

Parrish, W.R., Voth, R.O., Hust, J.G., Flynn, T.M., Sindt, C.F., Olien, N.A.;
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Selected topics on hydrogen fuel

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ABSTRACT

The National Bureau of Standards played a vital role in developing hydrogen technology for the space age and is now engaged in efforts to adapt and improve this technology for the commercial use of hydrogen fuel. This document is a summary report on selected hydrogen-fuel topics and was prepared to identify cost and technical barriers to the commercial use of hydrogen fuel and to generate reference data for policy-planning, decision-making and design. Cryogenic hydrogen fuel technology is emphasized in the economic and systems analyses reported herein. Using the best available technical and economic data, hydrogen fuel is not currently cost competitive with alternative fuels; however, we must not reject hydrogen on the basis of current economic comparisons. Increased efficiencies of production, liquefaction and energy conversion may dramatically change these comparisons-of-today as will increased fossil fuel prices and more stringent environmental and pollution constraints. Hydrogen appears currently marketable in certain integrated utility systems, in transoceanic transport of energy produced far at sea, and is a necessary element in a wide variety of growing industrial processes and in the liquefaction of coal. This publication identifies research and development needs within selected areas of NBS competence and future research plans are outlined.

Key words: Conservation; conversion; cost; cryogenics; economics; embrittlement; energy; hydrogen; industrial, instrumentation, liquefaction; literature; materials; production; solar; storage; transmission; transportation; utilities.