

**Module: Introduction**

**Page: W0. Introduction**

---

**W0.1**

**Introduction**

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

American Electric Power (AEP) has been providing electric service for more than 100 years and is one of the largest electric utilities in America, serving more than 5.4 million customers in portions of 11 states. AEP ranks among the nation's largest generators of electricity, owning 31,000 megawatts of generating capacity in the U.S. AEP also owns the nation's largest electricity transmission system, a more than 40,000-mile network that includes more 765 kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. AEP's utility units operate as AEP Ohio, AEP Texas, Appalachian Power (in Virginia, West Virginia), AEP Appalachian Power (in Tennessee), Indiana Michigan Power, Kentucky Power, Public Service Company of Oklahoma, and Southwestern Electric Power Company (in Arkansas, Louisiana and east Texas). AEP's headquarters are in Columbus, Ohio.

---

**W0.2**

**Reporting year**

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

Period for which data is reported
Thu 01 Jan 2015 - Thu 31 Dec 2015

---

**W0.3**

### Reporting boundary

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

Companies, entities or groups over which financial control is exercised

---

#### W0.4

##### Exclusions

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

Yes

---

#### W0.4a

##### Exclusions

Please report the exclusions in the following table

Exclusion	Please explain why you have made the exclusion
Corporate and distribution facilities.	Only generation facilities and river operations are included in the disclosure, since these are the only ones with significant exposure to water issues.

---

#### Further Information

**Module: Current State**

**Page: W1. Context**

**W1.1**

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

<b>Water quality and quantity</b>	<b>Direct use importance rating</b>	<b>Indirect use importance rating</b>	<b>Please explain</b>
Sufficient amounts of good quality freshwater available for use	Vital for operations	Important	Adequate water quantity is needed for electric generation facilities and for barge operations; adequate water quality is needed to ensure compliance with water quality standards and for general operations
Sufficient amounts of recycled, brackish and/or produced water available for use	Important		Recycled water is used at generation facilities (direct use) and for gas fracking (indirect use as part of supply chain).

**W1.2**

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

<b>Water aspect</b>	<b>% of sites/facilities/operations</b>	<b>Please explain</b>
Water withdrawals- total volumes	76-100	Only surface water withdrawals from steam electric facilities are reported here, however, groundwater withdrawals are recorded at all generation facilities.
Water withdrawals- volume by sources	76-100	Only surface water discharges from steam electric facilities are reported here, but the discharge volume of each facility is recorded by treatment method as per NPDES permit requirements.
Water discharges- total volumes	76-100	Only surface water discharges from steam electric facilities are reported here, but the discharge quality of each facility is recorded by standard effluent parameters (i.e. pH) as per NPDES permit requirements.

<b>Water aspect</b>	<b>% of sites/facilities/operations</b>	<b>Please explain</b>
Water discharges- volume by destination	76-100	Only surface water discharges from steam electric facilities are reported here.
Water discharges- volume by treatment method	76-100	Only surface water discharges from steam electric facilities are reported here, but the discharge volume of each facility is recorded by treatment method as per NPDES permit requirements.
Water discharge quality data- quality by standard effluent parameters	76-100	Only surface water discharges from steam electric facilities are reported here, but the discharge quality of each facility is recorded by standard effluent parameters (i.e. pH) as per NPDES permit requirements.
Water consumption- total volume	76-100	Only surface water discharges from steam electric facilities are reported here and water consumption is not a required measurement, however, it is estimated based on facility design flows.
Facilities providing fully-functioning WASH services for all workers	76-100	

**W1.2a**

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

<b>Source</b>	<b>Quantity (megaliters/year)</b>	<b>How does total water withdrawals for this source compare to the last reporting year?</b>	<b>Comment</b>
Fresh surface water	8557961	Lower	Value is for the entire AEP steam electric fleet. It is lower due to numerous plant retirements which occurred during 2015.
Brackish surface water/seawater		Not applicable	
Rainwater		Not applicable	
Groundwater - renewable		Not applicable	

Source	Quantity (megaliters/year)	How does total water withdrawals for this source compare to the last reporting year?	Comment
Groundwater - non-renewable		Not applicable	
Produced/process water		Not applicable	
Municipal supply		Not applicable	
Wastewater from another organization		Not applicable	
Total	8557961	Lower	Value is for the entire AEP steam electric fleet. It is lower due to numerous plant retirements which occurred during 2015

**W1.2b**

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

Destination	Quantity (megaliters/year)	How does total water discharged to this destination compare to the last reporting year?	Comment
Fresh surface water	8276332	Lower	Value is for the entire AEP steam electric fleet. It is lower due to numerous plant retirements which occurred during 2015
Brackish surface water/seawater		Not applicable	
Groundwater		Not applicable	
Municipal/industrial wastewater treatment plant		Not applicable	
Wastewater for another organization		Not applicable	
Total	8276332	Lower	Value is for the entire AEP steam electric fleet. It is lower due to

Destination	Quantity (megaliters/year)	How does total water discharged to this destination compare to the last reporting year?	Comment
			numerous plant retirements which occurred during 2015

**W1.2c**

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

Consumption (megaliters/year)	How does this consumption figure compare to the last reporting year?	Comment
287870	Lower	Value is lower due to numerous plant retirements which occurred during 2015

**W1.3**

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

Yes

**W1.3a**

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

Proportion of suppliers %	Total procurement spend %	Rationale for this coverage
76-100		Many critical suppliers are queried on their water use. Potential solutions, as well as the need for possible assistance, are identified.

