

Turning to Water Conservation to Save Energy

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SAN FRANCISCO — In the run-up to the Copenhagen climate summit conference last year, water researchers and advocates held a special meeting to address the fact that water issues were absent from the draft negotiating text. This was a major oversight, given the amount of energy that is used to collect, treat, distribute and use water and wastewater. Just how much energy is consumed has not been measured in most places, but a 2005 energy policy report published by the state of California found that annual water-related energy consumption in the state accounted for 19 percent of electricity consumption, 32 percent natural gas consumption, and 88 million gallons, or 333 million liters, of diesel fuel. River Network, an organization that advocates water conservation, has extrapolated that data nationally. In a report last year it calculated that Americans use 520 megawatt-hours, or 13 percent of U.S. electricity consumption, on water.

This level of consumption offers an opportunity, said Bevan Griffiths-Sattenspiel, a project coordinator with the network. “Reducing your water use not only saves energy and greenhouse gas emissions, but it’s also a key way to adapt to climate change because most effects of global warming will be manifest through our water resources,” he said.

The relationship between power and water utilities is lopsided. While electric utilities pay little or nothing for their water, the largest operating cost for water utilities is often their electricity bill.

Santa Clara Valley Water District has drawn a lesson from that. Serving 1.8 million residents in the southern part of the San Francisco Bay Area, including Silicon Valley, it has had a water conservation program since the early 1990s. In 2007, it released a report analyzing its success in terms of energy conservation, emissions mitigation and cost. From 1993 to 2006, the report said, the district saved approximately 1.42 billion kilowatt-hours of energy, equivalent to the annual power used by 207,000 households, through financial incentives, advisory programs and infrastructure investments that cut water consumption.

That translated into a financial saving of about \$183 million and an avoidance of 335,000 tons of carbon dioxide emissions.

California is not the only U.S. state with water supply issues. By 2013, at least 36 states expect shortages, according to a 2003 study by the U.S. Government Accountability Office.

Last year, driven by climate change concerns, the U.S. government drafted several policy proposals, mostly focused on water conservation — with indirect energy efficiency benefits — but a few directly addressing the connection between water and energy.

In February, Ken Salazar, the U.S. secretary of the interior, signed an order establishing the WaterSMART initiative, a strategy that would map and conserve water and measure the water consumption of various types of energy.

In December, the U.S. House of Representatives passed the Energy and Water Research Integration Act. The measure would direct the secretary of energy and other relevant federal agencies to establish the Energy-Water Architecture Council to improve energy and water-resource data collection, reporting and technological innovation. The bill is now in the Senate and under consideration by its energy and natural resources committee.

Mr. Griffiths-Sattenspiel, of River Network, said the proposed legislation seemed to be long on research, and short on action. “We have enough information already” to achieve significant water and energy savings, he said. “It’s something we should start moving forward on.”

Water conservation has its own rewards, helping ecosystems to survive and saving consumers money. Mary Ann Dickinson, president of the Alliance for Water Efficiency, an advocacy organization, said utilities could cut per-capita water consumption about 15 percent through easy, and relatively painless, conservation measures.

“That’s an achievable goal,” Ms. Dickinson said.

For industrial users, the potential savings are far greater. Intel, for example, cut its annual water use by three billion gallons, or 40 percent of its 2008 consumption, by investing \$100 million in conservation practices, said Suzanne Fallender, a company spokeswoman.

Cutting back on watered lawns can make a big difference. “Outdoor water use can be as much of 30 percent of demand,” across the United States, rising to 80 percent in the arid western states, Ms. Dickinson said.

While California’s figures give some sense of current consumption, potential future energy savings could be even more significant, Mr. Griffiths-Sattenspiel said. Most cities start by exploiting the closest and most abundant freshwater resources: conservation, he said, could help them to postpone the development of more distant, or otherwise more energy intensive sources, like water from desalination.

“Saving water now can help us avoid those more energy-intensive projects and supplies in the future,” Mr. Griffiths-Sattenspiel said.

Aside from reducing overall water usage to reduce energy consumption, significant energy savings can be obtained by changing the way water is heated. Solar water heaters, for example, are popular in many countries around the world, but they have yet to take off in the United States.

“All the focus here is on photovoltaics and solar thermal systems, but solar hot water heaters are far more cost effective than photovoltaics, especially in the Southwest,” said Peter Gleick, an international water expert and president of the research organization Pacific Institute, referring to the southwestern United States.

Ms. Dickinson, of the Alliance for Water Efficiency, said “the general public hasn’t been conditioned” to want solar hot water heaters. “And the developer community hasn’t been conditioned to offer what customers aren’t asking for,” she added.

In general, water managers can learn other lessons from energy. Just as policy makers are considering the benefits of diversified energy supplies — security, independence, efficiency, and environmental benefits — a decentralized water supply system has much to recommend it as well, Mr. Griffiths-Sattenspiel said. This, he said, could include the recycling of used household water for irrigation, the use of permeable pavement and greenways to limit rainfall runoff, and rainwater harvesting at private homes.

“I’m not talking about just those 55-gallon little drums, but an actual cistern that can collect and supply a substantial amount of water and can store it for irrigation and toilet flushing,” he said.

And as with energy, computerized “smart meters” that help to manage demand could be another tool.

“If we install smart meters, customers can actually see how much water they’re using, how they’re using the most, and figure out ways to save it,” Mr. Griffiths-Sattenspiel said. “And utilities can see where demand is and how much they really need to store.”