

Book Review for 12/14/03 by Frank Lockwood

Title: "The Hydrogen Economy: The Creation of the Worldwide Energy Web and the Redistribution of Power on Earth"

Author: J. Rifkin

Publisher: Penguin Group, New York, 2003

Length: 295 pages

Price: \$14.95, paperback

Reading time: 2 - 3 hours

Reading rating: 7 (1 = very difficult; 10 = very easy)

Overall rating: 3 (1 = average, 4 = outstanding)

In this well researched and very readable book the author makes a convincing case the golden age of oil as the primary source of energy has already passed and the age of hydrogen is dawning. Rifkin argues the world's consumption of oil is at a rate that is two times greater than the rate of discovery of new sources of oil. He concludes the best solution to providing the energy needed to sustain the world's economies will be based on hydrogen.

According to a credible group of scientists, global production of conventional oil will peak during the first half of this century. The bulk of ultimately recoverable oil reserves are located in the politically sensitive Persian Gulf nations of Saudi Arabia, Kuwait, Iran, the United Arab Emirates, and Iraq. Rifkin warns the demise of the Age of Oil will require the nations of the world to find other sources of energy or suffer catastrophic collapse.

The ability to successfully use energy is based on the Laws of Thermodynamics that govern the transformation of energy. The first law states the total energy content in the universe is constant. The second law says that whenever energy is transformed, some of the available energy is lost in the process. Thus, as the eons of time go by, the energy in the universe will go from "available" to "unavailable." A similar problem faces those living on Earth. When a civilization loses its sources of available energy, such as the Romans did by stripping the forests of trees, then that civilization will decline and eventually fail.

The author discusses the effects of converting wood, coal, oil and natural gas into energy has had on the environment, such as global warming. He presents his concerns about the need to begin finding and using other types of energy such as wind, solar, and thermal. Rifkin believes hydrogen is the cleanest and most abundant source of energy and that hydrogen will end the long reign of hydrocarbon energy. The problem with hydrogen is how to economically acquire a sufficient supply to power the needs of modern society.

The book presents the author's views regarding the use of hydrogen fuel cells as mini-power plants. Fuel cells convert the chemical energy of hydrogen to generate electricity. Mini-power plants made up of many individual cells stacked atop one another can produce electricity at a rate two-and one-half times more efficiently than the internal combustion engine. The only effluents from a hydrogen fuel cell are electricity, heat, and pure distilled water. Rifkin states that "fuel cells powered by hydrogen could potentially produce enough electricity to serve the needs of the human race far into the future."

The author advances the concept of "distributed generation," the creation of integrated or stand-alone small electricity generation power plants that can be located at or near the site of end users such as factories, commercial businesses, public buildings, neighborhoods, and private residences. Rifkin states the cost of producing electricity from hydrogen fuel cells, now approximately \$3,000 to \$4,000 per kilowatt (as opposed to gas-fired central power plants cost of \$500 to \$1,000 per kilowatt) will be lowered through innovation and, as more units come into service, economies of scale.

Rifkin predicts the creation of a hydrogen network, in a manner similar to the World Wide Web, with individual mini-power plants linked together through a "Hydrogen Energy Web." His vision of the future includes automobiles power by hydrogen cells feeding electricity to the Hydrogen Energy Web when not on the road. Rifkin believes scientists and politicians will overcome the obstacles standing in the way of commercializing hydrogen as the primary source of energy.

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