(January 25, 2007) Hope, Hype and Hydrogen

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Legislation to create multimillion-dollar prizes for hydrogen energy technology has been reintroduced as promised, and one of the bill's biggest boosters says it could come up for a vote "pretty quickly." But the H-Prize Act doesn't really address the energy priorities outlined in President Bush's State of the Union address - such as increased ethanol production or tougher fuel economy standards. So why not offer prizes for a wider range of energy alternatives, including ethanol and biodiesel, rather than just for hydrogen?

"The reason to do a hydrogen prize is because we need a technological breakthrough there, whereas with ethanol and biodiesel, we already have some proven technologies that work," said Rep. Bob Inglis, R-S.C., who was the H-Prize Act's primary sponsor last year and is a co-sponsor this year.

To be sure, there are challenges attached to all the alternative energy initiatives being floated: For example, many experts say the United States can't produce enough corn to satisfy the ethanol fuel demand as well as farm and food-industry requirements, and efforts to convert waste cellulose into ethanol still face technological hurdles as high as Iowa cornstalks. Some speculate that biofuels will end up being little more than a sideshow in the energy drama.

But making the transition to a hydrogen economy is an even more speculative venture. It's true that hydrogen-driven fuel-cell cars would be the ultimate clean machines, but you'd have to build the infrastructure to produce, store and distribute the flammable gas safely. And as rocket scientist Robert Zubrin pointed out in his New Atlantis article, titled "The Hydrogen Hoax," nowadays the fuel is typically produced from natural gas or coal (fossil fuels!) using a relatively inefficient process.

A report from the National Academy of Sciences said the transition to a hydrogen economy would take "many decades" - which sounds like the same time frame required for commercially viable fusion power.

Nevertheless, Inglis and the H-Prize Act's other sponsors - as well as U.S. automakers such as GM and Ford - are hitching their hopes to a hydrogen star. Even converting natural gas to hydrogen, as inefficient as it is, could reduce carbon dioxide emissions by up to 60 percent, Inglis maintained.

"Reforming natural gas to hydrogen is a significant step in the right direction, if you're concerned about the carbon footprint," Inglis told me.

And eventually, hydrogen could be produced from water through electrolysis, with the electricity coming from solar cells, wind turbines or next-generation nuclear reactors. The gas might even be produced commercially through bacterial digestion of wastewater, just as other types of bacteria can turn manure into methane fuel (in some cases, even powering ethanol production plants).

"My view is that we should be pursuing all these technologies - solar, more nuclear, biodiesel, ethanol, all of the above to help the No. 1 objective, which is improving the national security of the United States," Inglis said.

Inglis sees job creation in the domestic energy and auto fields as the No. 2 objective, and cleaning up the air as No. 3.

"That's the real beauty of getting all the way through to hydrogen, because you end up having a mobile source of energy that has only water vapor as an emission," he said. "The one that gets you all the way there is hydrogen, but we're going to need some breakthroughs to make it there."

The H-Prize Act would provide incentives for those breakthroughs by offering prizes ranging from $1 million to $10 million - with private support potentially boosting the top prize to $50 million. Even though control of the House passed from Republican to Democratic hands, Inglis doesn't expect much change in last year's overwhelming (416-6) support for the legislation. This year, Rep. Dan Lipinski, D-Ill., is listed as the bill's primary sponsor.

"Breakthroughs in hydrogen research and development, which I believe this bill will induce, unfortunately will not lower energy prices this year or next," Lipinski said Tuesday during a speech at the Washington Auto Show. "But it will help our country, and the world, address our long-term energy needs in a unique way. The time to act is now."

Inglis told me there are early indications that "the House leadership may be willing to take this bill up pretty quickly, within the next several months, and that's very exciting."

Last year, the H-Prize legislation got stuck in the Senate, and Inglis acknowledged that "we need to do some additional work to convince key senators to help us." But if the bill makes it through the Senate, "I think the administration will be very supportive," Inglis said.

So what's the long-term prognosis for hydrogen fuel-cell power? On one hand, you have reports about H-power breakthroughs that could make fuel cells viable even for the small-scale engines used in lawnmowers and chainsaws. On the other hand, we're hearing about battery breakthroughs that could offer alternatives to the hydrogen economy. When it comes to energy technologies, how can anybody separate the hype from the reality? You can help out by adding your comments below.