Hydrogen Production from Nuclear Energy

Leon Walters and Dave Wade

Argonne National Laboratory

Abstract

During the past decade the interest in hydrogen as transportation fuel has greatly escalated. This heighten interest is partly related to concerns surrounding local and regional air pollution from the combustion of fossil fuels along with carbon dioxide emissions adding to the enhanced greenhouse effect. More recently there has been a great sensitivity to the vulnerability of our oil supply. Thus, energy security and environmental concerns have driven the interest in hydrogen as the clean and secure alternative to fossil fuels.

Remarkable advances in fuel-cell technology have made hydrogen fueled transportation a near-term possibility. However, copious quantities of hydrogen must be generated in a manner independent of fossil fuels if environmental benefits and energy security are to be achieved. The renewable technologies, wind, solar, and geothermal, although important contributors, simply do not comprise the energy density required to deliver enough hydrogen to displace much of the fossil transportation fuels. Nuclear energy is the only primary energy source that can generate enough hydrogen in an energy secure and environmentally benign fashion.

Methods of production of hydrogen from nuclear energy, the relative cost of hydrogen, and possible transition schemes to a nuclear-hydrogen economy will be presented.