Researchers meet major hydrogen milestone

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A team of scientists from the U.S. Department of Energy's Idaho National Laboratory earlier this month reached a major milestone with the successful production of hydrogen through High-Temperature Electrolysis (HTE).

The milestone was reached when the Integrated Laboratory Scale experiment started producing hydrogen at a rate of 5.6 cubic meters per hour.

The achievement was recognized at a media event in Idaho Falls Sept. 18.

"This is by far the biggest achievement we've had," said Carl Stoots, the experiment's principal investigator.

High-Temperature Electrolysis is a system of producing hydrogen very efficiently by using technology originally developed for solid oxide fuel cells. HTE is a significant improvement over the more conventional methods to produce hydrogen. HTE uses an electric current through water to separate it into hydrogen and oxygen. Combined with a clean power source such as a next-generation nuclear plant, HTE could produce hydrogen at 45 to 55 percent efficiency.

There are several potential applications of hydrogen from high-temperature electrolysis, all of which are closer to being actualized now that HTE has proven itself capable of producing hydrogen at such an advanced level. Hydrogen is commonly used to help produce liquid

fuels. INL Laboratory Fellow Steve Herring, who heads the HTE project, said it could also prove helpful in upgrading fuel from the Athabasca Tar Sands in Alberta, Canada, because producing gasoline and diesel fuel from such heavy oil deposits requires extensive amounts of hydrogen and steam.

September's achievement is a major scale-up from earlier INL experiments on a small scale. Herring said his team wanted it to match the final product closely.

With this milestone met, the HTE plant is on its way to opening many doors for innovation in energy production, contributing to the Department of Energy's overarching goal of a "hydrogen economy." Eventually, HTE could provide pure hydrogen for fuel cell-powered cars, Herring said – "but that's a long way off."

Source: Idaho National Laboratory