

# Hydrogen economy and renewable sources exploitation: the role of membrane engineering and the competition between energy and food

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## Abstract

In the last decade, a general agreement has been noticed regarding the consideration that the fossil fuels are limited and that the CO<sub>2</sub> emission and other harmful products constitute the main cause of the global warming and climate change. The common interest to deplete the fossil fuels dependence and to reduce the greenhouse gases emissions represents a top priority for both Academia and Industry. Biomass is a renewable resource useful for biodiesel and bioethanol production. In particular, bioethanol may be produced by biological processes [1]. Meanwhile, the growing attention toward the so called hydrogen economy, in which hydrogen is seen as a new energy carrier, involves a growing interest about hydrogen permeable membranes as compact devices for hydrogen generation and purification [2]. The combination of a renewable source and an alternative technology such as membrane engineering represents today a valuable option to produce hydrogen energy with respect to the conventional processes. Indeed, membrane reactors (Figure 1) represent an innovative and intensified technology for the production and the simultaneous recovery of high-grade hydrogen in only one stage. Here, the impact and the perspectives of membrane reactor technology utilization for converting biomass into high grade hydrogen via reforming reactions is described, paying also attention to the competition between food and energy in the exploitation of renewable bio-feedstocks.

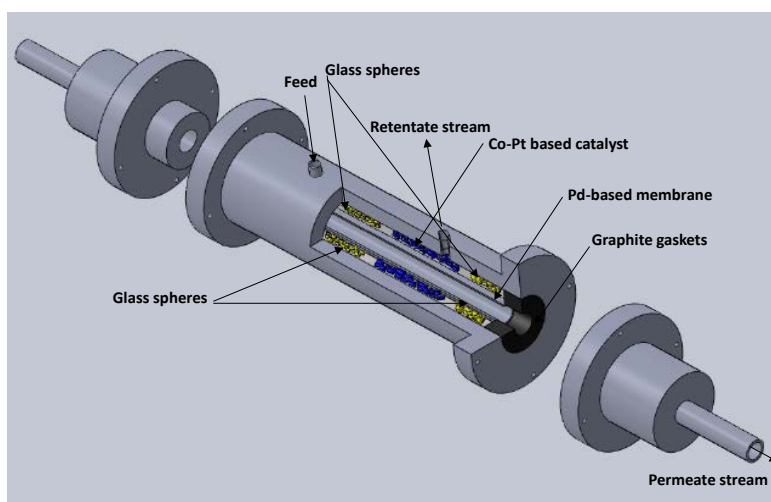


Figure 1. Scheme of a tubular membrane reactor for high grade hydrogen generation [3].

**Keywords:** membrane reactor technology, renewable sources, hydrogen economy

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