---

**W1.3b**

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

Primary reason	Please explain
----------------	----------------

---

**W1.4**

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

Yes

---

**W1.4a**

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

Country	River basin	Impact indicator	Impact	Description of impact	Length of impact	Overall financial impact	Response strategy	Description of response strategy
United States of America	Mississippi River	Phys-Declining water quality Phys-Flooding	Closure of operations	Due to flooding in the Red River basin during 2015, it became necessary to alter operations and limit generation at the AEP Turk Plant. The US Corps of Engineers held back significant amounts of water; however, upon release, which was rapid, water quality deteriorated, forcing an unscheduled 2-week outage at the plant.	weeks	Confidential Business Information	Engagement with public policy makers Engagement with other stakeholders in the river basin	A consultant was engaged to substantiate the water quality deterioration. In addition, AEP staff have joined with a local municipality to discuss the problem with the Corp of Engineers and to seek a resolution to prevent future events.
United States of America	Mississippi River	Reg-Regulation of discharge quality/volumes leading to higher compliance costs Reg-Regulatory uncertainty Rep-Community opposition	Higher operating costs	On September 30, 2015, USEPA finalized a rule revising the regulations for the Steam Electric Power Generating category. The rule sets strict limits on the discharge of pollutants in flue gas desulfurization waste water and prohibits the discharge of coal ash transport water. The new requirements directly affect 12 AEP facilities and compliance costs will be in the millions of dollars.	years	Confidential Business Information	Engagement with public policy makers Increased capital expenditure Increased investment in new technology	AEP will comply with the new requirements in the most cost effective and technologically advanced manner possible.
United States of America	Mississippi River	Phys-Drought Phys-Flooding	Plant/production disruption leading to reduced output	Continuing drought since 2011 has resulted in deteriorating water quality which has resulted in more cooling tower blowdown and a faster filling of the Oklaunion Plant evaporation ponds. The plant took a one	4 years	Confidential Business Information	Engagement with other stakeholders in the river basin Infrastructure investment	Construction of new evaporation pond to supplement existing capacity.



Country	River basin	Impact indicator	Impact	Description of impact	Length of impact	Overall financial impact	Response strategy	Description of response strategy
				month outage in the fall to conserve evaporation pond capacity; however, flooding during May required ongoing high cooling tower blowdown rates.				

W1.4b

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

Primary reason	Future plans
----------------	--------------

**Further Information**

**Module: Risk Assessment**

**Page: W2. Procedures and Requirements**

W2.1

Does your organization undertake a water-related risk assessment?

Water risks are assessed

**W2.2**

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

Risk assessment procedure	Coverage	Scale	Please explain
Water risk assessment undertaken independently of other risk assessments	Direct operations and supply chain	All facilities	AEP reports extensively on its water use and consumption and associated risks and mitigation efforts in its annual GRI report (see attached report). Data on water use are collected on a per plant basis in response to the annual FERC and GRI reporting questions. Discharge data are collected from NPDES discharge monitoring reports, which are also compiled on a per plant basis.

**W2.3**

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

Frequency	Geographic scale	How far into the future are risks considered?	Comment
Annually	Facility	1 to 3 years	Varies from one to two years during drought conditions.
Annually	Region	>6 years	Texas requires five- and ten-year water conservation goals to be included in company water conservation plan.
Annually	Region	>6 years	State agency or industry groups periodically forecast water demands for their states that may look ahead as far as 50 years. Texas and Indiana have undertaken such reviews.
Sporadically not defined	Region	3 to 6 years	Texas, Oklahoma and Arkansas have updated their State water plans, which includes evaluations of regional water demands.

---

**W2.4**

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

Yes, evaluated over the next 5 years

---

**W2.4a**

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

When new generation facilities are planned, models are used to forecast the availability of adequate water. For example, such assessments were conducted prior to the construction of the Turk (Arkansas) and Stall (Louisiana) plants. Electric generation forecasts are also used to predict the need for water. For AEP hydro operations, most facilities operate as run-of-river and thus are operated to match inflow. Therefore, water availability to determine future generation is not forecasted. Adjustments are made based upon USGS river gauge information. If weather forecasts indicate the potential for a significant rain event three to seven days out, those forecasts will be followed and plans will be made to modify plant operations to adapt to the expected increases in inflow and, at a few plants, provide mitigation to downstream flooding potential.

