

# ***Trip characteristics and fuel economy: Why your mileage will vary***

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Using National Household Travel Survey Data for Transportation Decision Making  
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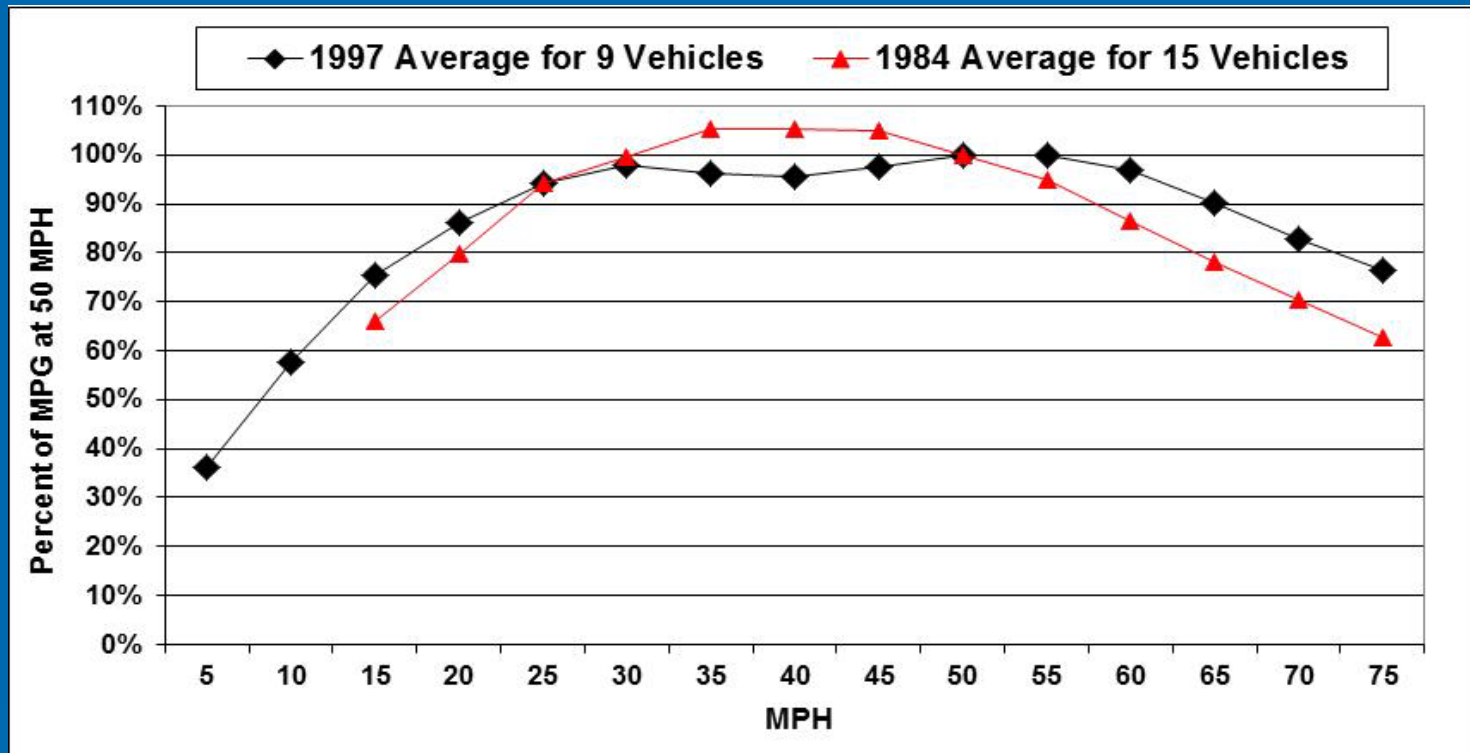
The Keck Center of the National Academies, Washington, D.C.

