

### **573d Solar-Thermal Production of Carbon Black in the Desert Sw**

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The production of hydrogen and amorphous structured carbon black has been demonstrated at high rates using a solar-thermal fluid-wall transport tube reactor process. Experimental results will be summarized. In order to assess the near-term viability of the process, design and economic considerations are given to the processing of a slip stream being fed to a natural gas power plant in the Phoenix, AZ area. The reactor is heated to 1500 C using three heliostat fields, each focusing sunlight on one of three secondary concentrators along the length of the reaction tube. Carbon black is collected in a downstream baghouse filter and hydrogen is purified using a pressure swing adsorber (PSA). Some of the purified hydrogen is recycled to provide the protective fluid-wall gas. The process gas stream out of the PSA is primarily methane and hydrogen. The carbon black produced can be sold to the tire industry while the high purity hydrogen can be used to drive a stationary fuel cell. In addition, significant heat recovery from the reactor can be used to produce steam to drive a turbine to generate electrical power. The product gas from the PSA is sent to the NG plant for combustion. Calculations are made to determine the CO<sub>2</sub>-equivalent avoidance of the plant and the value of the CO<sub>2</sub>-equivalent avoidance credits in order for the plant to be profitable. It is anticipated that such a process has near term feasibility once greenhouse gas avoidance credits are marketed in the United States.