---

**W2.4b**

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

Main reason	Current plans	Timeframe until evaluation	Comment

---

**W2.5**

**Please state the methods used to assess water risks**

Method	Please explain how these methods are used in your risk assessment
Internal company knowledge Regional government databases WRI Aqueduct Other: U.S. Department of Agriculture Drought Maps	

**W2.6**

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

Issues	Choose option	Please explain
Current water availability and quality parameters at a local level	Relevant, included	Water availability is an issue for some western fleet facilities, particularly those in drought-prone areas.
Current water regulatory frameworks and tariffs at a local level	Relevant, included	Regulatory compliance is a corporate goal for all facilities; during drought conditions, the lack of water can make it difficult to fully utilize water rights.
Current stakeholder conflicts concerning water resources at a local level	Relevant, included	During drought conditions, the lack of water can make it difficult to fully utilize water rights; in addition, concerns about threatened and endangered species can limit access to water.
Current implications of water on your key commodities/raw materials	Relevant, not yet included	Sufficient river water levels are needed for coal and limestone barges; gas fracking also requires significant quantities of water.
Current status of ecosystems and habitats at a local level	Relevant, included	Compliance with all water quality standards at all facilities is a corporate goal; construction projects can be limited or curtailed due to wetland or threatened or endangered species impacts, which are very much a concern of many stakeholder groups.
Current river basin management plans	Relevant,	AEP is a sponsor of the EPRI Ohio River Ecological Research Program and a member of

Issues	Choose option	Please explain
	included	ORSANCO, both of which evaluate the health of fish populations in the Ohio River.
Current access to fully-functioning WASH services for all employees	Relevant, included	Fully-functioning WASH services are provided to all employees.
Estimates of future changes in water availability at a local level	Relevant, included	Water availability is expected to become a growing issue for some western fleet facilities, particularly those in drought-prone areas.
Estimates of future potential regulatory changes at a local level	Relevant, included	Regulatory compliance is a corporate goal for all facilities; during drought conditions, the lack of water can make it difficult to fully utilize water rights; current (316b) and (steam electric effluent guidelines) EPA regulations will affect access to, and use of, water.
Estimates of future potential stakeholder conflicts at a local level	Relevant, included	During drought conditions, the lack of water can make it difficult to fully utilize water rights; in addition, concerns about threatened and endangered species can limit access to water. These issues are expected to grow in the near future.
Estimates of future implications of water on your key commodities/raw materials	Relevant, not yet included	Sufficient river water levels are needed for coal and limestone barges; gas fracking also requires significant quantities of water.
Estimates of future potential changes in the status of ecosystems and habitats at a local level	Relevant, included	Compliance with all water quality standards at all facilities is a corporate goal; construction projects can be limited or curtailed due to wetland or threatened or endangered species impacts, which are very much a concern of many stakeholder groups and expected to grow in the future.
Scenario analysis of availability of sufficient quantity and quality of water relevant for your operations at a local level	Relevant, included	The WRI Aqueduct and the US Drought Monitor maps were used to assess water risks for the AEP fleet, particularly those in the western part of the country.
Scenario analysis of regulatory and/or tariff changes at a local level	Not evaluated	scenario analysis not done
Scenario analysis of stakeholder conflicts concerning water resources at a local level	Not evaluated	scenario analysis not done
Scenario analysis of implications of water on your key commodities/raw materials	Not relevant, included	scenario analysis not done
Scenario analysis of potential changes in the status of ecosystems and habitats at a local level	Relevant, not yet included	scenario analysis not done
Other	Not evaluated	scenario analysis not done

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

Stakeholder	Choose option	Please explain
Customers	Not evaluated	
Employees	Not evaluated	
Investors	Relevant, included	Investors are informed of water issues through the company's annual Corporate Accountability Report, which includes references to the company's GRI and CDP reports.
Local communities	Relevant, included	Local communities are often involved in discussions regarding water availability, particularly for recreational uses.
NGOs	Relevant, included	AEP frequently engages NGOs to discuss water-related issues.
Other water users at a local level	Relevant, included	Local communities are often involved in discussions regarding water availability, particularly for recreational uses. Other water use sectors (water supply, agriculture) may also be discussed.
Regulators	Relevant, included	It is a corporate goal to always comply with water quality standards and the company works with local, state and federal regulators to achieve this goal.
River basin management authorities	Relevant, included	AEP is a member of the Ohio River Valley Sanitation Commission's (ORSANCO) Power Industry Advisory Committee. While the Commission does not address water quantity issues, it does address water quality in the Ohio River. AEP also participates in regional water planning organizations that cover western and northeastern Texas, Arkansas, and the Illinois River watershed.
Statutory special interest groups at a local level	Not evaluated	
Suppliers	Not evaluated	
Water utilities/suppliers at a local level	Not evaluated	
Other	Not evaluated	

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

Primary reason	Please explain
----------------	----------------

---

**Further Information**

AEP reports extensively on water in its annual GRI report (attached).

