

The viability of hydrogen transportation markets: Chicken or egg?

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Hydrogen may well be the new gasoline. But where's the nearest "gas" station where you can pull up and refuel your energy-efficient vehicle? Will hydrogen stations be strategically convenient—located on street corners and travel-stop locations around the globe?

What marketing development obstacles need to be overcome if hydrogen vehicles are ever to penetrate the transportation system and gain widespread acceptance?

According to an article by James Winebrake and Patrick Meyer in "Technovation: The International Journal of Technological Innovation, Entrepreneurship and Technology Management," there are a number of barriers to overcome before the hydrogen-fuel infrastructure becomes efficient, affordable and publicly accepted. However, both agree the 100-year reign of petroleum as the dominant transportation fuel is coming to an end—due to mounting prices, scarcity, and a need to reduce environmentally degrading emissions.

Winebrake, professor and chair of the Department of Science, Technology and Society/Public Policy at Rochester Institute of Technology, and Meyer, an RIT alumnus and a doctoral candidate at the Center for Energy and Environmental Policy at the University of Delaware, believe the use of hydrogen technology in transportation systems bears a direct relationship to the "chicken and egg" phenomenon.

"Consumers will not purchase hydrogen vehicles if there is no refueling infrastructure to service the vehicles; and the infrastructure development will not occur if there are no vehicles in operation to support it," Winebrake says.

In the study, the authors created a computer-based model, called H2VISION that simulated the dynamic relationships between vehicle purchases and refueling infrastructure. Using this computer model, they were able to determine how the cycle of vehicle purchases and infrastructure development operates and to propose recommendations to policymakers who aim incentives towards hydrogen transportation. Some of their recommendations include:

- Initial investment in hydrogen refueling stations should support station "clusters" within urban regions so consumers can easily refuel vehicles with little additional convenience cost compared to gasoline.
- Government policies should support both vehicle markets and refueling infrastructure simultaneously in order to achieve the greatest market penetration at the least cost.
- Home refueling of hydrogen vehicles would go a long way to encourage market development, and appropriate government support of home refueling technologies is needed.

Winebrake, who is also co-director of the RIT Laboratory for Environmental Computing and Decision Making, was cautiously optimistic about the prospects of a hydrogen based transportation sector developing in the coming decades.

"A lot of pieces of the puzzle are still missing," Winebrake notes. "But with appropriate economic incentives and technological advancement, a hydrogen transportation future may soon be in reach."

Source: Rochester Institute of Technology

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