Integrating Water and Energy Resource Management in the Context of Climate Change

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Integrated policy, planning, and management of water and energy resources can provide multiple economic, environmental, and climate benefits. Climate change and variability pose new challenges for both water and energy management. Response strategies that integrate water and energy, and which incorporate both mitigation and adaptation, will be required. The science is indicating that action is increasingly urgent. While both energy and water managers have used integrated planning approaches for decades, the broader integration of water and energy management is a relatively new and exciting opportunity.

Energy and water managers have used integrated planning approaches for decades, but the broader integration of water and energy management is a relatively new and exciting opportunity. Water and energy systems are interconnected in several important ways. Developed water systems provide energy (e.g. through hydropower), and they consume energy, primarily through pumping and thermal processes. Many energy systems require energy for cooling and other purposes. Moving water over distances and elevation gains, treating and distributing it, meeting end-uses for various purposes, and collecting and treating the resulting wastewater, accounts for one of the largest uses of electrical energy in some areas. For example, estimates by the California Energy Commission indicate that 19% of the state's electricity use, and 33% of natural gas use (excluding power plants), is devoted to water use. Examples of new approaches to the integration of water and energy planning, including policy processes at the California Energy Commission, Public Utilities Commission, Department of Water Resources, and the Climate Action Team will be discussed.

Methodologies for accounting for embedded energy, from initial extraction through treatment, distribution, end-use, wastewater treatment and discharge, will be reviewed. The water intensity of energy production will also be addressed. New approaches to institutional collaboration between energy and water management authorities and providers will also be discussed.