HYDROGEN POTENTIAL FROM COAL, NATURAL GAS, NUCLEAR, AND HYDRO POWER

Technical Report by Anelia Milbrandt & Margaret Mann - February 2009 - NREL/TP-560-42773
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The study estimated that more than 72 million tonnes (metric tons) of hydrogen can be produced fromcoal/ natural gas resources, nuclear, and hydro power per year **(considering only 30%% of their total current annual production)**. Leading states include Wyoming (26% of total potential), Texas (16%), West Virginia (8%), Kentucky (6%), and New Mexico (5%). The United States consumed about 396 million tonnes of gasoline in 2007 (IEA 2008), therefore the amount of hydrogen derived from these sources could displace about 80% of this consumption*. Although this study uses current production of coal/natural gas and electricity generation from nuclear/hydro power plants rather than the total amount of resources available or power generation capacity, it helps highlight opportunities for first-generation hydrogen production during the transition period to a hydrogen economy.

Coal is by far the most abundant and available fossil fuel in the country and technologies for gasifying coal to produce hydrogen are in relatively advanced states of development. Another method to produce hydrogen is via electrolysis of water - splitting water with an electric current. Electrolysis offers great locational advantages for either distributed production at fueling stations or points of use, or at electrical generation facilities as a way of using excess power generation at night or during other off-peak periods.

As an energy carrier, hydrogen can be produced from any primary energy source. Currently, most hydrogen is produced from natural gas via steam methane reforming. Other sources like coal and biomass can also be used to generate hydrogen through gasification. Electricity, once produced from nuclear, hydro, solar, wind, or geothermal, can generate hydrogen through electrolysis. Given that this wide diversity of energy resources is geographically specific, it's important to understand where resources are located so that appropriate plans can be made for production technologies and infrastructure.

Review the full report at www.osti.gov/bridge then "search" NREL/TP-560-42773.

*1 kg. of hydrogen can potentially displace 4.35kg. or 1.58 gallons of gasoline.

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