



Highlights of [GAO-08-305](#), a report to congressional requesters

Why GAO Did This Study

The United States consumes more than 20 million barrels of oil each day, two-thirds of which is imported, leaving the nation vulnerable to rising prices. Oil combustion produces emissions linked to health problems and global warming. In January 2003, the administration announced a 5-year, \$1.2 billion Hydrogen Fuel Initiative to perform research, development, and demonstration (R&D) for developing hydrogen fuel cells for use as a substitute for gasoline engines. Led by the Department of Energy (DOE), the initiative's goal is to develop the technologies by 2015 that will enable U.S. industry to make hydrogen-powered cars available to consumers by 2020.

GAO examined the extent to which DOE has (1) made progress in meeting the initiative's targets, (2) worked with industry to set and meet targets, and (3) worked with other federal agencies to develop and demonstrate hydrogen technologies. GAO reviewed DOE's hydrogen R&D plans, attended DOE's annual review of each R&D project, and interviewed DOE managers, industry executives, and independent experts.

What GAO Recommends

GAO recommends that DOE update its *Hydrogen Posture Plan's* assessment of what can reasonably be achieved by 2015 and how this may differ from its prior posture plans. In commenting on a draft of the report, DOE agreed with the recommendation, stating that it will update its posture plan during 2008.

To view the full product, including the scope and methodology, click on [GAO-08-305](#). For more information, contact Mark Gaffigan at (202) 512-3841 or gaffiganm@gao.gov.

HYDROGEN FUEL INITIATIVE

DOE Has Made Important Progress and Involved Stakeholders but Needs to Update What It Expects to Achieve by Its 2015 Target

What GAO Found

DOE's hydrogen program has made important progress in all R&D areas, including both fundamental and applied science. Specifically, DOE has reduced the cost of producing hydrogen from natural gas, an important source of hydrogen through the next 20 years; developed a sophisticated model to identify and optimize major elements of a projected hydrogen delivery infrastructure; increased by 50 percent the storage capacity of hydrogen, a key element for increasing the driving range of vehicles; and reduced the cost and improved the durability of fuel cells. However, some of the most difficult technical challenges lie ahead, including finding a technology that can store enough hydrogen on board a vehicle to achieve a 300-mile driving range, reducing the cost of delivering hydrogen to consumers, and further reducing the cost and improving the durability of fuel cells. The difficulty of overcoming these technical challenges, as well as hydrogen R&D budget constraints, has led DOE to push back some of its interim target dates. However, DOE has not updated its 2006 *Hydrogen Posture Plan's* overall assessment of what the department reasonably expects to achieve by its technology readiness date in 2015 and how this may differ from previous posture plans. In addition, deploying the support infrastructure needed to commercialize hydrogen fuel-cell vehicles across the nation will require an investment of tens of billions of dollars over several decades after 2015.

DOE has effectively involved industry in designing and reviewing its hydrogen R&D program and has worked to align its priorities with those of industry. Industry continues to review R&D progress through DOE's annual peer review of each project, technical teams co-chaired by DOE and industry, and R&D workshops. Industry representatives are satisfied with DOE's efforts, stating that DOE generally has managed its hydrogen R&D resources well. However, the industry representatives noted that DOE's emphasis on vehicle fuel cell technologies has left little funding for stationary or portable technologies that potentially could be commercialized before vehicles. In response, DOE recently increased its funding for stationary and portable R&D.

DOE has worked effectively with hydrogen R&D managers and scientists in other federal agencies, but it is too early to evaluate collaboration among senior officials at the policy level. Agency managers are generally satisfied with the efforts of several interagency working groups to coordinate activities and facilitate scientific exchanges. At the policy level, in August 2007, DOE convened the inaugural meeting of an interagency task force, composed primarily of deputy assistant secretaries and program directors. The task force is developing plans to demonstrate and promote hydrogen technologies.