



Highlights of [GAO-12-880](#), a report to the Ranking Member, Committee on Science, Space, and Technology, House of Representatives

Why GAO Did This Study

Water and energy are inextricably linked and mutually dependent, with each affecting the other's availability. Since 2009, GAO has issued five reports on the interdependencies between energy and water. These reports have shown that a considerable amount of water is used to cool thermoelectric power plants, grow feedstocks and produce biofuels, and extract oil and natural gas. Some of these sources of energy may also negatively affect water quality. In addition, developing oil and gas resources can produce wastewater—known as “produced water”—that must be managed or treated. Conversely, significant amounts of energy are needed to extract, transport, treat, and use water in urban areas.

GAO was asked to identify key energy-water nexus issues that Congress and federal agencies need to consider when developing and implementing national policies for energy and water resources. To conduct this work, GAO systematically reviewed its five reports to identify key nexus issues. GAO also used a content analysis of related literature and interviews with specialists to validate these themes.

What GAO Recommends

GAO is recommending that DOE take the actions necessary to establish a program to address the energy-water nexus, with involvement from other federal agencies, as described in the Energy Policy Act of 2005. DOE agreed with the recommendation and stated that it will work with other federal agencies and experts to implement it.

View [GAO-12-880](#). For more information, contact Anu K. Mittal at (202) 512-6100 or mittala@gao.gov or Frank Rusco at (202) 512-3841 or ruscof@gao.gov.

ENERGY-WATER NEXUS

Coordinated Federal Approach Needed to Better Manage Energy and Water Tradeoffs

What GAO Found

As GAO's past work has shown, and other studies and specialists have confirmed, there are a number of key energy-water nexus issues that Congress and federal agencies need to consider when developing and implementing national policies for energy and water resources. Specifically:

- Location greatly influences the extent to which energy and water affect one another. For example, as GAO reported in November 2009, the impact of increased biofuel production on water resources will depend on where the feedstock is grown and whether or not irrigation is required. Consequently, it is important for Congress and federal agencies to consider the effects that national energy production and water use policies can have at the local level.
- Although technologies and approaches exist to reduce the impact of energy development on water resources and reduce the energy needed to move, use, and treat water, their widespread adoption is inhibited by barriers such as economic feasibility and regulatory challenges. In implementing energy and water policies, Congress and federal agencies will also need to be cognizant of the barriers when deciding whether to promote the adoption of these technologies and approaches.
- Making effective policy choices will continue to be challenging without more comprehensive data and research. GAO's past work has identified the need for more data and research related to the energy-water nexus, for example, to better understand hydrological processes, including aquifer recharge rates and groundwater movement. In the absence of such data and research, developing and implementing effective policies could continue to be a challenge for Congress and federal agencies.
- Improved energy and water planning will require better coordination among federal agencies and other stakeholders. GAO's work has demonstrated that energy and water planning are generally “stove-piped,” with decisions about one resource made without considering impacts to the other resource. Improved planning will require federal agencies to work with one another and other stakeholders, such as state and local agencies, academia, industry, and environmental groups. Congress and some agencies have taken steps to improve coordination, but these actions are incomplete or in their early stages. For example, in the Energy Policy Act of 2005, Congress directed the Department of Energy (DOE) to establish a federal program to address the energy-water nexus, but DOE has not done so.
- Uncertainties affecting energy and water resources cannot be ignored because they could significantly affect the future supply and demand of both resources. For example, specialists GAO talked to and literature GAO reviewed identified climate change, population growth, and demographic shifts as significant uncertainties expected to exacerbate the challenges associated with managing both the supply and demand of water and energy. These uncertainties must, therefore, be accounted for when developing national policies that affect both of these resources.