---

**Attachments**

[https://www.cdp.net/sites/2016/89/689/Water 2016/Shared Documents/Attachments/Water2016/W2.ProceduresandRequirements/2016 GRI - AEP.pdf](https://www.cdp.net/sites/2016/89/689/Water%202016/Shared%20Documents/Attachments/Water2016/W2.ProceduresandRequirements/2016%20GRI%20-%20AEP.pdf)

**Module: Implications****Page: W3. Water Risks**

---

**W3.1**

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

Yes, direct operations and supply chain

---

**W3.2**

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

Capital and O&M expenses to comply with water-related regulations; closure of facilities and load curtailment at others in response to water-related regulations or water stressors (scarcity, flooding, etc.). Assessment is limited to the steam-electric facilities utilizing surface water withdrawals (excluding ground water sources and hydroelectric facilities) in the Mississippi and Sabine watersheds that fall within the WRI Aqueduct med-high overall water risk areas or the US drought map moderate to exceptional drought areas. The WRI Aqueduct overall water risk identifies areas with higher exposure to water-related risks and is an aggregated measure of all selected indicators from the Physical Quantity, Quality and Regulatory & Reputational Risk categories and was utilized with an "electric power" weighting scheme.

**W3.2a**

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

Country	River basin	Number of facilities exposed to water risk	Proportion of total operations (%)	Comment
United States of America	Mississippi River	10	21-30	Number of steam-electric facilities utilizing surface water withdrawals (excluding ground water sources and hydroelectric facilities) in the Mississippi watershed that fall within the WRI Aqueduct med-high water risk areas or the US drought map moderate to exceptional drought areas. Proportion of operation affected based on % generation during 2015.
United States of America	Sabine River	2	1-5	Number of steam-electric facilities utilizing surface water withdrawals (excluding ground water sources and hydroelectric facilities) in the Sabine watershed that fall within the WRI Aqueduct med-high water risk areas or the US drought map moderate to exceptional drought areas. Proportion of operation affected based on % generation during 2015. Sabine River facilities were not affected during 2015.

**W3.2b**

**Please provide the proportion of financial value that could be affected at river basin level associated with the facilities listed in W3.2a**



Country	River basin	Financial reporting metric	Proportion of chosen metric that could be affected within the river basin	Comment
United States of America	Mississippi River	% generation capacity	21-30	The majority of the company's 2015 steam electric generation is within the Mississippi River watershed and withdrawals surface water, however, only 12 are in drought prone or water "stressed" areas.

**W3.2c**

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

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
United States of America	Mississippi River	Physical-Increased water scarcity	Higher operating costs	AEP steam electric facilities are exposed to water risks, however, based on the WRI Aqueduct Tool and US Drought maps, 12 are located	Current-up to 1 year	Probable	High	Increased investment in new technology	unknown	AEP participated in a research project with the Electric Power Research Institute to develop, test and deploy efficient,

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
				<p>in “stressed” areas within the Mississippi and Sabine watersheds and exposed to risks that could generate a substantive change in business operations. Increasing demand for water can create uncertainties and pressure on the power sector. This could be a future business risk because of the need for water to produce electricity and an expected increase in the need for water in areas in which we operate.</p>						<p>advanced cooling technologies. As a general rule, we apply a water consumption metric of 0.35 gal/kwh for once-thru cooled facilities and 0.70 gal.kwh for closed cycle facilities; for simple cycle, fossil steam turbines w/once-thru cooling, a water use metric of 20,000 to 50,000 gal/MWH is followed; there is a focus on maximizing operating efficiency, which in turn helps reduce the amount of water that is used for</p>

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										<p>cooling and other purposes. We also consider water consumption in evaluating pollution control technology. For example, a “wet” SO2 scrubber will consume more water than a “dry” scrubber. We are investigating opportunities to reduce water use as address new regulatory requirements; for example, wet fly ash disposal facilities are being converted to dry fly ash operations ,which will result in significant</p>

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										water use reductions.
United States of America	Mississippi River	Regulatory-Mandatory water efficiency, conservation, recycling or process standards	Higher operating costs	In Texas, AEP operates four steam electric facilities within the Mississippi River basin. The installation of required efficiencies at the western facilities results in capital and O&M expenses.	Current-up to 1 year	Highly probable	Low	Increased investment in new technology	unknown	AEP annually files a Water Conservation Plan for power plants located in the state of Texas and installs required water efficiency devices. Examples include water reuse devices, low flow fixtures, air cooled generators, water recirculation devices, reverse osmosis units, ultra filters and dry ash conveyance.
United States of America	Mississippi River	Regulatory-Regulation of discharge quality/volumes leading to higher	Higher operating costs	The production of electricity can affect the quality of surface water	Current-up to 1 year	Highly probable	High	Increased investment in new technology	unknown, but high (millions of dollars)	We have invested heavily in water treatment systems to

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
		compliance costs		and groundwater through precipitation runoff, infiltration and collection of wastewater for treatment. States protect surface waters through a National Pollutant Discharge Elimination System (NPDES) permit process. Exceedances of permit effluent limits can result in violations and fines. Required treatment systems cost millions of dollars.						ensure we comply with our NPDES permits and we have an extensive groundwater monitoring program to help us detect adverse impacts to water quality. Our design and construction practices for new landfills typically include composite liners, leachate collection systems and groundwater monitoring wells. We proactively added an additional synthetic liner to the landfill that serves the John W. Turk,

