Great Lakes Commission des Grands Lacs

NEWS RELEASE

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New study evaluates impacts of power plants on Great Lakes water resources

Ann Arbor, Mich. – Can and should impacts on water sources used to generate electricity help drive future energy production policy in the Great Lakes basin?

Approximately 90 percent of the electrical power in the basin is produced by thermoelectric plants, which use 26 billion gallons of water a day for cooling. So, the question is a significant one, particularly for inland lakes, streams and aquifers potentially vulnerable to lower flow rates projected in some climate change models.

A recently completed research project by the Great Lakes Commission took up this and related questions as part of the Commission's Great Lakes Energy-Water Nexus (GLEW) Initiative, sponsored by the Great Lakes Protection Fund. The Initiative examined how water withdrawal or consumption associated with power production could impact the health of the Great Lakes basin's rivers and streams. Findings from this 18-month effort are summarized in the report *Integrating Energy and Water Resources Decision Making in the Great Lakes Basin: An Examination of Future Power Generation Scenarios and Water Resource Impacts.*

"Although most water used for power generation in the basin comes directly from the Great Lakes, about one-quarter uses water from groundwater or a Great Lakes tributary. That's not insignificant," said Dr. Vincent Tidwell, principle member of the technical staff at Sandia National Laboratories and a technical adviser to the project.

The report synthesizes several background reports examining technical and policy aspects of power and water in the Great Lakes basin. The technical analysis examines how changes in the type of power generation could affect sensitive watersheds in the future. That analysis is complemented by a review of relevant water and energy policies that identifies gaps and opportunities for improvements.

New metrics developed as part of the project revealed that approximately one-quarter of all of the watersheds in the Great Lakes basin may be ecologically vulnerable to water withdrawals under certain "low-flow" conditions – conditions that are likely to be more frequent in the future as the impacts of climate change become more severe.

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Additionally, more than half (57 percent) of the 102 watersheds studied were found to be at moderate to high risk of degrading ecological health due to additional thermal impacts, and 36 percent have water quality that is moderately to highly impaired according to U.S. EPA and state reports. All told, one-fifth of the Great Lakes basin's sub-watersheds rank *high* for two or more of these risk factors.

Professor Mark Bain of Cornell University, another project partner, said: "Because of the Great Lakes Energy-Water Nexus project, we now know which areas in the basin are most susceptible to ecological impairment from new water uses, including power production."

Using a model developed by Sandia National Laboratories, five future power scenarios were analyzed for the period 2007 to 2035: 1) Business as usual, including use of open-loop cooling where water used for cooling is returned to the river, lake or aquifer from which it was withdrawn; 2) no new open-loop cooling; 3) open-loop cooling totally prohibited; 4) a renewable energy portfolio with 50 percent wind, 25 percent biofuel and 25 percent natural gas; and 5) that same portfolio with carbon capture and sequestration.

For all five scenarios, water *withdrawals* would decrease, but by far the largest decreases (87 percent) would occur where there is no open-loop cooling at all. In every case except the open-loop cooling prohibited, thermoelectric water withdrawals would continue to be the basin's predominant water use through 2035.

In contrast, *consumptive* water use would increase under all five scenarios with the largest increase in consumptive use (24 percent) occurring under the carbon capture and sequestration scenario, in part due to increased water required for this process.

The lowest increase in consumptive use (7.6 percent) would occur under the renewable energy portfolio, reflecting the considerably lower water use associated with natural gas combined cycle technologies as well as wind power generation, which uses no water. Under all scenarios, consumptive uses from the thermoelectric power sector would be lower when compared to industrial and municipal water use sectors.

"These energy scenarios were helpful in examining futures where water availability to support new power production might conflict with water needed to support ecological health," said Dick Munson, public affairs chief for the Illinois firm Recycled Energy Development. "They show that even in the water-rich Great Lakes basin, there are pockets of vulnerability due to inadequate water supply."

The GLEW project highlighted the Great Lakes-St. Lawrence River Basin Water Resources Compact, established by the eight Great Lakes states, as an important step for managing water withdrawals. The report noted several areas where state implementation of the Compact could have important implications for water and energy usage, including conditioning prior approval of water withdrawals on environmental review; lower withdrawal thresholds, particularly in vulnerable areas or at-risk watersheds; and consumptive reviews as part of an application for a water withdrawal permit.

Federally authorized agencies such as the Federal Energy Regulatory Commission (FERC) and Regional Transmission Organizations (RTOs) were identified as potentially important institutions for analyzing and predicting the ways in which water resources are used for power generation. The GLEW analysis also

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identified several ways for public utility commissions to evaluate environmental impacts and use those results in decisionmaking, including requiring periodic water resource impact studies.

According to Tim Eder, executive director of the Great Lakes Commission: "The GLEW project takes us one step further in our understanding of how our energy choices today could impact our water resources in the future."

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The Great Lakes Energy-Water Nexus project was led by the Great Lakes Commission with guidance from an expert team of researchers, policy analysts and technical advisers. Principal partners included Cornell University, Sandia National Laboratories, the Great Lakes Environmental Law Center and the Environmental Law and Policy Center. Funding support was provided by the Great Lakes Protection Fund. The summary report and background papers can be found at www.glc.org/energy/glew.

The Great Lakes Commission, chaired by James Tierney, assistant commissioner for water resources at the New York State Department of Environmental Conservation, is an interstate compact agency established under state and U.S. federal law and dedicated to promoting a strong economy, healthy environment and high quality of life for the Great Lakes-St. Lawrence region and its residents. The Commission consists of governors' appointees, state legislators, and agency officials from its eight member states. Associate membership for Ontario and Québec was established through the signing of a "Declaration of Partnership." The Commission maintains a formal Observer program involving U.S. and Canadian federal agencies, tribal authorities, binational agencies and other regional interests. The Commission offices are located in Ann Arbor, Michigan. Learn more at www.glc.org.