

# University of Michigan Eco-Driving Index (EDI)

<http://www.ecodrivingindex.org>

Latest data: March 2014

Developed and issued monthly by

Michael Sivak and Brandon Schoettle

Sustainable Worldwide Transportation (<http://www.umich.edu/~umtriswt>)

University of Michigan Transportation Research Institute

## What is the EDI?

The University of Michigan Eco-Driving Index (EDI) is a national index that estimates the average monthly amount of greenhouse gases produced by an individual U.S. driver who has purchased a new vehicle that month. The amount of greenhouse gases emitted when using internal-combustion engines depends on the amount of fuel used. The EDI estimates the amount of fuel used (and thus the amount of greenhouse gases emitted) by taking into account two primary variables: the fuel economy of the vehicle and the distance driven.

## How is the EDI calculated?

The monthly values of the EDI are derived from two sub-indexes: (1) the average amount of fuel used per distance driven by newly purchased vehicles ( $EDI_f$ ), and (2) the distance driven per individual driver ( $EDI_d$ ). The index and the two sub-indexes are computed monthly relative to their respective values in October 2007 (the nominal start of the 2008 model year—the first model year for which the EPA started using the current fuel-economy rating system). The EDI is computed by cross-multiplying  $EDI_f$  and  $EDI_d$ . The lower the value of the EDI, the smaller the environmental impact.

$EDI_f$  estimates the relative amount of fuel needed to drive a fixed distance.  $EDI_f$  is calculated as an inverse of the sales-weighted harmonic mean fuel economy of purchased new vehicles for each individual month.

$EDI_d$  provides information about the relative amount of driving per licensed driver.  $EDI_d$  starts with the estimates of the total distance driven in the U.S. for each month as issued by FHWA. These raw distances are then adjusted by us to take into account (1) the seasonal variations in driving (in the U.S. more driving is done in the summer than in the winter), (2) the varying number of days in a month, (3) the continuously increasing number of drivers, and (4) the so-called rebound effect (increased amount of driving as a consequence of improved fuel economy of the new vehicle). (As recommended by the EPA, a rebound effect of 10% is included, meaning that 10% of the gain in fuel economy is assumed to be effectively lost due to increased amounts of driving.)

## Current, recent, and future values of the EDI

The values of the index (EDI) and of its two sub-indexes ( $EDI_f$  and  $EDI_d$ ) from October 2007 through March 2014 are shown in Figure 1 and Table 1.

The EDI for March 2014 stands at 0.78, indicating that in March 2014 there was a 22% reduction of emissions per driver of newly purchased vehicles compared to the situation in October 2007. ( $EDI_f$  and  $EDI_d$  for March 2014 are 0.81 and 0.96, respectively.)

Future monthly values of the EDI will be issued with a lag of about 50 days (due to lags in the availability of the underlying data). (Data for recent months are occasionally updated in the underlying FHWA and EPA data sources, possibly resulting in small changes to recent sub-index and EDI values.)