# Presentation Overview

1. Steady Speed MPG by MPH
  2. EPA Fuel Economy Drive Cycles: % of Miles by MPH
  3. EPA Miles by MPH vs. NHTS Miles by Trip Average MPH
  4. Adjusted EPA MPG vs. Achieved Vehicle Stock MPG
  5. Hybrid Vehicles vs. 1997 MPG by MPH
  6. Implications for Transportation Decision Making
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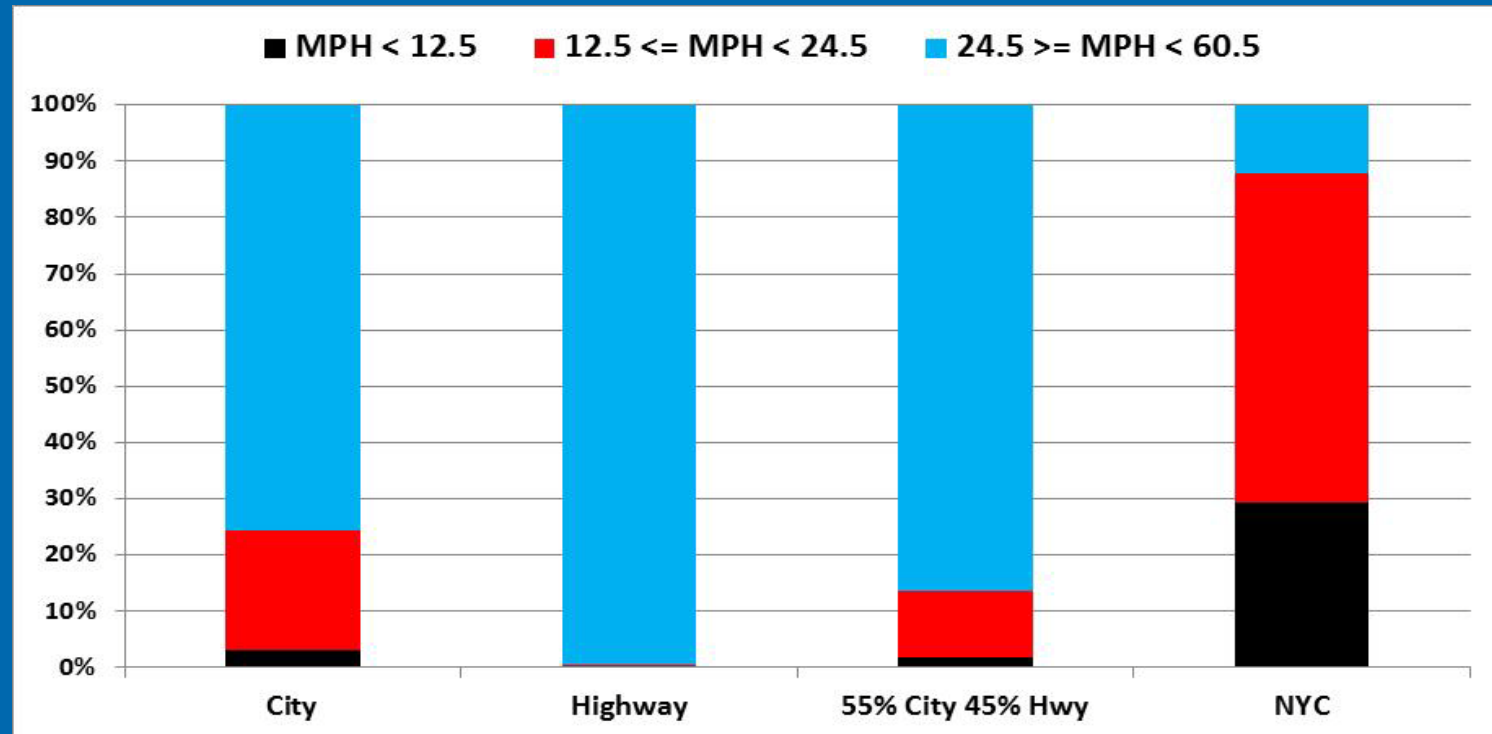
# Steady Speed MPG by MPH

