DOE Hydrogen and Fuel Cells Program Record	
Record #: 5008	**Date:** December 28, 2005
Title: FCV Hydrogen Demand in 2040	
Originator: Fred Joseck, Mark Paster	
Approved by: JoAnn Milliken	**Date:** January 3, 2006

Items:

- 64 million metric tons of hydrogen would be needed to power 300 million hydrogen fuel cell vehicles in 2040.
- 300 million FCVs would be 80% of the vehicle fleet of 375 million vehicles projected for 2040.

Data/References:

The following values were based on the *VISION Model: Description of Model Used to Estimate the Impact of Highway Technologies and Fuels on Energy Use and Carbon Emissions to 2050.* Singh M., A. Vyas, and E. Steiner, Argonne National Laboratory, December 2003, ANL/ESD/04-1 (www.transportation.anl.gov/pdfs/TA/299.pdf).

1- 375 million vehicles projected for 2040 in the U.S. Vehicles refer to light duty vehicles as defined in the model.

2- 300 million FCVs is based on the model's assumption of the following FCV market sales rates: 4% in 2018, 27% in 2020, 78% in 2030, and 100% by 2038.

3- 13,000 miles per light duty vehicle in 2040. (Also from *Transportation Energy Data Book: Edition 23-2003*, Table 7.4 (7-4)).

4- 24.3 miles per gallon for conventional light duty vehicles in 2040.

5- 2.5 is the assumed ratio of FCVs miles per kg (or gge) of hydrogen to miles per gallon of gasoline for conventional vehicles.

Calculations:

300 million Fuel cell vehicles x 13,000 miles per vehicle per year = 3,900 billion miles driven per year

24.3 miles per gallon for conventional vehicles x 2.5 factor for fuel cell vehicle in 2040 = 60.75 miles/kg of H2 for a fuel cell vehicle.

3,900 billion miles divided by 60.75 miles/kg of hydrogen = 64 million metric tons of hydrogen required.