



# Hydrogen Extraction from Wastewater (20130046, Dr. William Arnold)

**IP Status:** Issued US Patent; **Application #:** 14/198,104

## Energy Production from Hydrogen in Wastewater

Hydrogen extraction from wastewater for use as energy is possible with a recent University of Minnesota innovation. The system includes a membrane laden with hydrogen-generating bacteria. The hydrogen is then passed into hollow fibers for removal and can be utilized by fuel cells for energy production. The process does not require costly wastewater aeration at the time of disposal, is modular and can be altered to fit many liquid waste streams including industrial, agricultural, and sanitary waste.

## Wastewater Energy

Wastewater is a nutrient-filled and energy-dense substance that is costly to remove from industrial circumstances. There exists a large market for exploiting wastewater for its chemical energy. However, current methods of exploiting wastewater are harmful to the environment and expensive. These methods still require resource-intensive aeration of the exploited water at the time of disposal.

## BENEFITS AND FEATURES OF HYDROGEN FROM WASTEWATER:

- Efficient hydrogen production
- Removes need for expensive wastewater aeration
- Lower cost water treatment (anticipated)

**Phase of Development** Proof of Concept. Laboratory-tested.

## Researchers

William Arnold, PhD

*Associate Department Head, Department of Civil Engineering, College of Science and Engineering*

[External Link](http://www.cege.umn.edu) ([www.cege.umn.edu](http://www.cege.umn.edu))

Paige Novak, PhD

*Professor, Department of Civil Engineering, College of Science and Engineering*

[External Link](http://www.cege.umn.edu) ([www.cege.umn.edu](http://www.cege.umn.edu))

## Technology ID

20130046

## Category

Engineering & Physical  
Sciences/Chemicals  
Engineering & Physical  
Sciences/Sustainable Technology  
Life Sciences/Industrial Biotech

## View online page