## MPG at 5 MPH Intervals as % of MPG at 50 MPH



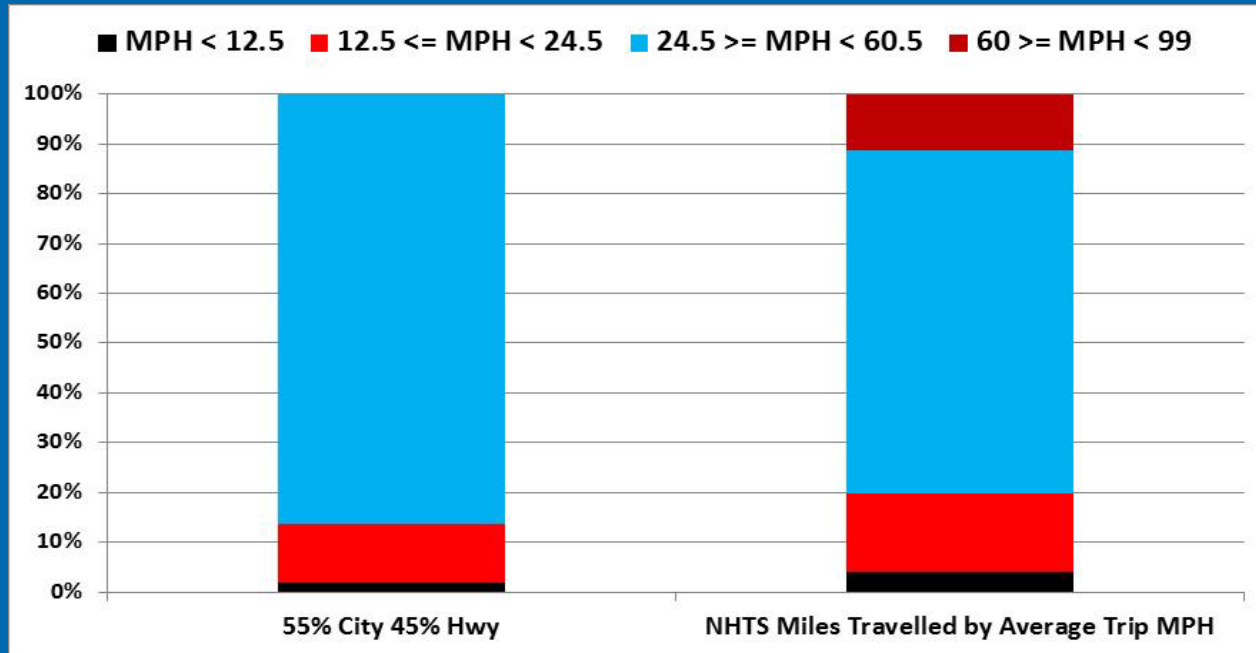
- MPG near vehicle maximum MPG at 25 MPH to 60 MPH
- MPG = 75% - 90% of max mpg at 15 - 25 MPH and at 65 - 75 MPH
- MPG = 57% of vehicle maximum at 10 MPH - and just 36% at 5 MPH

