

The Hydrogen Cycle

The splitting of water into its component parts is actually a method of energy storage. Energy is added to an electrolyzer and water is separated into Hydrogen and Oxygen. When Hydrogen is added to a fuel cell, that energy is released and electrical power is produced. It is preferable that the water not be of high purity due to the extremely low conductivity of pure water. However, that is usually not a problem, since the purity of most water found locally is not an issue.

One critical prerequisite is that the electrolyzer be powered by renewable energy of some type. That guarantees that no resources are consumed and no emissions are produced. There are several methods of splitting water: biological production using algae and high temperature electrolysis are two of the more common methods. The method shown here is the commonly used low temperature type.

Solar or wind-generated electricity are ideal matches, since the source energy can produce hydrogen when it is available and the hydrogen can be stored and used to produce electricity at any time.

A fuel cell reverses the process employed by an electrolyzer and recombines hydrogen with oxygen from the surrounding air releasing energy to produce electricity. In fact, some electrolyzers are built to be reversible and can double as a fuel cell when needed.

These processes have not been economically viable in the past, but with the rising cost of fossil fuels, the steady buildup of pollutants in the atmosphere, and the ever-increasing human population, they are becoming far more attractive and will continue to do so in the future.

See a diagram of an [Electrolyzer and Fuel Cell](http://pfp100.us/efc.pdf) (.PDF) - <http://pfp100.us/efc.pdf>.