



Highlights of [GAO-10-23](#), a report to the Chairman, Committee on Science and Technology, House of Representatives

Why GAO Did This Study

In 2000, thermoelectric power plants accounted for 39 percent of total U.S. freshwater withdrawals. Traditionally, power plants have withdrawn water from rivers and other water sources to cool the steam used to produce electricity, so that it may be reused to produce more electricity. Some of this water is consumed, and some is discharged back to a water source.

In the context of growing demands for both water and electricity, this report discusses (1) approaches to reduce freshwater use by power plants and their drawbacks, (2) states' consideration of water use when reviewing proposals to build power plants, and (3) the usefulness of federal water data to experts and state regulators. GAO reviewed federal water data and studies on cooling technologies. GAO interviewed federal officials, as well as officials from seven selected states.

What GAO Recommends

To improve federal data collection efforts, GAO is making several recommendations, including that EIA consider collecting and reporting data on power plants' use of advanced cooling technologies and alternative water sources, and that USGS consider reinstating collection of data on power plant water consumption and distributing data on the use of alternative water sources. USGS agreed with our recommendations. DOE provided technical comments that we incorporated, as appropriate.

View [GAO-10-23](#) or [key components](#). For more information, contact Anu Mittal or Mark Gaffigan at (202) 512-3841 or mittala@gao.gov or gaffiganm@gao.gov.

ENERGY-WATER NEXUS

Improvements to Federal Water Use Data Would Increase Understanding of Trends in Power Plant Water Use

What GAO Found

Advanced cooling technologies that rely on air to cool part or all of the steam used in generating electricity and alternative water sources such as treated effluent can reduce freshwater use by thermoelectric power plants. Use of such approaches may lead to environmental benefits from reduced freshwater use, as well as increase developer flexibility in locating a plant. However, these approaches also present certain drawbacks. For example, the use of advanced cooling technologies may result in energy production penalties and higher costs. Similarly, the use of alternative water sources may result in adverse effects on cooling equipment or regulatory compliance issues. Power plant developers must weigh these drawbacks with the benefits of reduced freshwater use when determining which approaches to pursue.

Consideration of water use by proposed power plants varies in the states GAO contacted, but the extent of state oversight is influenced by state water laws, related state regulatory policies, and additional layers of state regulatory review. For example, California and Arizona—states that historically faced constrained water supplies, have taken formal steps aimed at minimizing freshwater use at power plants. In contrast, officials in five other states GAO contacted said that their states had not developed official policies regarding water use by power plants and, in some cases, did not require a state permit for water use by new power plants.

Federal agencies collect national data on water availability and water use; however, of these data, state water agencies rely on federal water availability data when evaluating power plants' proposals to use freshwater more than federal water use data. Water availability data are collected by the U.S. Geological Survey (USGS) through stream flow gauges, groundwater studies, and monitoring stations. In contrast, federal data on water use are primarily used by experts, federal agencies, and others to identify industry trends. However, these data users identified limitations with the federal water use data that make them less useful for conducting trend analyses and tracking industry changes. For example, the Department of Energy's (DOE) Energy Information Administration (EIA) does not systematically collect information on the use of advanced cooling technologies and other data it collects are incomplete. Similarly, USGS discontinued distribution of data on water consumption by power plants and now only provides information on water withdrawals. Finally, neither EIA nor USGS collect data on power plant developers' use of alternative water sources, which some experts believe is a growing trend in the industry. Because federal data sources are a primary source of national data on water use by various sectors, data users told GAO that without improvements to these data, it becomes more difficult for them to conduct comprehensive analyses of industry trends and limits understanding of changes in the industry.