# EPA Fuel Economy Drive Cycles: % of Miles by MPH



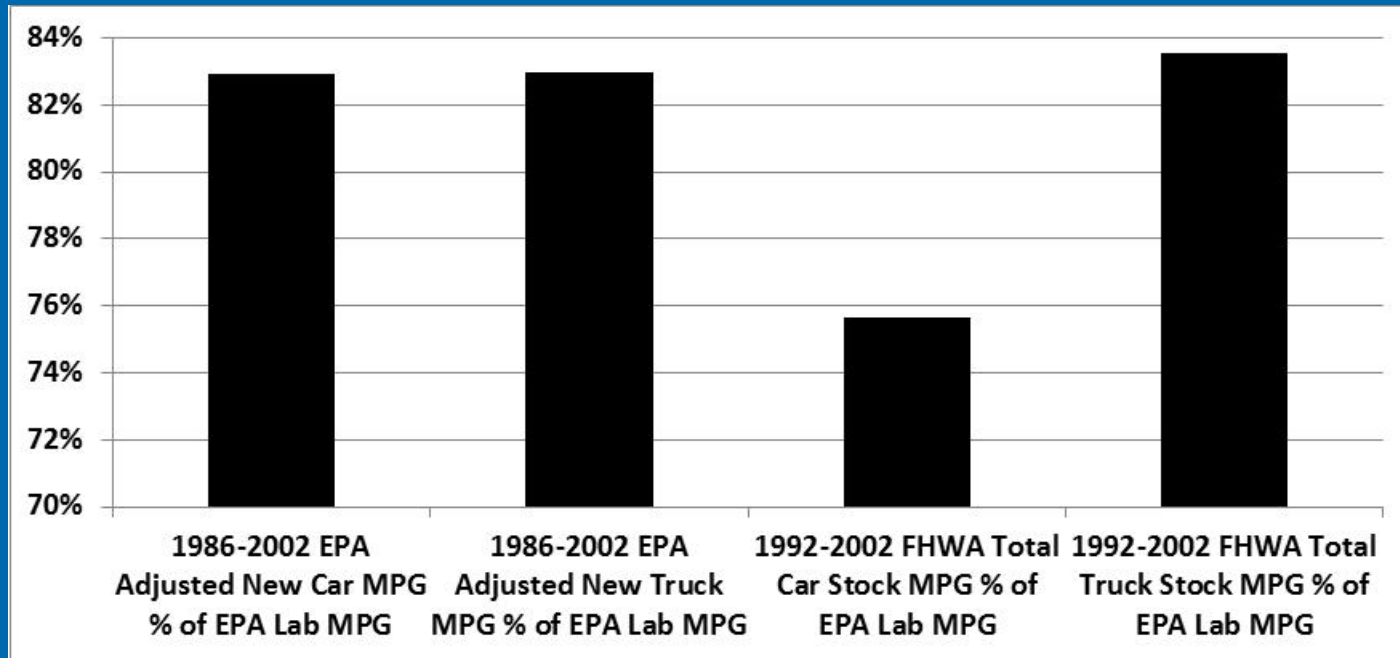
- EPA overall MPG rating is weighted 55% city MPG and 45% highway MPG
  - 86% of miles at 24.5 – 60.5 MPH; 12% at 12.5 – 24.5 MPH; 2% at 0 – 12.5 MPH
  - MPH < 12.5 excludes idle time: 19% of city cycle and 2% of highway cycle time
  - EPA reported MPG adjusts test MPG for higher speeds, and for air conditioning and colder temperatures, but not for slower speeds
- NYC drive cycle, not used in EPA MPG rating, is 12% at 24.5 – 60.5 MPH; 59% at 12.5 – 24.5 MPH; and 29% at 0 – 12.5 MPH, with 35% idle time

