Improvements in vehicle emissions and fuel economy: 2008 to the present

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Research on energy, environmental, and safety aspects of future road transportation worldwide
What is the EDI?

A national index that estimates the average monthly amount of greenhouse gases (GHG) produced by an individual U.S. driver who has purchased a new vehicle that month.

www.ecodrivingindex.org
www.umich.edu/~umtriswt/ecodriving.html
How is the EDI calculated?

- Monthly values from two sub-indexes:
  - \( EDI_d \) – distance driven per driver
  - \( EDI_f \) – fuel used per distance driven
How is the EDI calculated?

- EPA method for fuel economy estimates changed with MY2008
  - Not directly comparable with pre-MY2008 values
- Monthly values are scaled relative to October 2008 – the nominal starting month of MY2008
How is the EDI calculated?

\[ EDI_d \times EDI_f = EDI \]
EDI values

EDI for April 2014:

0.99 × 0.81 = 0.80
EDI values

Proportion relative to Oct-07

Month-Year

EDId (distance driven)

0.93
-7%
EDI values

Proportion relative to Oct-07

Month-Year

EDIf (fuel used per distance driven)

0.81  -19%
EDI values

Proportion relative to Oct-07

Month-Year

EDI_d (distance driven)

EDI_f (fuel used per distance driven)

0.99

0.81
EDI values

The graph shows the proportion of EDI values relative to Oct-07 for different periods, with labels for EDI_d (distance driven), EDI_f (fuel used per distance driven), and EDI (vehicle emissions). The graph indicates a decrease in EDI values over time, with a notable drop of 20%.
EDI values

Month-Years

Proportion relative to Oct-07

EDI (vehicle emissions)

EDI_D (distance driven)

EDI_f (fuel used per distance driven)

0.78 -22%

UMTRI
Fuel economy monitoring

- Average sales-weighted fuel economy
  - Monthly sales of new, light-duty vehicles
  - EPA “combined” city/highway ratings (window sticker value)
  - Corporate Average Fuel Economy (CAFE) ratings also monitored
On-road fuel economy: 1923-2008

Miles per gallon

Year

All vehicles

Cars

Light trucks

All trucks

Medium and heavy trucks

+3.4 mpg
Fuel economy monitoring

Average sales-weighted mpg

Month-Year

25.6 mpg
+5.5 mpg
Fuel economy monitoring

Month-Year

Average sales-weighted mpg

MY2008 20.8
MY2009 21.3
MY2010 22.1
MY2011 22.5
MY2012 23.5
MY2013 24.6
MY2014 25.2

+5.4 mpg (+27%)
Fuel economy monitoring (CAFE)

- Unadjusted mpg in EPA database
- Does not include credits or adjustments available to manufacturers
Fuel economy monitoring (CAFE)

31.1 mpg
+6.4 mpg
Fuel economy monitoring (CAFE)

+6.3 mpg (+26%)
Target values:

- Do not directly account for credits and other adjustments
- Potential to change as future vehicle footprints and fleet sales are unknown (estimates)
Average CAFE (unadjusted mpg)

- CAFE - target
- CAFE - projected achieved

Model year

- MY 2012: 28.7
- MY 2013: 29.7
- MY 2014: 30.6
- MY 2015: 31.5
- MY 2016: 32.2
- MY 2017: 33.8
- MY 2018: 34.9
- MY 2019: 36.0
- MY 2020: 38.2
- MY 2021: 39.9
- MY 2022: 40.0
- MY 2023: 41.7
- MY 2024: 42.9
- MY 2025: 44.2
- MY 2026: 45.6
- MY 2027: 46.2
- MY 2028: 52.0
- MY 2029: 54.5
Projected Achieved:

- Sales-weighted harmonic mean fuel economy of the unadjusted mpg
- Anticipated actual performance (without credits)
- Assumes credits will be used to make up the difference
Fuel economy monitoring (CAFE)

+5.2 mpg (+20%)
Fuel economy monitoring (CAFE)
Summary

- Average new-vehicle fuel economy near a record high
- Fuel economy improvements have resulted in a significant decrease in emissions from new vehicles
- CAFE performance exceeded projections in previous 2 years
- On track to meet or exceed CAFE projections this year
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Thank you