

XI.12 A High Efficiency PV to Hydrogen Energy System (Phase II Project)

Mr. Kenneth W. Stone

Amonix, Inc.

3425 Fujita Street

Torrance, CA 90505-4018

Phone: (310) 325-8091; E-mail: info@amonix.com

DOE Grant Number: DE-FG02-04ER83900

In order to facilitate energy independence, increased usage of alternative energy sources will be required. Unfortunately, of the renewable technologies now available, there are no viable alternatives that can produce power 24 hours a day. For example, wind energy requires a threshold wind speed and solar energy requires sunlight. However, if solar energy could be used to produce hydrogen, then the hydrogen could be used as a fuel source for fuel cells, which in turn could produce totally clean energy 24 hours a day, 7 days a week. The challenge is to incorporate both of these technologies in an efficient and cost effective system. This project will address this challenge by integrating a high-concentration photovoltaic system with a hydrogen electrolyzer. Phase I identified the system and subsystem requirements for both power input and output. A preliminary design was completed, and estimates of annual hydrogen production and system cost were calculated. Phase II will incorporate a feedback system into the design to ensure the most efficient use of the solar energy. Efficiencies will be further improved, and costs reduced, by using a smaller silicon device in the solar sub-system.