

NAS and NAE Hydrogen and Fuel Cell Assessment

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Reality reared its head in two reports released in the last month on the Presidential initiative on hydrogen and fuel cell vehicles; one by the National Associations of Science and Engineering and another by the American Physical Society.

In early March a mixed panel from the National Associations of Science and Engineering (NAS), released a report that spoke to, among other issues, the technology developments needed for both the transition period and the hydrogen economy and the U.S. Department of Energy's (DOE) role in hydrogen research and development. The report laid out four research priorities:

- Develop cost-effective, durable, safe and environmentally desirable fuel cell systems and hydrogen storage systems for light duty vehicles;
- Develop the hydrogen infrastructure;
- Reduce the cost of renewable hydrogen production;
- Develop effective CO₂ capture and storage technologies.

Major fuel cell vehicle recommendations included the need for PEMFC breakthrough research in a number of areas. The report also recommended ending research on compressed hydrogen and cryogenic on-board storage, as well as discontinuing PEM stationary RD&D. Other major recommendation in the report included:

- DOE infrastructure program requires greater emphasis;
- Increased emphasis on distributed electrolysis and other new distributed generation concepts;
- Use of physical testing to resolve safety issues; and
- Closer coupling of the hydrogen program and CO₂ capture with an early emphasis on CO₂ transition infrastructure.

These results were presented to DOE and Congress in February. Hearings were held on DOE program on March 3rd by the House Science Committee at which time the NAS presented their findings.

Also asked to testify at the hearing was the American Physical Society which had just completed this less extensive study of the hydrogen and fuel cell program which is based on the President's initiative as stated in his 2003 State of the Union address. The report is well characterized in its press release:

"The POPA (Panel on Public Affairs) report concludes that major scientific breakthroughs are required for the Initiative to succeed. The most promising hydrogen-engine technologies require factors of 10 to 100 improvements in cost or performance in order to be competitive. Current production methods are four times more expensive than gasoline. And, no material exists to construct a hydrogen fuel tank that meets the consumer benchmarks. A new material must be discovered."

The report goes on to say that incremental improvements are not sufficient to achieve commercialization.

These reports are likely to have an impact on the funding of future research and the direction of the DOE Program.