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CONTACT: Nancy Ross, nross@pacinst.org or 510.251.1600 x106
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Research Shows New Water Threats to Energy Security in the U.S. Intermountain West – and New Strategies for Sustainable Energy and Water Use

November 3, 2011 – Oakland, CA: The production of electricity, from fuel extraction to generation, has growing impacts on both water availability and quality. A new analysis from the Pacific Institute evaluates future water needs for different energy futures and identifies a growing risk of conflicts between electricity production and water availability in the U.S. Intermountain West. The new report also identifies strategies to ensure the long-term sustainable use of both resources.

The study, ***Water for Energy: Future Water Needs for Electricity in the Intermountain West***, examines the water requirements for current and projected electricity generation within the Intermountain West, which is the area bound by the Rocky Mountains in the East and the Sierra Nevada and Cascade Mountains in the West. While water and energy conflicts are increasing across the United States, the Intermountain West is of particular interest for this study because it has a growing population (and growing demand for energy and water), a diverse fuel mix for power generation, and existing water constraints and limitations that are expected to worsen.

Under current trends, by 2035, water withdrawals and consumption for electricity generation in the region are projected to increase by 2% and 5%, respectively, over 2010 levels – but water availability is already affecting power plant operations and siting in the Intermountain West. And in addition to the water needed for electricity generation, population and economic growth will increase demands for water resources, even as climate change makes the available water supply less reliable. These trends will intensify water resource conflicts throughout the region. The good news is that by expanding energy-efficiency efforts, installing more dry cooling systems, and relying more heavily on renewable energy, such as wind and solar PV, these water requirements can be dramatically reduced. The new analysis shows these alternative strategies can permit increases in electricity production with a significant reduction in total water demands, reducing pressure on scarce and over-allocated water resources.

“Economic and population growth are concentrated in water-scarce areas of the West, intensifying conflict over limited water resources,” said Heather Cooley, co-director of the Pacific Institute Water Program and lead author of the report. “We quantify in several scenarios how employing water-saving cooling technologies and adding renewables and efficiency improvements into the energy portfolio can dramatically reduce a power plant’s vulnerability to water scarcity.” Cooley also noted that the growing risks of climate change make it even more urgent to tackle the problem of producing more energy with less water. “Most climate models show that parts of this region will become even drier, with warmer temperatures and more frequent and intense droughts. Our ‘Renewable Energy’ and ‘Alternative Cooling’ scenarios offer the potential to reduce climate risks and increase water reliability and environmental flows.”

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The study shows that if 25% of the power generated by thermoelectric plants used water-saving cooling technologies, such as dry cooling, water withdrawals and consumption in 2035 would be 26% and 17%, respectively, lower than 2010 levels. Even greater savings can be achieved by expanding energy-efficiency efforts and relying more heavily on renewable energy, such as wind and solar PV. In combination, these measures reduce water withdrawals and consumption by 71% and 45% below 2010 levels – a massive savings.

"We now know that there are very important links between water and energy and that long-term sustainable use of both resources requires more comprehensive and integrated study and management," said Cooley. "But this analysis shows the western U.S. can meet the electricity demands of a growing population using far less water than we do today."

The other major finding of the report is that while we can dramatically reduce the water requirements for electricity generation, there are other growing energy-related threats to regional water availability and quality. Extracting fossil fuels for energy production are especially risky because they require processes that use and pollute water. Too often, water-quality impacts are poorly understood and largely ignored.

The Pacific Institute report, available at www.pacinst.org/reports/water_for_energy, identifies concrete steps to reduce risk in the water-energy nexus: 1) improve data, information, and education on the impact of the energy sector on water resources; (2) accelerate water and energy efficiency improvements; (3) accelerate development and deployment of renewable energy systems; (4) establish cooling technology requirements that limit water use; and (5) promote switching to alternative water sources (such as wastewater and industrial water).

Based in Oakland, California, the Pacific Institute is a nonpartisan research institute that works to create a healthier planet and sustainable communities. Through interdisciplinary research and partnering with stakeholders, the Institute produces solutions that advance environmental protection, economic development, and social equity – in the West, nationally, and internationally. www.pacinst.org. This project was funded by the William and Flora Hewlett Foundation.

654 13th Street, Preservation Park, Oakland, California 94612, U.S.A.
510-251-1600 | fax: 510-251-2203 | e-mail:pistaff@pacinst.org | www.pacinst.org