WATER MANAGEMENT

NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

At NETL, we strive to be the nation's premier energy technology laboratory, delivering integrated solutions to enable America's transformation to a sustainable energy future. We're working hard to develop the technologies and innovations that will address the current administration's ambitious climate goals of a carbon emissions-free power sector by 2035 and a net-zero emissions economy by 2050.

The **Water Management technology program within the Crosscutting Research Portfolio** aims to reduce the amount of freshwater used by fossil-fueled power plants and to minimize the potential impacts of plant operations on water quality.

The vision for this program is to develop a 21st-century America that can count on our nation's abundant, sustainable fossil energy and water resources to achieve the flexibility, efficiency, reliability and environmental quality essential to our continued economic health and national security.

Thermoelectric power generation accounts for more than 40 percent of freshwater withdrawals (143 billion gallons of water per day) and more than 3 percent of freshwater consumption (approximately 4 billion gallons per day) in the United States. As the cost associated with water consumption increases, so will the need for water treatment, recovery and reuse.

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The Water Management Program addresses the competing needs for water consumption through research in three dynamic platforms:

- Increasing Water Efficiency and Reuse
- Treatment of Alternative Sources of Water
- Energy Water Analysis

INCREASING WATER EFFICIENCY AND REUSE — There is an inextricable link between water and energy, and it is increasingly important to use water effectively throughout the power generation sector. This area aims to advance concepts for both new and existing plants to minimize water intake and use. Examining plant cycles and testing new efficient processes can not only reduce water intake, but it can also lower overall operating costs.

TREATMENT OF ALTERNATIVE SOURCES OF WATER — Identifying and treating alternative sources of water, such as brackish and effluent streams, offers opportunities for scientists to address energy-water system challenges. This area focuses on furthering technology to utilize alternative water resources that span multiple facets of research and development (R&D), including consideration of capital costs, operating costs and system integration.

ENABLING TECHNOLOGY DEVELOPMENT — The complex relationship between energy and water is constantly developing. The multiple components that impact the system can be modeled and analyzed to better inform decision-makers and scientists alike. This area helps prioritize research objectives through analyses of water-energy system behavior.

This program leads a critical, national effort directed at removing barriers to sustainable, efficient, water and energy use; This program leads a critical, national effort directed at the following: (1) removing all barriers to sustainable, efficient water and energy use; (2) developing feasible technology solutions; and (3) enhancing our understanding of the intimate relationship between energy and water resources.

WATER MANAGEMENT R&D IMPACTS THE WATER-ENERGY NEXUS AND PROVIDES INNOVATIVE TECHNOLOGIES FOR EFFICIENT ENERGY PRODUCTION IN THE FOLLOWING WAYS:

- Develops cost-effective technology solutions to maintain and enhance plant efficiency while utilizing power plant discharges.
- Reduces water consumption due to evaporative losses and improves power plant conceptual designs.
- Stretches water availability with new water treatment technologies that economically derive clean water from alternative sources.
- Employs data modeling and advanced analytics to examine existing water availability data on a regional basis.

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