



SOLVING THE PROBLEM

LiquidCool Solutions (LCS) is developing a total immersion electronics cooling technology with the potential to offer 40% energy savings and significant cost savings compared with air-cooling technologies. A safe and easy-to-maintain dielectric fluid is pumped directly into the server enclosure to cool electronic components while protecting them from environmental contaminants. Liquid has more than 1,400 times the heat-carrying capacity of air by volume and enables heat produced by the servers to be used elsewhere in the connected building.

THE IMPACT:

Worldwide, data centers now consume more energy annually than a small country. More than 90% of that energy is consumed by building-connected data centers rather than Internet and cloud service facilities. The continued growth of digital activity paired with the conventional design and operation practices of these mid- to small-sized data centers could contribute to a projected doubling of worldwide data center energy use by 2020 relative to 2013 use. A disruptive energy-saving solution is needed.

HOW IN² IS HELPING:

At the time of IN² project commencement, LCS was in need of field testing to demonstrate the advantages of their technology. NREL supported the request by first testing and mapping the performance of LCS's Liquid Submerged Server in a laboratory environment. After successful laboratory evaluation and development of the LCS prototype, NREL performed a field demonstration to evaluate the installation, maintenance, and computing performance of a live server rack. Specifically, the unit is installed at the Energy Systems Integration Facility (ESIF) on the NREL campus.

TIER 1: Bench Scale

- Concept development stage
- Develop plans for prototyping & testing
- 3 – 5 years to market

TIER 2: Prototype

- Available for testing & validation
- Plans for development of final product
- Less than 2 years to market

TIER 3: Commercially Ready

- Models available in limited quantity
- Integrated demonstration
- Less than 18 months to market testing

ABOUT THE IN² PROGRAM

IN² is a technology incubator that fosters and accelerates early stage technology companies that provide scalable solutions to reduce the energy impact of buildings. Through a \$30 million program funded by the Wells Fargo Foundation and co-administered by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), sustainable building technologies are able to evolve and develop, contributing to the overall goal of a Smart and Connected Community that uses energy, water and other resources efficiently, reducing the negative impact on the environment.

