THE POTENTIAL FOR THE PRODUCTION OF HYDROGEN FROM RENEWABLE ENERGY SOURCES IN AUSTRIA

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Hydrogen has the potential to become the future energy carrier for generation of electricity in mobile as well as in stationary applications, and at the same time serving as an energy storage medium for a renewable energy system, to address increasing environmental concerns and energy security. International projects suggest that the biggest drawback for a hydrogen economy - cost competitiveness - could be overcome. The near-term focus as a transition strategy for the production of hydrogen, according to the U.S. Department of Energy's Hydrogen R&D Program, is steam reforming of abundant, inexpensive natural gas. The resulting cost-competitive hydrogen fuel increases the probability that hydrogen systems will be successfully introduced into many sectors of the economy and become competitive with fossil fuel-based systems following a transition of hydrogen energy production from fossil fuel-based sources to renewable energy-based sources. Another international project, the Clean Energy Network Using Hydrogen Conversion WE-NET (World Energy Network) of the Agency of Industrial Science and Technology in the Ministry of International Trade and Industry (MITI) of Japan aims at efficient utilisation of energy by hydrogen production from water by harnessing renewable energy.

The current world-wide interest in a hydrogen economy is spurred by the potential of hydrogen to power non-polluting vehicles. In Austria, energy supply is characterised by the prominent role of renewables and offers therefore the potential for the production of ‘clean’ hydrogen. The share of renewable energy in the overall energy system has been rising continuously since the mid-seventies and reached 26.4 % of total energy supply in 1996. The most important renewable sources of energy are hydropower with a share of 13.4 %, and the so-called “other energy sources” (especially biomass) with about 13 %. Electricity from hydropower offers a possible path to produce renewable hydrogen, but since the energy relationship between hydrogen and electricity is fixed by physical laws the electrolysis is unlikely to become a predominant method for production of hydrogen. A main source for renewable hydrogen in Austria could be the national wood resources, stored in the Austrian forests. Due to the fact that over the last years only 2/3 of the annual growth has been harvested, a surplus of wood could be yielded without decreasing the stock on the long-term. Studies about availability of biomass and technologies to produce hydrogen from solid biomass as well as further sources for renewable hydrogen in Austria from biogas utilisation in agriculture and landfill gas recovery will be discussed in the paper.