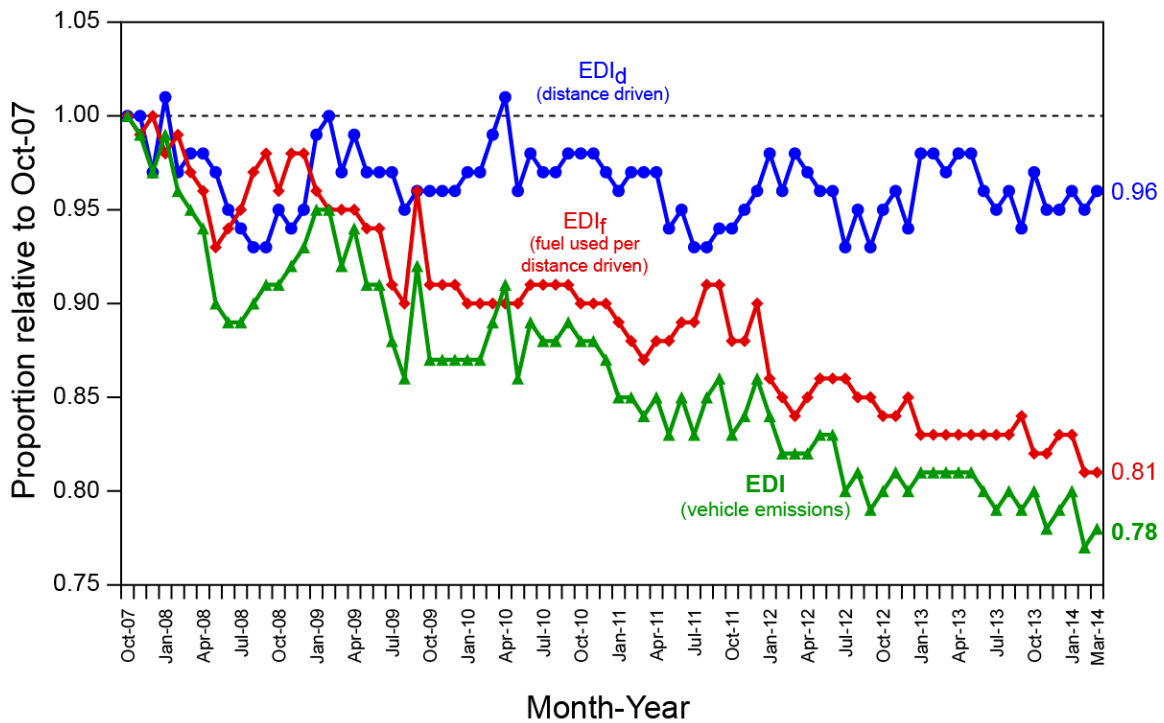


Figure 1. University of Michigan Eco-Driving Index (EDI) and the two sub-indices ( $EDI_d$  and  $EDI_f$ ) for October 2007 through March 2014.

Table 1  
University of Michigan Eco-Driving Index (EDI) and the two sub-indices ( $EDI_d$  and  $EDI_f$ ) for October 2007 through March 2014.

| Month-Year | $EDI_d$<br>(distance driven) | $EDI_f$<br>(fuel used per<br>distance driven) | EDI<br>(vehicle emissions) |
|------------|------------------------------|---|----------------------------|
| Mar-14     | 0.96                         | 0.81  | 0.78                       |
| Feb-14     | 0.95                         | 0.81  | 0.77                       |
| Jan-14     | 0.96                         | 0.83  | 0.80                       |
| Dec-13     | 0.95                         | 0.83  | 0.79                       |
| Nov-13     | 0.95                         | 0.82  | 0.78                       |
| Oct-13     | 0.97                         | 0.82  | 0.80                       |
| Sep-13     | 0.94                         | 0.84  | 0.79                       |
| Aug-13     | 0.96                         | 0.83  | 0.80                       |
| Jul-13     | 0.95                         | 0.83  | 0.79                       |
| Jun-13     | 0.96                         | 0.83  | 0.80                       |
| May-13     | 0.98                         | 0.83  | 0.81                       |
| Apr-13     | 0.98                         | 0.83  | 0.81                       |
| Mar-13     | 0.97                         | 0.83  | 0.81                       |

(continued)

Table 1 (continued)