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										Jr., ultra-supercritical coal plant in southwest Arkansas. This will bring the design up to the level included in the EPA's proposed coal combustion residuals rule
United States of America	Mississippi River	Regulatory- Unclear and/or unstable regulations on water allocation and wastewater discharge	Higher operating costs	EPA has finalized new 316b regulations that govern cooling water intake structures and has revised the steam electric effluent guidelines that require the installation of new water treatment technologies at power plants. Due to the uncertainty	1-3 years	Highly probable	High	Increased investment in new technology	unknown, but modest(millions of dollars)	We agree that appropriate and cost-effective measures can be taken to reduce impacts to aquatic life from cooling water intake structures but believe that, for many plants, the impacts are small. Due to the uncertainty of meeting the new 316b fish mortality

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
				of meeting the fish mortality standards, AEP will need to install new technologies to meet a water intake velocity standard, which could cost up to \$10 million per affected facility. Similar investment will be required to meet the new effluent guideline requirements.						standard, AEP will implement new technologies to meet a 0.5 fps water intake velocity standard. The agency has finalized a rule that lays out a process for a site-specific review of technology choices. With regards to the new effluent guidelines, AEP is installing new water treatment technologies now and is allowing room for additional installations as required.
United States of America	Mississippi River	Regulatory-Statutory water withdrawal limits/changes to water	Higher operating costs	In Texas, AEP operates six steam electric facilities (four in the	Current-up to 1 year	Probable	Medium	Increased investment in new technology	unknown, but high (millions of dollars)	AEP is installing more water efficient devices where it is

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
		allocation		Mississippi watershed). Water is critical to their operation for steam production and plant cooling purposes. Mandatory limits on water withdrawals would require the installation of expensive water-saving technologies, such as dry scrubbers, dry cooling towers or dry ash disposal.						appropriate. For example, AEP will be installing "dry" pollution control systems at some facilities to comply with new air emissions control requirements.
United States of America	Mississippi River	Reputational-Litigation	Delays in permitting	AEP power plants can withdraw billions of gallons of water per day. Such withdrawals can stress aquatic systems. While such	Current-up to 1 year	Probable	High	Engagement with public policy makers	unknown but high (millions of dollars)	Water quality, use and management are important issues to our industry. While our industry faces new rules related to the Clean Water Act, we are proactively



Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
				<p>impacts are rare and most of the water is returned to the system, the general public often believes that power plant operations have a negative impact on water bodies. The public can object to permits for new or existing facilities. Delays in obtaining permits incur additional costs. Associated legal expenses can become significant.</p>						<p>taking steps to reduce our water consumption, improve water quality and address availability issues in drought-prone regions. The retirement of several once-through cooled facilities during 2015 has dramatically reduced the amount of water "used" at AEP power plants.</p>

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

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
United States of America	Mississippi River	Physical-Inadequate infrastructure	Higher operating costs	More than half of the operational lock chambers run by the U.S. Army Corps of Engineers on inland waterways are over 50 years old. AEP relies on barges to deliver coal. Increasing maintenance on this system has affected our ability to deliver coal to our power plants on time. For example, coal delivery costs increased \$1.7 million as a result of failure of just one facility in 2010.	Current-up to 1 year	Probable	High	Infrastructure investment	Unknown but high (millions of dollars)	The U.S. Army Corps of Engineers, which maintains and operates the inland waterways, recognizes the problem, but has not received adequate funding from Congress to address it. AEP supports the Water Resource and Reform Development Act of 2014, which required the Corps, working with the Inland Waterway Users Board, to draft a new 20-year Capital Development Plan. This plan, which is now called the Capital Investment Strategy, was completed and reviewed by the Assistant Secretary

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
										of the Army and the Office of Management and Budget for approval/revisions. AEP anticipates that infrastructure projects should be started and completed within the next 7-9 years. AEP also works with the American Waterway Operators group, an industry lobbying group which represents our interests.
United States of America	Mississippi River		Other: Constraint to future growth.	The development of shale gas has made natural gas an economically viable fuel source for AEP generating units; however, the drilling of these gas wells requires large amounts of water. During these	1-3 years	Probable	High	Supplier diversification	unknown	AEP is transitioning its generation fleet to take advantage of the benefits of shale gas; however, it will maintain a balanced portfolio that utilizes several energy sources, including coal, gas, renewables, energy efficiency, nuclear, solar and hydro. Maintaining a balanced generation portfolio helps to

Country	River basin	Risk driver	Potential impact	Description of impact	Timeframe	Likelihood	Magnitude of potential financial impact	Response strategy	Costs of response strategy	Details of strategy and costs
				operations, there is a risk of contaminating local underground sources of drinking water. Improper discharge of waste waters can also negatively impact surrounding surface waters. As a result, regulators are considering restrictions, which would lead to increased costs for this important fuel source.						minimize the impacts of a changing energy infrastructure. If shale gas development is slowed, it could affect the electric sector's reliance on gas and create price volatility for customers and potentially affect system reliability.

