

weight to improve fleet fuel economy, and thereby helps to improve safety.

A simple weight-based standard could be based on a relationship in which fuel consumption (gallons per mile) varies with respect to curb weight. Compared to a single value standard, a simple weight-based standard could discourage

manufacturers from complying by reducing vehicle weight or reduce the incentive that exists under the current program. However, NHTSA's updated size and safety study suggests that fleet-wide safety is unlikely to be compromised—and may actually be enhanced—by modest reductions in the

weight of vehicles of curb weight greater than approximately 5,000 pounds. Such considerations led the NAS to suggest a standard that would be weight-based below 4,000 pounds and fixed for vehicles weighing above 4,000 pounds.¹¹ This concept is illustrated in Figure 1.

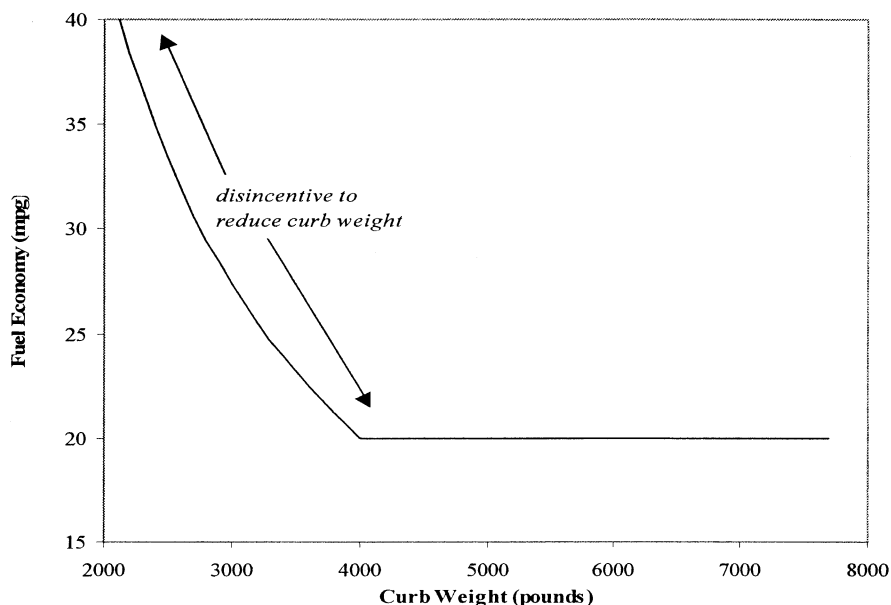


Figure 1. NAS E-CAFE Standard (mile per gallon basis)

As observed by the NAS, while limiting the incentive to reduce the weight of lighter vehicles, this approach would create “a strong set of incentives to improve the fuel economy of the heaviest vehicles.” (NAS, p. 108) As is true under the current fixed-value CAFE system, the E-CAFE standard would not discourage weight reduction as a compliance strategy above this 4,000-pound break point.

Using the NAS E-CAFE concept as a model, we have considered how such a weight-based standard might be applied to the light truck fleet. We considered a similarly discontinuous function with a fixed value at curb weights over 5,000 pounds. However, our analysis is focused on light trucks alone, rather than light trucks and cars together. For illustrative purposes, we used the prevailing standard for passenger cars, 27.5 mpg, as a constant at the lower end

of the truck weight range. Because this function involves discontinuities near which behavior might be distorted, we also examined a continuous function (in this case, a logistic function) that approaches limits equal to the constant-value segments of the discontinuous function.

To better understand the implications of these two potential standards, we used data for the MY 2002 fleet and adjusted the constants for each function until the stringency as applied to the overall industry was equivalent to the stringency under the baseline standard (*i.e.*, a constant-value standard of 20.7 mpg). The individual data points plotted in Figure 2 show the curb weights and fuel economies of different light truck models sold in MY 2002. The dashed line shows the constant-value 20.7 mpg standard applicable in MY 2002. The two solid lines show weight-

based standards that would have been equivalent in stringency (*i.e.*, that given the same mix of vehicles, would have resulted in the same net fines required) to the constant-value 20.7 mpg standard. The cross-marked solid line shows a standard modeled on the NAS E-CAFE approach and an underlying linear dependence of fuel consumption on curb weight. The unmarked solid line shows a standard that uses an underlying logistic dependence of fuel consumption on curb weight. While these examples both originated from statistical analysis of the MY 2002 data, because a CAFE standard fulfills a prescriptive rather than descriptive purpose, there is no a priori reason any attribute-based standard for a future model year would need to fit the historical data.

¹¹ It should be noted that the 4,000 lb. break point identified by NAS is not based on the updated NHTSA size and safety study, and that the point

selected by NAS reflects a system that combines both cars and light trucks into a single category.

Therefore, that break point might not be appropriate under the system considered here.