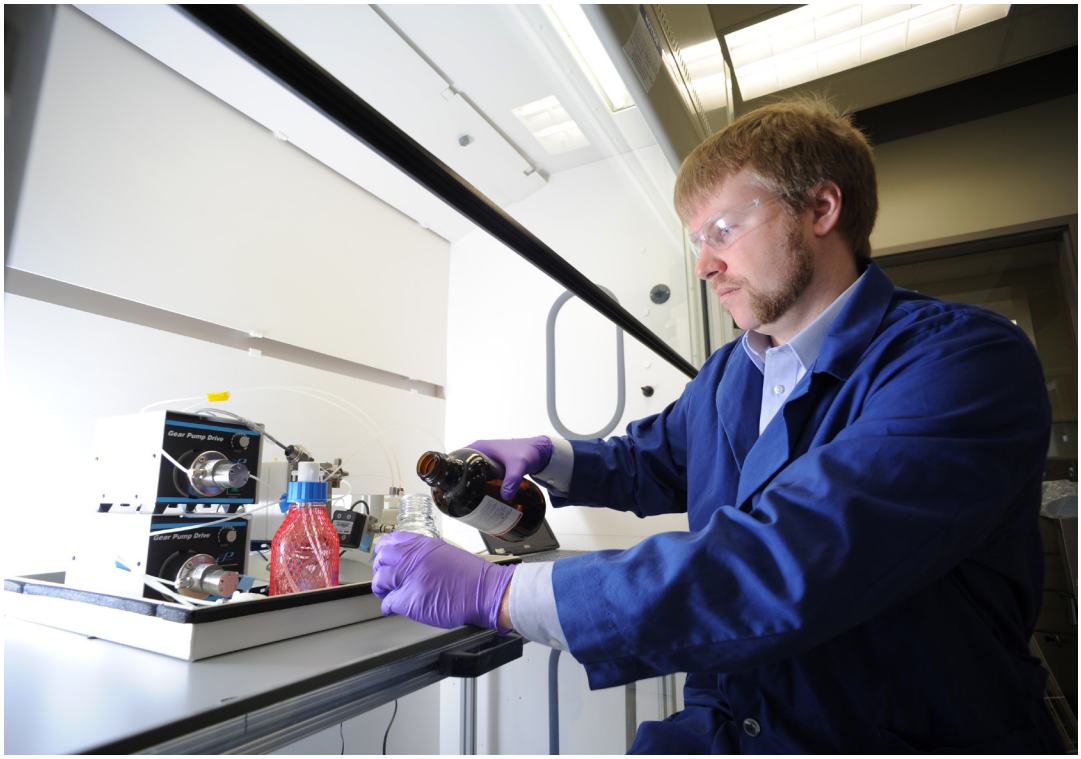

The Switchable Polarity Solvent Forward Osmosis technology developed at INL won an R&D 100 Award in 2013.

Water Technology Innovation Program

The global availability and quality of water, especially for large economies like America's, are principal issues growing in significance. Stress already is occurring among industrial, residential and agricultural water interests in portions of the United States.

A worldwide market for water recycling and reuse is growing rapidly. Developing critical partnerships will lead to solutions because the water-energy nexus is a crosscutting issue that no single customer owns, but many are willing to support.

All principal Department of Energy program offices (including Fossil Energy, Nuclear Energy and Energy Efficiency and Renewable Energy) have a critical need to increase water recycling efforts and develop less water-intensive technologies. Additional stakeholders include the U.S. Environmental Protection Agency, Department of Homeland Security and the private sector. Aligning planning and development boundaries will make it possible to address this critical national need.

The Water Technology Innovation Program at Idaho National Laboratory is establishing leadership in water technology innovation and demonstration. The program aims to reduce today's water treatment energy costs up to 80 percent by 2020.

Why INL?

INL has a rich history of expertise related to modular water contaminant removal research and development. Its capabilities include multifaceted and integrated membrane science, filtration, systems engineering and process simulation. The laboratory possesses substantial expertise in radiological, biological and chemical constituent detection and removal, and industrial process control technology.

As a multiprogram applied science and engineering laboratory, INL hosts a broad suite of capabilities spanning initial innovation to system-scale performance assessment. Its facilities range from the lab-scale Chemical Separation Demonstration Laboratory to the full-scale Water Security Test Bed.

The Water Technology Innovation Program is a coordinated INL effort to create an environment that nurtures innovation in water contaminant

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removal technology. Such innovation will focus on specific markets and applications where the technology would have the greatest impact. INL's multifaceted capabilities can focus coordination to bring improved, innovative and cost-effective water processing technologies to the energy, manufacturing and agricultural industries.

Applications and Current Research

Geothermal Water:
Geothermally derived water has significant value in terms of mineral content and heat, which can be used to drive separation processes to yield valuable products. INL is leading a pilot-scale project.

Combined Cycle Processes:
An example of a combined process is joining carbon capture with water purification. This is the scope of an INL research project funded by DOE's National Energy Technology Laboratory.

Produced Water:
Currently, water produced from national oil and gas extraction processes exceeds 70 billion barrels per year (3.8 trillion gallons). Disposal costs can range from $0.50 to $10 per barrel depending on the disposal method (which can span injection wells to distillation).

Industrial Water:
One goal of the WTIP is to help industry recycle all water used for industrial processes and thermoelectric cooling. Porifera Inc., a U.S.-based startup, has executed a license option agreement for rights to a unique forward osmosis draw solute under the Startup America Program.

Agricultural Water:
Large-scale agricultural operations present significant water issues including contamination from Concentrated Animal Feeding Operations and fertilizing operations.

Desalination:
The global desalination market was 25 billion cubic meters (about 210 billion barrels) in 2010 and is expected to grow to 370 billion barrels by 2020.

The Water Security Test Bed at INL is part of a suite of capabilities that span initial innovation to system-scale performance assessment.

For more information

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