| Month-Year | EDI <sub>d</sub><br>(distance driven) | EDI <sub>f</sub><br>(fuel used per<br>distance driven) | EDI<br>(vehicle emissions) |
|------------|---------------------------------------|--|----------------------------|
| Feb-13     | 0.98                                  | 0.83   | 0.81                       |
| Jan-13     | 0.98                                  | 0.83   | 0.81                       |
| Dec-12     | 0.94                                  | 0.85   | 0.80                       |
| Nov-12     | 0.96                                  | 0.84   | 0.81                       |
| Oct-12     | 0.95                                  | 0.84   | 0.80                       |
| Sep-12     | 0.93                                  | 0.85   | 0.79                       |
| Aug-12     | 0.95                                  | 0.85   | 0.81                       |
| Jul-12     | 0.93                                  | 0.86   | 0.80                       |
| Jun-12     | 0.96                                  | 0.86   | 0.83                       |
| May-12     | 0.96                                  | 0.86   | 0.83                       |
| Apr-12     | 0.97                                  | 0.85   | 0.82                       |
| Mar-12     | 0.98                                  | 0.84   | 0.82                       |
| Feb-12     | 0.96                                  | 0.85   | 0.82                       |
| Jan-12     | 0.98                                  | 0.86   | 0.84                       |
| Dec-11     | 0.96                                  | 0.90   | 0.86                       |
| Nov-11     | 0.95                                  | 0.88   | 0.84                       |
| Oct-11     | 0.94                                  | 0.88   | 0.83                       |
| Sep-11     | 0.94                                  | 0.91   | 0.86                       |
| Aug-11     | 0.93                                  | 0.91   | 0.85                       |
| Jul-11     | 0.93                                  | 0.89   | 0.83                       |
| Jun-11     | 0.95                                  | 0.89   | 0.85                       |
| May-11     | 0.94                                  | 0.88   | 0.83                       |
| Apr-11     | 0.97                                  | 0.88   | 0.85                       |
| Mar-11     | 0.97                                  | 0.87   | 0.84                       |
| Feb-11     | 0.97                                  | 0.88   | 0.85                       |
| Jan-11     | 0.96                                  | 0.89   | 0.85                       |
| Dec-10     | 0.97                                  | 0.90   | 0.87                       |
| Nov-10     | 0.98                                  | 0.90   | 0.88                       |
| Oct-10     | 0.98                                  | 0.90   | 0.88                       |
| Sep-10     | 0.98                                  | 0.91   | 0.89                       |
| Aug-10     | 0.97                                  | 0.91   | 0.88                       |
| Jul-10     | 0.97                                  | 0.91   | 0.88                       |
| Jun-10     | 0.98                                  | 0.91   | 0.89                       |
| May-10     | 0.96                                  | 0.90   | 0.86                       |
| Apr-10     | 1.01                                  | 0.90   | 0.91                       |
| Mar-10     | 0.99                                  | 0.90   | 0.89                       |

(continued)

Table 1 (continued)

| Month-Year | EDI <sub>d</sub><br>(distance driven) | EDI <sub>f</sub><br>(fuel used per<br>distance driven) | EDI<br>(vehicle emissions) |
|------------|---------------------------------------|--|----------------------------|
| Feb-10     | 0.97                                  | 0.90   | 0.87                       |
| Jan-10     | 0.97                                  | 0.90   | 0.87                       |
| Dec-09     | 0.96                                  | 0.91   | 0.87                       |
| Nov-09     | 0.96                                  | 0.91   | 0.87                       |
| Oct-09     | 0.96                                  | 0.91   | 0.87                       |
| Sep-09     | 0.96                                  | 0.96   | 0.92                       |
| Aug-09     | 0.95                                  | 0.90   | 0.86                       |
| Jul-09     | 0.97                                  | 0.91   | 0.88                       |
| Jun-09     | 0.97                                  | 0.94   | 0.91                       |
| May-09     | 0.97                                  | 0.94   | 0.91                       |
| Apr-09     | 0.99                                  | 0.95   | 0.94                       |
| Mar-09     | 0.97                                  | 0.95   | 0.92                       |
| Feb-09     | 1.00                                  | 0.95   | 0.95                       |
| Jan-09     | 0.99                                  | 0.96   | 0.95                       |
| Dec-08     | 0.95                                  | 0.98   | 0.93                       |
| Nov-08     | 0.94                                  | 0.98   | 0.92                       |
| Oct-08     | 0.95                                  | 0.96   | 0.91                       |
| Sep-08     | 0.93                                  | 0.98   | 0.91                       |
| Aug-08     | 0.93                                  | 0.97   | 0.90                       |
| Jul-08     | 0.94                                  | 0.95   | 0.89                       |
| Jun-08     | 0.95                                  | 0.94   | 0.89                       |
| May-08     | 0.97                                  | 0.93   | 0.90                       |
| Apr-08     | 0.98                                  | 0.96   | 0.94                       |
| Mar-08     | 0.98                                  | 0.97   | 0.95                       |
| Feb-08     | 0.97                                  | 0.99   | 0.96                       |
| Jan-08     | 1.01                                  | 0.98   | 0.99                       |
| Dec-07     | 0.97                                  | 1.00   | 0.97                       |
| Nov-07     | 1.00                                  | 0.99   | 0.99                       |
| Oct-07     | 1.00                                  | 1.00   | 1.00                       |