W3.2e

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

Primary reason	Please explain
----------------	----------------

---

W3.2f

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

Primary reason	Please explain
----------------	----------------

---

W3.2g

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

Primary reason	Future plans
----------------	--------------

---

**Further Information**

**Page: W4. Water Opportunities**

---

W4.1

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

Yes

**W4.1a**

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

Country or region	Opportunity	Strategy to realize opportunity	Estimated timeframe	Please explain
United States of America	Improved water efficiency Innovation Regulatory changes	Water stress in the western U.S. and changing regulations present two opportunities for AEP to benefit from market opportunities. In the west, trading water rights with farmers may be an effective alternative to finding new sources of water. It is often more cost effective for a farmer to sell water rights, if only for one year, than to grow crops that may fail. AEP would benefit from access to necessary water at a lower cost than developing new water sources. In the east, new regulations are resulting in the closure of many once-thru cooled power plants. AEP's water withdrawals and consumption have dropped dramatically during 2015 greatly reducing the company's exposure to water issues.	1-3 years	Droughts occur on an annual basis and the plant closures will occur during 2015, hence the 1-3 year timeframe.

**W4.1b**

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

Primary reason	Please explain
----------------	----------------

W4.1c

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

Primary reason	Please explain

Further Information

**Module: Accounting**

**Page: W5. Facility Level Water Accounting (I)**

W5.1

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

Facility reference number	Country	River basin	Facility name	Total water withdrawals (megaliters/year) at this facility	How does the total water withdrawals at this facility compare to the last reporting year?	Please explain
Facility 1	United States of America	Mississippi River	Arsenal Hill-Stall	2279	Lower	changes in fleet dispatch
Facility 2	United States of	Mississippi	Comanche	2730	Higher	changes in fleet

Facility reference number	Country	River basin	Facility name	Total water withdrawals (megaliters/year) at this facility	How does the total water withdrawals at this facility compare to the last reporting year?	Please explain
	America	River				dispatch
Facility 3	United States of America	Sabine River	Knox Lee	367986	Higher	changes in fleet dispatch
Facility 4	United States of America	Mississippi River	Lieberman	39736	Much lower	changes in fleet dispatch
Facility 5	United States of America	Mississippi River	Lone Star	7451	Much higher	changes in fleet dispatch
Facility 6	United States of America	Mississippi River	Oklaunion	4599	Lower	changes in fleet dispatch
Facility 7	United States of America	Sabine River	Pirkey	563196	Lower	changes in fleet dispatch
Facility 8	United States of America	Mississippi River	Rockport	29408	Much lower	changes in fleet dispatch
Facility 9	United States of America	Mississippi River	Southwestern	1960	Much lower	changes in fleet dispatch
Facility 10	United States of America	Mississippi River	Turk	6216	Much lower	changes in fleet dispatch
Facility 11	United States of America	Mississippi River	Welsh	1344899	About the same	changes in fleet dispatch
Facility 12	United States of America	Mississippi River	Wilkes	414799	About the same	changes in fleet dispatch

#### Further Information

Page: **W5. Facility Level Water Accounting (II)**

W5.1a



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

Facility reference number	Fresh surface water	Brackish surface water/seawater	Rainwater	Groundwater (renewable)	Groundwater (non-renewable)	Produced/process water	Municipal water	Wastewater from another organization	Comment
Facility 1	2279								
Facility 2								2730	Treated water from Lawton, OK POTW
Facility 3	367986								
Facility 4	39736								
Facility 5	7451								
Facility 6	4599								
Facility 7	563196								
Facility 8	29408								
Facility 9	1960								
Facility 10	6216								
Facility 11	1344899								
Facility 12	414799								

**W5.2**

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

Facility reference number	Total water discharged (megaliters/year) at this facility	How does the total water discharged at this facility compare to the last reporting year?	Please explain
---------------------------	---	--	----------------

Facility reference number	Total water discharged (megaliters/year) at this facility	How does the total water discharged at this facility compare to the last reporting year?	Please explain
Facility 1	2211	Much lower	changes in fleet dispatch
Facility 2	2683	About the same	changes in fleet dispatch
Facility 3	367881	Higher	changes in fleet dispatch
Facility 4	39730	Much lower	changes in fleet dispatch
Facility 5	7451	Much higher	changes in fleet dispatch
Facility 6	0	About the same	changes in fleet dispatch
Facility 7	558172	About the same	changes in fleet dispatch
Facility 8	10056	Lower	changes in fleet dispatch
Facility 9	970	Lower	changes in fleet dispatch
Facility 10	269	About the same	changes in fleet dispatch
Facility 11	1333780	About the same	changes in fleet dispatch
Facility 12	412578	About the same	changes in fleet dispatch

**W5.2a**

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

Facility reference number	Fresh surface water	Municipal/industrial wastewater treatment plant	Seawater	Groundwater	Wastewater for another organization	Comment
Facility 1	2211					
Facility 2	2683					
Facility 3	367881					
Facility 4	39730					
Facility 5	7451					
Facility 6	0					

Facility reference number	Fresh surface water	Municipal/industrial wastewater treatment plant	Seawater	Groundwater	Wastewater for another organization	Comment
Facility 7	558172					
Facility 8	10056					
Facility 9	970					
Facility 10	269					
Facility 11	1333780					
Facility 12	412578					