# EPA Test Miles by MPH vs. NHTS Miles by Trip Average MPH



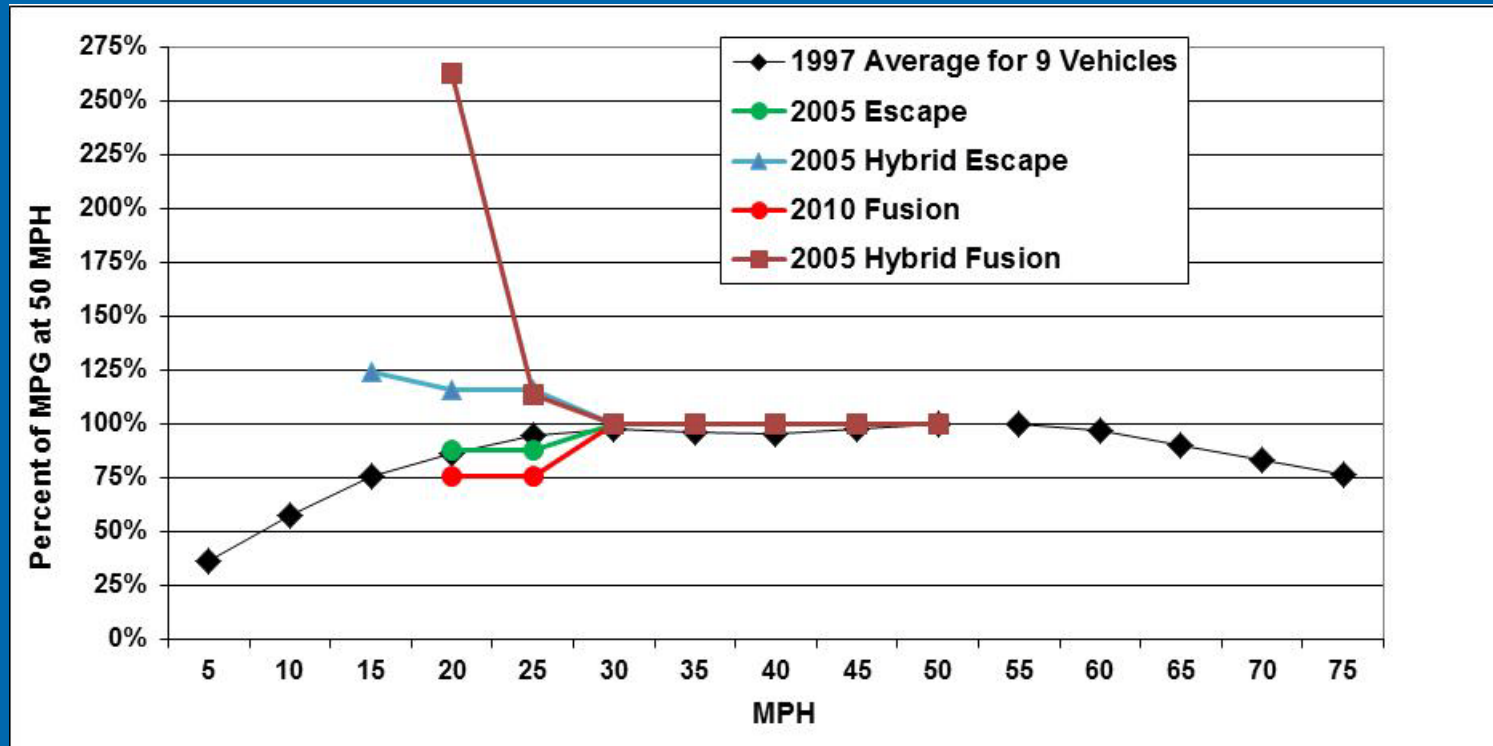
- NHTS trip average MPH includes idle time excluded from EPA test MPH
- 11% of NHTS miles at average trip speed > 60 MPH includes 1% > 80 MPH (and excludes 2% of total NHTS miles at average trip MPH > 99)
- % NHTS trip miles at average speeds of 0 – 24.5 MPH is 160% of the percent of miles at 0 – 24.5 MPH in weighted EPA tests
- 2009 NHTS % < 25 mph is low because recession reduced traffic

## Adjusted EPA MPG vs. Achieved Vehicle Stock MPG



- EPA test MPG for new cars and trucks little changed from 1986-2002
- EPA adjusted MPG was 83% of test MPG for both cars and trucks
- FHWA 1992-2002 car and truck stock MPG (total miles / total fuel) was
  - 75.6% of EPA 1985-2002 new car unadjusted test MPG, and
  - 83.5% of EPA 1985-2002 new truck unadjusted test MPG.
- 2009 NHTS data show 22% of car miles vs. 18% of truck miles at average trip speeds of less than 25 mph

## Hybrid Vehicles vs. 1997 MPG by MPH



- Ford Escape and Fusion city MPG ratings (average speed of 21-26 mph) are 88% and 76% of highway MPG, similar to 1997 MPG by MPH trend
- Hybrid Escape and Fusion city MPG ratings are 115% of highway MPG
- Hybrid Escape tested at average of 15 MPH was 125% of highway MPG
- Hybrid Fusion tested at average of 20 MPH was 270% of highway MPG

# Implications for Transportation Decision Making

- Steady speed MPG by MPH tests need to be updated with comparisons for hybrid and non-hybrid vehicles
- EPA should consider adding NYC drive cycle with new MPG weightings:
  - 20% NYC drive cycle
  - 50% City drive cycle
  - 30% Highway drive cycle (with adjustments for 60-80 MPH)
- Simple calculator could be provided at [fueleconomy.gov](http://fueleconomy.gov) to allow car buyers to enter estimates of the percent distribution of their trip miles by drive cycle (NYC + city + highway = 100%) to better estimate their achieved mpg
- This calculator would be especially helpful in communicating the value of hybrid vehicles to drivers who travel more often in congested traffic.