

gasoline savings in response to a higher CAFE standard for light-duty trucks would reduce disruption costs by this amount in addition to the value of savings in gasoline itself.

General Motors and Lutter and Kravitz commented that the agency's economic analysis should include the external costs of increased congestion, noise, and accidents caused by additional driving due to the rebound effect. While the agency views the values provided by Lutter and Kravitz and General Motors out of the mainstream of estimates, the agency has decided to add these costs into its analysis. The agency reviewed several sources for estimates, including FHWA, and determined that it will use a figure of 4.0 cents, 2.15 cents, and 0.06 cents per vehicle-mile for congestion, accident, and noise costs, respectively.

Both vehicle manufacturers and consumer groups commented on the effect of higher vehicle prices on sales. Consumer groups argued that consumers are willing to pay more for fuel economy. Honda, on the other hand, questioned whether consumers would trade other features for fuel economy and whether they would consider fuel economy savings beyond their ownership period. The agency has decided to add into its analysis a discussion of the impacts of higher prices on sales. Based on the economic literature, cited in Chapter VII of the FEA, a price elasticity of 1.0 is assumed. The agency believes that higher light truck prices could shift some new vehicle sales from light trucks to automobiles and might also delay retirement and replacement of used vehicles.

The agency has also decided to provide a value associated with the benefits attained through refueling time saved over the lifetime of the vehicle. No direct estimates of the value of extended vehicle range were readily available, so our analysis calculates the reduction in the annual number of required refueling cycles that results from improved fuel economy, and applies DOT-recommended values of travel time savings to convert the resulting time savings to their economic value. (See Chapter VIII of the FEA for a detailed description of those values.) The estimated change in required refueling frequency reflects the increased light truck use associated with the rebound effect, as well as the increased driving range stemming from higher fuel economy. The present value of lifetime social benefit from extended vehicle range are estimated at \$22.6 million for MY 2005, 73.2 million for MY 2006, and 107.7 million for MY

2007. We recognize that this value may represent an upper bound estimate of this benefit. Some people may periodically refuel their vehicles (e.g., each weekend) regardless of how much fuel they have.

g. Refinery Emissions/GREET

In order to estimate the contribution of refinery emissions, we employed the GREET model in our analysis. The Draft Environmental Assessment included petroleum refining and distribution emissions as representative of "upstream" emissions. The agency calculated the changes in these upstream emissions under the proposal. General Motors commented that the agency incorrectly used extraction emissions factors in its analysis.

Upon reviewing this issue, the agency agrees with General Motors' comment that we did not appropriately account for the emissions reductions likely to result from gasoline savings due to the agency's CAFE action. However, the agency disagrees with General Motors' contention that emissions attributable to petroleum extraction would be unaffected by the action and should thus be excluded from its analysis of the action's potential environmental impacts.

In response to General Motors' comments, we have used information derived from the GREET model to disaggregate total emissions throughout the gasoline supply process into those occurring during each of the different stages in that process, and we have employed these disaggregated emission factors to develop more reliable estimates of the reduction in emissions associated with lower gasoline consumption by light trucks. Specifically, we have used information extracted from the GREET model to develop separate estimates of emissions that occur during each of four phases of the gasoline production and distribution process: crude oil extraction; crude oil storage and transportation to refineries; gasoline refining; and transportation, storage, and distribution of refined gasoline. (Emissions that occur during vehicle refueling at gasoline stations are included in our estimates of increased emissions from additional light truck use due to the rebound effect, and are presented separately in the analysis.)

Our revised analysis incorporates the following assumptions in estimating the reductions in these emissions from lower gasoline use by light trucks: (1) Reductions in imports of gasoline reduce emissions associated with gasoline transportation, storage, and distribution; (2) reductions in domestic refining of gasoline from imported crude

oil reduce emissions associated with crude oil transportation and storage, crude oil refining into gasoline, and gasoline transportation, storage, and distribution; and (3) reductions in domestic refining of gasoline from domestically-produced crude oil reduce emissions associated with crude oil extraction, crude oil transportation and storage, gasoline refining, and gasoline transportation, storage, and distribution.⁹

We use these assumptions in conjunction with the disaggregated emission factors for each phase of the gasoline supply process and assumptions regarding the reductions in imports and domestic refining of gasoline (see foreign-domestic split, below) attributable to fuel savings from this final rule. The resulting estimates of emissions reductions associated with gasoline supply and distribution are reflected in our calculations. We believe that these estimates respond to General Motors' concerns.

h. Foreign-Domestic Split

In the NPRM, we assumed that 45 percent of the reduction in fuel use would be reflected in reduced domestic gasoline refining, and that the remaining 55 percent would be met by reduced imports of refined gasoline. We stated, "Part of the fuel savings resulting from the Proposed Action leads to lower U.S. imports of refined gasoline, and thus does not affect refinery emission levels in the U.S. However, the remaining fuel savings are assumed to reduce the volume of gasoline refined within the U.S. (from either imported or domestically-produced crude petroleum), which produces a corresponding reduction in criteria pollutant refinery emissions. This analysis assumes 55 percent of refined gasoline is imported and 45 percent is refined domestically." This estimate was based on a detailed analysis of differences in gasoline consumption, imports, and domestic refining between the "Low Economic Case" and the "Reference Case" forecasts presented in the EIA's AEO 2002. (This analysis was conducted by EIA at the request of the agency.)

General Motors questioned this assumption, stating that there is little evidence that this same proportion

⁹In effect, these assumptions imply that the distance that crude oil typically travels to reach refineries is approximately the same regardless of whether it is transported from domestic oilfields or import terminals, and that the distance that domestically-refined gasoline travels from refineries to retail gasoline stations is approximately the same as foreign-refined gasoline must be transported from import terminals to these same gasoline stations.