### W5.3

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

Facility reference number	Consumption (megaliters/year)	How does this compare to the last reporting year?	Please explain
Facility 1	68	Much lower	changes in fleet dispatch
Facility 2	47	About the same	changes in fleet dispatch
Facility 3	320	About the same	changes in fleet dispatch
Facility 4	54	About the same	changes in fleet dispatch
Facility 5	3	About the same	changes in fleet dispatch
Facility 6	4599	Much lower	changes in fleet dispatch
Facility 7	6709	About the same	changes in fleet dispatch
Facility 8	19352	Much lower	changes in fleet dispatch
Facility 9	990	Much lower	changes in fleet dispatch
Facility 10	5946	Lower	changes in fleet dispatch
Facility 11	13029	About the same	changes in fleet dispatch
Facility 12	2226	About the same	changes in fleet dispatch

---

**W5.4**

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

Water aspect	% verification	What standard and methodology was used?
Water withdrawals- total volumes	76-100	FERC reporting
Water withdrawals- volume by sources	76-100	NPDES permitting
Water discharges- total volumes	76-100	NPDES permitting
Water discharges- volume by destination	76-100	NPDES permitting
Water discharges- volume by treatment method	76-100	NPDES permitting
Water discharge quality data- quality by standard effluent parameters	76-100	NPDES permitting
Water consumption- total volume	Not verified	

---

**Further Information**

**Module: Response**

**Page: W6. Governance and Strategy**

---

**W6.1**

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

Highest level of direct responsibility for water issues	Frequency of briefings on water issues	Comment
Senior Manager/Officer	Other: Bi-weekly	AEP's Vice President of Environmental Services has direct responsibility for water quality and quantity issues within the company. He is briefed on all water-related issues as they arise and is regularly kept apprised on a regular basis, not less than every other week.

**W6.2**

**Is water management integrated into your business strategy?**

Yes

**W6.2a**

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

Influence of water on business strategy	Please explain
Greater due diligence	AEP's corporate environmental compliance goal, including compliance with water requirements, is a key part of its business strategy. Potential changes to water regulatory programs have, for many years, been included in the company's long-term capital forecast, which includes our best assessment of the financial exposure due to water-related issues. This forecast is incorporated into our business strategy and communicated to the investment community.
Water management incentives established for employees	AEP's corporate environmental compliance goal, including compliance with water requirements, is a key part of its business strategy.
Water management incentives established for senior management	AEP's corporate environmental compliance goal, including compliance with water requirements, is a key part of its business strategy.

Influence of water on business strategy	Please explain
Water resource considerations are factored into location planning for new operations	Non-water dependent transmission and generation (solar, wind) facilities are located to minimize any physical impacts to water (spills, wetland impacts, etc.).

**W6.2b**

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

Influence of water on business strategy	Please explain
Closure of operations	Partially due to the impact of water-related regulations (316(b) and steam electric effluent guidelines), facilities have been retired.
Increased capital expenditure	Due to the impact of water-related regulations (316(b) and steam electric effluent guidelines), water-treatment or water intake facilities will need to be retrofitted or installed.

**W6.2c**

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

Primary reason	Please explain

---

**W6.3**

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

Yes

---

**W6.3a**

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

<b>Content</b>	<b>Please explain why this content is included</b>
Publicly available Company-wide Performance standards for direct operations Incorporated within group environmental, sustainability or EHS policy Acknowledges the human right to water, sanitation and hygiene	AEP has management systems, policies and environmental experts in place to achieve its goal of zero environmental enforcement actions. The company is proactive in its efforts to protect people and the environment by committing to: maintain compliance with all applicable environmental requirements while pursuing the spirit of environmental stewardship; ensure that people working for or on behalf of AEP understand and integrate environmental responsibilities into their business functions; and support continual improvement of environmental performance and pollution prevention. AEP also locates and develops facilities to minimize any physical impacts to water (spills, wetland impacts, etc.).

---

**W6.4**

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

Water CAPEX (+/- % change)	Water OPEX (+/- % change)	Motivation for these changes
		This information is not collected by AEP.

## Further Information

### Page: W7. Compliance

#### W7.1

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

Yes, not significant

#### W7.1a

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

Facility name	Incident	Incident description	Frequency of occurrence in reporting year	Financial impact	Currency	Incident resolution
Big Sandy	Fine	For 2015, there was an enforcement action related to the Big Sandy waste water sewage treatment system, which involved a 2014 incident.	1	4000	USD(\$)	Fine was paid and incident was resolved with the Kentucky Department of Environmental Protection. It was an isolated event and the water treatment system was ultimately replaced with a system that has no surface water discharge.



---

**W7.1b**

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

2%

---

**W7.1c**

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

Impact as % of OPEX	Comparison to last year
0	No change

---

**Further Information**

The \$4000 fine is so small relative to AEP's annual operating expenses that it is well below 1%, hence a value of zero percent has been reported. Generation at the Big Sandy Plant represented 2% of AEP's total MWH production for the year.

