

Report Reveals Missed Opportunities to Save Water and Energy

Comprehensive survey shows connections between water and energy in academic, government and nonprofit publications between 1990 and 2013

Water and wastewater managers are missing substantial opportunities to save energy and money, according to a report published Wednesday (Sept. 4) by [Water in the West](#), a research center at Stanford University. The report, "[Water and Energy Nexus: A Literature Review](#)," also identifies the amount of water used to extract resources such as natural gas, oil and coal, and to generate electricity.

The report finds "robust opportunities for reductions in greenhouse gas emissions, as well as for the conservation of scarce water resources, coupled with the potential for generating significant new renewable energy resources," according to co-author [Cynthia Truelove](#), a visiting scholar with the [Stanford Woods Institute for the Environment](#).

The report is a comprehensive survey of publications by the academic, government and nonprofit sectors between 1990 and 2013 that analyzes policy, along with scientific and technical research, on the connections between water and energy.

"This report summarizes the tremendous breadth and depth of research and analysis that have explored the interrelationship between water and energy," said [Andrew Fahlund](#), executive director of Water in the West. "Nevertheless, it also points out a number of significant gaps in our understanding of the nexus of water and energy and points to important needs for future study."

The report is organized in two sections: "Energy for Water," which explores energy used by the water and wastewater sectors, and "Water for Energy," which documents water used to generate different forms of energy. It adopts a full life-cycle approach to show the integral relationship between water and energy.

Some key findings of the report:

- Current state, regional and local regulations for managing water and energy make it difficult to measure the significant supplies of electricity and natural gas employed in the extraction, conveyance, treatment and distribution of the nation's water supplies. Even California, the only state calling for water managers to mitigate energy use, is still wrestling with regulatory roadblocks. At present, 19 percent of California's electricity and more than 30 percent of the state's natural gas supplies are used in the extraction, conveyance and treatment of water, representing a huge opportunity for energy savings.
- Assumptions about less carbon-intensive fuels may be invalid. For example, natural gas is often heralded as a better choice than fossil fuels. But little data have been collected to assess the water expended in natural gas extraction methods, nor is there much information on the impact of these methods on water quality.
- Water and wastewater managers could generate significant renewable energy supplies and bring enhanced grid reliability to states like California. Tools such as energy tariffs and transmission regulations, as well as widespread deployment of innovative treatment processes,

could prompt the water sector to dramatically increase its renewable energy capacity with solar, wind, in-conduit hydro and biomass or biogas sources.

- Among the areas ripe for further research detailed in the report are the water demands of new energy technologies such as fracking, energy savings opportunities from distributed water treatment systems, innovative technologies for extracting energy from wastewater, and market mechanisms for more efficient water trading and transactions.

"Water and Energy Nexus: A Literature Review," can be [downloaded here](#).

About Water in the West

Water in the West is a partnership of the faculty, staff and students of the Stanford Woods Institute for the Environment and the Bill Lane Center for the American West, both based at Stanford University. The mission of Water in the West is to design, articulate and advance sustainable water management for the people and environment of the American West. It links ideas to action through cutting-edge research, creative problem solving, active collaboration with decision makers and opinion leaders, effective public communications and hands-on education of students.

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