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THE ENERGY-WATER NEXUS AND NON-POTABLE WATER

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ABSTRACT: In 2005 thermoelectric power production accounted for withdrawals of 201 billion gallons per day (BGD) representing 49% of total withdrawals, making it the largest user of water in the U.S. In terms of freshwater withdrawals thermoelectric power production is the second largest user at 140 BGD just slightly behind freshwater withdrawals for irrigation (USGS 2005). In contrast thermoelectric water consumption is projected at 3.7 BGD or about 3% of total U.S. consumption (NETL 2008). Thermoelectric water consumption is roughly equivalent to that of all other industrial demands and represents one of the fastest growing sectors since 1980. In fact thermoelectric consumption is projected to increase by 42 to 63% between 2005 and 2030 (NETL 2008). This projected range in growth is a function of many factors including the fuel mix of the future power plant fleet, cooling technology, and green house gas emissions controls. While long-term regional electricity transmission planning has traditionally focused on cost, infrastructure utilization, and reliability, issues concerning the availability of water represent an emerging concern. Thermoelectric expansion must be considered in the context of competing demands from other water use sectors balanced with fresh and non-fresh water supplies subject to climate variability. To explore this balance an integrated energy-water decision support system has been developed. The tool considers alternative expansion scenarios for the future power plant fleet and the related demand for water. The availability of fresh and non-fresh water supplies, subject to local institutional controls is then explored. This paper addresses integrated energy-water planning in the western U.S. and Canada involving an open and participatory process comprising decision-makers, regulators, utility and water managers.

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