**Page: W8. Targets and Initiatives**

---

**W8.1**

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

Yes, targets and goals

**W8.1a**

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

Category of target	Motivation	Description of target	Quantitative unit of measurement	Base-line year	Target year	Proportion of target achieved, % value
Water pollution prevention	Risk mitigation	AEP's water use is primarily regulated under environmental statutes such as the Clean Water Act. As such, AEP's formal environmental policy applies and acts as AEP's water policy. In addition to a target of zero environmental enforcement actions, the company undertakes additional water-related activities intended to improve and protect water quality. For example, the company is funding EPRI-related research to improve methods of treating FGD waste waters.	Other: 100% compliance and no violations	2014	2015	99%
Absolute reduction of water withdrawals	Risk mitigation	AEP's water use is primarily regulated under environmental statutes such as the Clean Water Act, but it is very much dependent on water availability. The company makes efforts to improve water efficiencies and to recycle water where possible to reduce discharges and mitigate water availability risks. Tracking water withdrawals per MWhr produced is a primary goal. This information has been reported in our GRI submittals since 2010.	% reduction per unit of production	2010	2015	100%
Community engagement	Water stewardship	A primary AEP goal is to "conduct research on the environmental effects of power generation and energy delivery on water and ecological resources." AEP has sponsored research on Ohio River fisheries for over 40 consecutive years.	Other: Consistant support of water-related R&D.	1970	2015	100%

**W8.1b**

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

Goal	Motivation	Description of goal	Progress
Watershed remediation and habitat restoration, ecosystem preservation	Water stewardship	A primary AEP goal is to “conduct research on the environmental effects of power generation and energy delivery on water and ecological resources.” During 2015, AEP sponsored organizations such as Living Lands and Waters ( <a href="http://livinglandsandwaters.org/">http://livinglandsandwaters.org/</a> ), Nature Conservancy of KY, Friends of Smith Mountain Lake, Friends of St. Joseph River, and many other organizations affiliated with water protection.	AEP is a member of the Electric Power Research Institute and has sponsored environmental organizations, such as Lands and Waters ( <a href="http://livinglandsandwaters.org/">http://livinglandsandwaters.org/</a> ), Nature Conservancy of KY, Friends of Smith Mountain Lake, Friends of St. Joseph River, and many other organizations affiliated with water protection.
Watershed remediation and habitat restoration, ecosystem preservation	Water stewardship	A primary AEP goal is to protect water and ecological resources. At the AEP Flint Creek Plant, the Eagle Watch and Nature Trail, which was established in 1999, is a 65-acre area on the upper end of SWEPCO Lake designated by SWEPCO as a nature area open to the public year round.	The AEP Flint Creek Eagle Watch Pavilion <a href="https://www.swepco.com/environment/EagleWatch.aspx">https://www.swepco.com/environment/EagleWatch.aspx</a> received a 2015 Pollinator Advocate Award from the Wildlife Habitat Council

#### W8.1c

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

#### Further Information

**Module: Linkages/Tradeoff**

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

#### W9.1

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

Yes

**W9.1a**

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

Environmental issues	Linkage or trade-off	Policy or action
Water-energy nexus	Linkage	AEP fully understands the linkage between water and energy. As a power generator, AEP requires large quantities of water to produce electricity and electricity is needed to acquire, treat and distribute water. New technologies being developed, such as carbon capture and storage, will also require large amounts of water.
Water Treatment Technologies	Linkage	New regulatory requirements to install dry or hybrid cooling could be required in states such as Texas, which is responding to recent droughts. These cooling systems are less efficient than once-through cooled facilities and create an energy "penalty." In addition, new wastewater treatment requirements that will result from the revised steam electric effluent guidelines, will require the installation of dry bottom ash disposal, FGD wastewater treatment and similar technologies. While it is true that the installation of dry bottom ash disposal requires much less water, it does incur an energy "penalty," as do additional wastewater treatment facilities. These "penalties" can only be met through the generation of additional power, which requires yet more water. AEP is working closely with state and federal regulators, as well as its own industry groups, such as the Utility Water Act Group and the Electric Power Research Institute, to help shape and influence regulations that are technically sound and have a positive cost-benefit ratio. We are also planning well in advance to ensure that the most water and energy efficient treatment technologies are installed in response to the new regulations.
Emission Controls	Trade-off	Due to a number of factors related to energy markets, environmental regulations, etc., many coal-fired, steam electric power plants across the country have been retired. Typically, these plants were once-through cooled facilities that withdrew large amounts of cooling water, but consumed very little. With the closure of these plants, water withdrawals for the industry will be dramatically reduced, however, due to a greater reliance on gas-fired generation, which utilizes closed-cycle cooling, water consumption rates, on a per facility basis, will increase.

**Further Information**

**Module: Sign Off**

**Page: Sign Off**

---

**W10.1**

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

Name	Job title	Corresponding job category
John McManus	VP Environmental Services	Environment/Sustainability manager

---

**W10.2**

Please select if your organization would like CDP to transfer your publicly disclosed response strategy from questions W1.4a, W3.2c and W3.2d to the CEO Water Mandate Water Action Hub.

Yes

---

**Further Information**

**CDP**