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## UNH Professor Shares Hybrid Car with Automotive Students

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DURHAM, N.H. — After more than 20 years of studying the impact of automobile emissions on the environment, University of New Hampshire botanist and forester Barry Rock realized it was time to practice what he preached.

The forestry professor, who has studied the impact of pollution on the health of forests from New Hampshire's White Mountains to the Black Triangle area of central Europe, is now the owner of a Toyota Prius. His Prius, one of only three sold in the state since its release in August, is a hybrid vehicle. It runs on both a regular gasoline engine and on a motor using electricity from a battery that never needs to be "plugged in" because the gasoline engine continually charges it. Honda also makes a hybrid called the Insight.

But Rock isn't satisfied with just driving a more energy efficient vehicle that gets better gas mileage (50-60 mpg). He wants people to know the impact their vehicle has on the environment, especially in light of President Bush's recent decision not to limit CO<sub>2</sub> emissions from U.S. power plants, and he's starting with the automotive students at the New Hampshire Community Technical College in Stratham.

"Carbon dioxide, when it is produced by the burning of fossil fuels, is a pollutant," Rock says. "If we're not going to reduce emissions from coal-burning plants, then we need to look at hybrid vehicles as an alternative."

Rock recently presented his research in the Czech Republic to the Stratham students. Some of his research is near villages where the average life expectancy is 31 years because sulfur dioxide emissions from coal-

burning power has damaged human health as well as forest health. In addition to the sulfur dioxide emissions, these plants are also a major source of carbon dioxide, a greenhouse gas linked to climate change and global warming. Healthy forests are an ally in the fight against global warming, because up to 48 percent of carbon dioxide is removed from the atmosphere by forests.

"I don't pretend to suggest that air quality in the U.S. is as bad as central Europe, but on the other hand, New England is downwind from the rest of the country," Rock tells the students. "In fact, we're known as the tailpipe of the nation. In the U.S., the automobile is the major source, not big industry. I want you to know that the emissions from the cars we drive have consequences."

Rock's guest lecture in associate professor Michael Firczuk's class is just one piece of the university's new partnership with the technical college system. The New Hampshire Space Grant Consortium, run by UNH, is providing scholarship money to students in the system who are studying in high-tech fields.

"The technical college system has many of these programs in place," says David Bartlett, associate director of UNH's Institute for the Study of Earth, Oceans and Space. "By providing financial support, we're achieving a common goal. We're all interested in having a well-trained and well-informed workforce, and this is making it possible."

Firczuk agrees, saying as with anything, it's about raising the level of awareness.

"The Prius has the potential to really succeed because it is driven like a regular car," Firczuk says. "We've been teaching emission control systems for the last 25 years, but the focus has been on the vehicle, keeping the customer happy. I want these students to know they can have an impact on the environment as well. These students are actually in a position to do something, not only in making a choice personally, but influencing the choices of others."

Rock admits he was afraid at first "that it would feel like I was driving an experiment," especially after

driving a Ford Explorer for the last five years, but says it is really no different than driving a Toyota Corolla, and the dealership, Bill Dube Toyota in Dover, was very knowledgeable on just how the vehicle runs. The biggest difference is the price tag. The hybrid is about \$6,000 more expensive than a similarly-sized Corolla.

"Hybrid vehicles reduce carbon dioxide emissions because they get such great gas mileage," Rock says. "In every gallon of gas there is about 20 pounds of carbon dioxide," and adds "When you get 20 mpg, that's like taking a 20-pound bag of charcoal and tossing briquettes out the window as fast as you can as you drive to Concord. If CO<sub>2</sub> levels continue to rise at current rates and we don't do anything to reduce our emissions, in about 100 years New England will experience an increase in the average temperature of 6-10 degrees F."

That might not seem like a big deal, until Rock points out that if you take the 30-year average temperature for Boston and add six degrees, the average temperature of Boston would be that of the 30-year average for Richmond, Virginia. Add 10 degrees, and temperatures are like those currently in Atlanta, Georgia. A few degrees increase in average temperature would make a huge difference in the climate of New England.

The Prius also reduces nitrogen oxide emissions, which are the precursor to ground level smog, by 90 percent. The impact of smog on both humans and forests could be reduced dramatically if nitrogen oxides from automobiles could be reduced. The Prius is a big step in that direction.

"If we don't do anything, we're going to double pre-industrial CO<sub>2</sub> levels in 50 years," Rock says. "CO<sub>2</sub> levels are higher than they've been in the last half million years and we're the cause; it's our cars. In the last 105 years, temperatures in New Hampshire have gone up 1.8 degrees (F). In the White Mountains region, there's been an increase of four degrees in the winter months. We can't say that increasing CO<sub>2</sub> levels are the only cause, but the New England of the future is going to be fundamentally different if we don't change the way we think about our cars."

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