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INNOVATIONS FOR HYDROPOWER AND OTHER RENEWABLES: POTENTIAL BENEFITS TO THE ENERGY-WATER NEXUS

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This paper is being submitted as part of a panel proposed by Michael Sale on the topic of Science and Technology Innovations for the Energy-Water Nexus.

Hydropower is the largest energy user of water in the U.S., although most of that water use is not consumptive. In 1995, USGS estimated that hydropower annual water uses was 3,160,000 million gallons per day, or about 16 times more than what is used for thermoelectric cooling. Water used in hydroelectric turbines is generally not consumed, but the timing of water releases may be shifted in time relative to natural flows through reservoir storage and release. Hydropower's regulation of river flows may compete with other water uses or complement them. Advanced hydropower technologies, such as more efficient turbines with improved environmental performance and higher hydraulic capacity, plus optimized project operations, offer substantial opportunities to reduce competition over scarce water resources. Other non-hydropower renewable energy sources also can contribute the challenges facing the energy-water nexus, where those renewables have low water-use intensity and can power water treatment and distribution. Case study examples will be used to illustrate these opportunities.

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