



## AUTOMOTIVE ENGINEERING

# FACT SHEET



## Test Results: Fuel Economy—Phase I & II

### BACKGROUND & METHODOLOGY

As a service to its members, the automotive industry and the general public, AAA conducted a multi-phase analysis of fuel economy ratings to determine the accuracy of mileage ratings shown on new vehicle window stickers. The results of the first two phases are as follows:

#### Fuel Economy: Phase I

- Motorists' self-reported\*, real-world fuel economy data submitted to the U.S. Environmental Protection Agency (EPA) website were analyzed to determine the extent to which motorists achieve the EPA-rated fuel economy for the vehicles they drive.
- Over 37,000 records representing over 8,400 vehicle year/make/model combinations were analyzed by AAA automotive engineers. This information was used to identify vehicles that were frequently reported as failing to meet the EPA's fuel economy ratings for subsequent research (*Phase II*)

#### Fuel Economy: Phase II

- Three vehicles from Phase I with an owner-reported fuel economy of nine to 12 percent less than the EPA "combined" rating were selected for additional testing.
- Each vehicle was evaluated by the Automobile Club of Southern California's Automotive Research Center using the EPA's city, highway and aggressive driving test cycles. These tests were performed on their chassis dynamometer using certified emissions equipment. Additional road testing was accomplished by driving the vehicles for a four week period. Drivers with different commutes and representing different demographics each drove the test vehicles for a week and maintained detailed logs of traffic, weather and fuel consumption.

### KEY FINDINGS—Phase I

#### Among drivers who submitted their vehicle's real-world fuel economy to EPA.gov:

- Drivers report a real-world fuel economy that averages 12 percent higher than the combined city and highway EPA mileage ratings for their vehicle.
- Eight out of 10 (81.8 percent) report higher fuel economy than the EPA ratings for their vehicle.
- 16 percent report lower fuel economy than the EPA ratings.
- 2.2 percent report fuel economy that matched the EPA ratings.
- Owners of vehicles equipped with manual transmissions reported, on average, 17 percent higher fuel economy than EPA ratings. Identical vehicles equipped with automatic transmissions were reported to achieve fuel economy only seven percent higher than EPA ratings.
- Owners of diesel-fuel vehicles, including light trucks, reported 20 percent higher fuel economy than EPA ratings.
- Minivan owners reported fuel economy that was equal to, or slightly lower than, EPA ratings.
- Truck owners with V-8 engines reported fuel economy that was five percent higher than EPA ratings, while owners of turbocharged V-6 engines reported fuel economy nine percent lower.
- Owners of sedans with V-6 engines reported a nine percent higher fuel economy than EPA ratings, while turbocharged four-cylinder engines reported fuel economy that was four percent lower than ratings.

## KEY FINDINGS—Phase II

- In an analysis of self-reported fuel economy data from the U.S. Environmental Protection Agency (*Phase I*), AAA identified three vehicles that were frequently reported as achieving “real world” fuel economy lower than the EPA’s window sticker rating.
- AAA tested these vehicles—a 2014 full-size pickup truck, a 2014 large sedan and a 2012 medium sedan— on an emissions-testing dynamometer and in a real-world setting to determine if the vehicles failed to meet EPA ratings.
- Test results showed the fuel economy of all three vehicles slightly exceeded EPA ratings when tested on dynamometers.
- Real world fuel economy of the three vehicles spanned the range of EPA window sticker values for city and highway miles-per-gallon.
- AAA concludes that an individual’s driving behaviors, including speed, rate of acceleration and braking, along with vehicle condition, driving environment and terrain are likely responsible for deviations from EPA ratings.

Phase III of AAA’s Fuel Economy Testing, in progress, will measure the specific impact that driving style, conditions, climate and terrain have on fuel economy. These results will be released in late 2015.

## WHAT DOES THIS MEAN FOR DRIVERS?

**Accelerate gently:** The harder you accelerate, the more fuel you consume. To maximize your fuel efficiency, take five seconds to accelerate a vehicle to 15 mph from a stop.

**Anticipate traffic:** Look ahead to avoid sudden stops and starts.

**Avoid high speeds:** Vehicles operate most efficiently when traveling between 30 and 50 miles per hour. Every 5 mph above 50 mph is like paying an additional 19 cents per gallon for gas\*\*.

**Coast to decelerate:** Where possible, coast to slow or stop to avoid unnecessary braking. Be sure to always use the brakes as necessary to let other motorists know your intentions.

**Maintain a steady speed:** Tests have shown that using cruise control (in highway driving) can save you fuel by avoiding constant speeding and slowing\*\*.

**Get junk out of the trunk:** Excess weight is a drag on your fuel economy. It costs more to haul every extra pound and roof-top carriers multiply the effect with additional wind resistance.

**Avoid excess idling:** For the conventional car or truck, turning off the ignition while waiting in a slow drive-through lane or picking up a child after school can save as much as three cents in fuel per minute.

## ABOUT EPA FUEL ECONOMY TESTING

- Automakers test their own vehicles – usually pre-production – and send the results to the EPA for the window stickers of new vehicles.
- The EPA reviews the results submitted by automakers and retests approximately 10 to 15 percent of those vehicles in the National Vehicles and Fuel Emissions Laboratory in Ann Arbor, Michigan. Performed on a dynamometer, this testing is carefully calibrated to replicate the expected road surface friction and wind resistance a vehicle would experience in real-world driving. The majority of tests conducted by the EPA are rechecks of the manufacturer’s submitted test results and the remaining stem from reports from consumers claiming their vehicle does not achieve the rated fuel economy.
- EPA fuel economy ratings are determined by a complex weighting of the results from five different tests performed on an emissions dynamometer. To ensure accurate results across multiple testing facilities, the EPA provides guidance to automakers on specific dynamometer settings that accurately reflect the effects of tire rolling resistance, driveline losses and aerodynamic drag.
- The Fuel Economy and Environment Label (window sticker) includes information that is valuable to make direct comparisons between vehicles. From a budgeting perspective, the Annual Fuel Cost, also on the window sticker, may be an easy-to-understand alternative to the miles-per-gallon fuel economy.