



Materials and Systems Research, Inc.

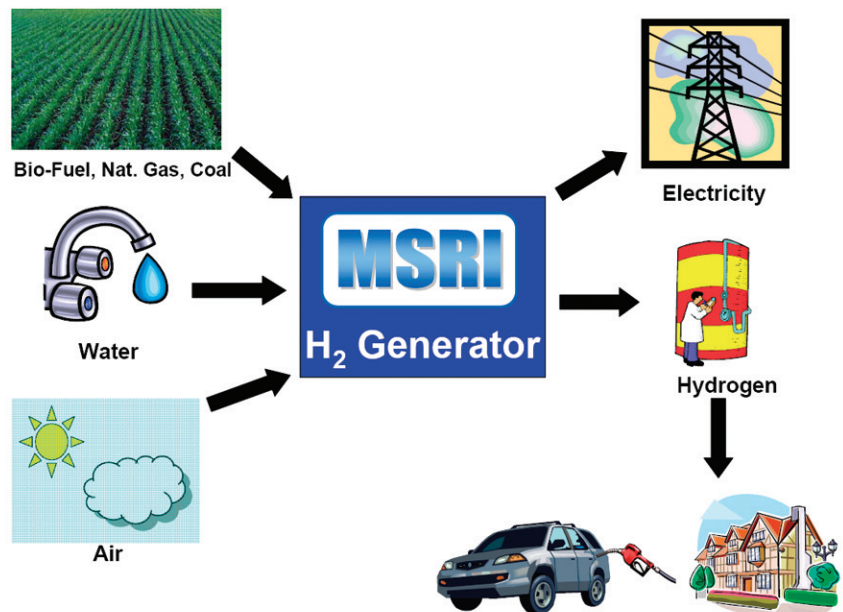
Hydrogen Production

To meet the hydrogen needs of the future, an efficient and economically viable source of hydrogen must be developed. While large scale production through reformation and electrolysis is a viable source, until the necessary distribution infrastructure is in place, this method of production will be limited in its ability to meet the anticipated demand during the transition to a hydrogen economy.

MSRI is currently developing an attractive alternative for small to medium scale hydrogen production using proprietary reversible electrolysis and solid oxide fuel cell (SOFC) technologies to co-produce clean hydrogen and electricity from natural gas or renewable resources. The hydrogen that is produced is extremely pure and ideal for use in distributed refueling stations for hydrogen powered vehicles or residential applications. Any excess production capacity could be used to generate electricity when full hydrogen production is unnecessary or electrical power is required, particularly in remote areas with limited electrical

utilities. Hydrogen or electrical production capacity could be increased by building additional modules as needed.

MSRI expects that a 5 kW hydrogen generation system will be capable of producing 5 kilograms of hydrogen per day. The cost of hydrogen production is expected to meet the Department of Energy's target of \$3/gge (gallon-of-gas equivalent). MSRI believes that this technology can meet the small to medium scale hydrogen demands that will be seen in areas without access to large scale production facilities.



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