Northwestern's truck scored firsts in fuel economy and emissions as well as design.

Class designs top gas vehicle—naturally

By Jon Van

A team of Northwestern University engineering students has found one class project to be a real gas, and a natural one.

The students won a trophy and cash prize for designing the best vehicle powered by natural gas among 20 competing universities. The contest, the Natural Gas Vehicle Challenge, was held in Detroit and sponsored by General Motors, the U.S. Department of Energy, the Society of Automotive Engineers and Argonne National Laboratory.

"It was the most innovative vehicle there," said Robert Larson, an Argonne scientist and an event organizer.

One innovation in Northwestern's design so impressed a judge that he hopes to work with the university to develop it into a commercial product.

The breakthough is a sensor that monitors the quality of natural gas used to power the truck that students converted from a gasoline-burner to a natural gas vehicle.

The amount of methane in natural gas can vary from 81 to 97 percent, depending upon its source, and knowing the makeup of the fuel being burned at any given time can be useful in maximizing efficiency. The students designed a sensor that measures the time it takes for sound to pass through the gas to determine its methane content.

Another innovation uses a catalyst to extract hydrogen from emissions given off by the engine so it can be used as fuel. This enables the system to reduce pollutants while boosting efficiency.

Students applied for patents on both innovations.

About 50,000 vehicles in the United States can run on natural gas. Stricter air pollution standards that will take effect in coming years have boosted interest in natural gas because it is cleaner burning than most fuels.

The Northwestern vehicle's emissions met standards scheduled to take effect in California, the nation's most stringent.

"We weren't surprised to win the best design award," said Richard Lueptow, faculty adviser on the project. "We'd seen the competition and pushed ahead with significant advances in the technology."

Northwestern's truck scored firsts in fuel economy and emissions as well as design, but lost overall competition because of penalties for being late to the contest.

The lateness was caused by a malady familiar to any back-yard tinkerer.

"We had some faulty parts we had to replace at the last minute," said Lueptow.

"We knew we'd be penalized for that, but felt we'd be vindicated if we won the design competition, and we did."