)

Level
Company-wide

Primary motivation
Water stewardship

Description of target
APS created a water metric in 2016 designed to reduce our consumption of non-renewable groundwater, because 15% of the fleet's water usage was supplied from groundwater. In 2016, the target for this metric was an 8 percent reduction from the 2014 baseline. For 2017 the target was a 10% reduction, 2018 was 12% 2019 was 14 % and 2020 was 16%. The target for 2021 was 31% below 2014 consumption, which we exceeded by reducing total groundwater consumption to 33% below 2014. Our long-term goals are to reduce groundwater consumption by 50% over the 2014 baseline by 2025; and to 80% by 2035.

Quantitative metric
Other, please specify (% reduction of water sourced from GW)

Baseline year
2014

Start year
2016

Target year
2035

% of target achieved
32

Please explain
We have reached our targets annually and are 6 years into our 19-year goal, so 32% of the target is achieved.

Target reference number
Target 2

Category of target
Other, please specify (Increase Pumping Equipment Reliability)

Level
Company-wide

Primary motivation
Risk mitigation

Description of target
APS owns and operates 43 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 electrical or mechanical issues, well casing problems, and/or human performance errors. These failures disrupt scheduled maintenance plans, result in unplanned/unbudgeted costs, and could result in loss of water necessary to support generation. Our fleet well reliability rate in 2015 was 90%, equating to five unplanned failures. Water Resource Management established a goal to increase the reliability rate by 2% per year through 2019, resulting in a 98% reliability rate in 2019, equating to one unplanned failure. In 2021, zero unplanned well failures were recorded.

Quantitative metric
Other, please specify (Well and Pumping Equipment Reliability)

Baseline year
2015

Start year
2016

Target year
2021

% of target achieved
100

Please explain
The 2020 result was 98% reliability, meeting the goal of 98% reliability. The 2021 result was 100%, exceeding the goal of 98% reliability.

Target reference number
Target 3

Category of target
Other, please specify (Summertime Equivalent Availability Factor)

Level
Site/facility

Primary motivation
Risk mitigation

Description of target
APS fossil plants have a summertime equivalent availability factor (EAF) target designed to ensure that generation capacity is available during the summer when the greatest power demand exists. To support the plants' EAF goals, Water Resource Management set a 2019 goal to provide water to the fossil plants sufficient to support the EAF target 100% of the time. In other words, well pumping capacity at every plant must always be sufficient to meet peak generation demand on the hottest summer day. In 2020 and again in 2021, the summertime EAF was met 100% of the time.

Quantitative metric
Other, please specify (Summertime EAF)

Baseline year
2018

Start year
2019

Target year
2021

% of target achieved
100

Please explain
The 2021 result was 100% EAF reliability, on-target. A similar goal of 100% was established for 2022.

W8.1b

(W8.1b) Provide details of your water goal(s) that are monitored at the corporate level and the progress made.

Goal
Reduce environmental impact of product in use phase

Level
Company-wide

Motivation
Other, please specify (Reduce Water Intensity Use in Operations)

Description of goal
APS's goal to reduce water intensity is important because it will help reduce our overall water consumption and move us to a more sustainable, water-secure position going forward. It will also help us phase out less efficient operating units, achieving production goals with the least amount of water possible. This will be accomplished by retiring older water intensive units and replacing them with more efficient units, increasing use of solar and wind generation, increasing energy efficiency programs, and implementing water conservation plans at all power plants.

Baseline year
2019

Start year
2020

End year
2035

Progress
The indicators used to assess progress are based on the increased number of megawatts resulting from increasing use of solar and wind generation and the number of older water intensive units that have been retired and replaced with more efficient units. Our goal is to reduce overall Company water intensity by 50% from 2020 levels by 2035. We are on-track to meet this fleet water intensity target, enabled in part by replacing two old steam units at the Ocotillo Power Plant with five quick-start gas turbines that are 85% more efficient than the steam units. In 2022, we plan to install 200 MW of new renewable generating capacity. APS also adopted a new metric that tracks the number of Clean MW Installed over a three-year rolling average, beginning in 2022, which also will improve our water intensity performance.

W9. Verification

W9.1

(W9.1) Do you verify any other water information reported in your CDP disclosure (not already covered by W5.1a)?

Yes

W9.1a

(W9.1a) Which data points within your CDP disclosure have been verified, and which standards were used?

Disclosure module	Data verified	Verification standard	Please explain
W1 Current state	The following water use and discharge data has been verified for CY2021: Palo Verde, Four Corners, Redhawk, Cholla, Ocotillo, Saguaro, Sundance, West Phoenix, and Yucca.	ISAE 3000	APS's water withdrawal and discharge data was verified in accordance with the guidelines set forth in the International Standard on Assurance Engagements (ISAE) 3000. Verification of APS's water data for CY2021 was constructed to provide a reasonable level of assurance.

W10. Sign off

W-FI

(W-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

W10.1

(W10.1) Provide details for the person that has signed off (approved) your CDP water response.

	Job title	Corresponding job category
Row 1	Chairman of the Board, President and Chief Executive Officer, Pinnacle West Capital Corporation & Chairman of the Board and Chief Executive Officer Arizona Public Service Company	Chief Executive Officer (CEO)

W10.2

(W10.2) Please indicate whether your organization agrees for CDP to transfer your publicly disclosed data on your impact and risk response strategies to the CEO Water Mandate's Water Action Hub [applies only to W2.1a (response to impacts), W4.2 and W4.2a (response to risks)].

Yes

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below

I have read and accept the applicable Terms