

NREL Estimates U.S. Hybrid Electric Vehicle Fuel Savings

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Hybrid electric vehicles have saved close to 230 million gallons – or 5.5 million barrels – of fuel in the United States since their introduction in 1999, according to a recent analysis conducted at the U. S. Department of Energy’s National Renewable Energy Laboratory (NREL).

“Sales of hybrid electric vehicles have increased an average of 72 percent a year for the past five years and in 2006 the average fuel economy based on new EPA estimates was 35 miles per gallon for new hybrid models sold in the U.S.,” said Kevin Bennion, an NREL vehicle systems analysis research engineer.

To estimate the total fuel saved by hybrid electric vehicles, NREL researchers combined hybrid electric vehicle sales and fuel economy data to determine fuel savings. The fuel economy data included new EPA mpg ratings, but old EPA mpg ratings and user-reported values were also reviewed.

VISION modeling software developed by Argonne National Laboratory was used to determine vehicle stock – the total number of hybrid electric vehicles in use in a given year. The annual vehicle stock estimates and the vehicle sales data were combined to calculate fuel savings of replacing a conventional vehicle with a hybrid. The conventional vehicles selected were models by the same manufacturer that most closely matched the hybrid electric vehicles in terms of size, weight and performance.

In 2006, the average fuel economy improvement for hybrid electric vehicles over the replaced conventional vehicle was approximately 45 percent.

Even with this improvement, hybrid electric vehicles would have to replace a significant portion of the total light duty vehicle fleet to have an impact on petroleum imports. For example, net imports of oil in 2003 were 11.24 million barrels per day, and 8.55 million barrels per day went to light duty vehicle use.

“Although the fuel savings from hybrid electric vehicles to date is relatively small compared to the total fuel use, as the technology matures and these numbers increase they can have a significant impact in reducing our overall transportation fuel use,” said NREL senior research engineer Matthew Thornton who leads NREL’s vehicle systems analysis research in the Center for Transportation Technologies and Systems.

The Center for Transportation Technologies and Systems has conducted research to advance hybrid electric vehicles viability in the marketplace since the early 1990s. Today, the Center focuses on developing and evaluating new technologies such as hydrogen, biofuels and plug-in hybrid electric vehicles.

Source: National Renewable Energy Laboratory

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