INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

May 8, 2002

Jeffrey W. Runge, M.D.
Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Request for Comments; National Academy of Science Study and Future Fuel Economy Improvements, Model Years 2005-2010
Docket No. NHTSA 2002-11419

Dear Dr. Runge:

The Insurance Institute for Highway Safety is pleased to have the opportunity to respond to the National Highway Traffic Safety Administration's (NHTSA) questions regarding future fuel economy requirements for cars and light trucks. Although the Institute understands that the impetus for NHTSA's request for comment is based on the agency's intention "to begin developing a proposal for light truck average fuel economy standards for model years after MY 2004"(page 5769), it is hoped that these comments will be applied generally to the issue of fuel economy standards for all light duty vehicles.

These comments will be brief and focus on the safety implications of the current Corporate Average Fuel Economy (CAFE) structure. The Institute believes that the National Academy of Sciences (NAS) report referenced in the notice provides a thorough review of the issues involved in designing fuel economy requirements that are consistent with safety, economic, and environmental concerns. The Institute is largely in agreement with the conclusions of the report and believes the agency should be guided by the report in its current deliberations. Nevertheless, we would like to expand on a few points: the potential for higher fuel economy requirement to increase fatalities and injuries under the current CAFE structure, the possible structure of a weight-indexed or size-indexed (attribute-based) standard to reduce incentives to downweight or downsize vehicles, and the potential for an attribute-based system that considers cargo or load capability to replace the increasingly artificial distinction between cars and light trucks.

Current CAFE Standard and Safety

NHTSA's notice asks, "Could CAFE standards be modified so that manufacturers are encouraged to achieve improved fuel economy through application of technology instead of through downsizing and

downweighting?" (page 5770). The question indicates that NHTSA appreciates the potential for adverse safety consequences if new CAFE requirements caused downsizing and downweighting in the new car fleet as occurred in response to the energy crisis and CAFE requirements of the 1970s. However, the agency needs to recognize that adverse safety consequences could result from other manufacturer strategies as well as the relatively uniform downweighting that occurred then.

For example, if the agency increases CAFE to require greater light truck fuel economy, manufacturers might achieve the new requirements in a number of ways under the current CAFE structure:

- New engine technology and aerodynamic designs might be used. From a safety standpoint, this is the desired strategy. However, there is nothing about the current CAFE structure that makes this strategy preferable to manufacturers over other possible strategies.
- Weight could be reduced across all sizes of trucks. This is a likely scenario, as it not only improves fuel economy but could also reduce production costs if the weight savings were achieved through reduced materials. For example, the steel industry has developed innovative structural designs that are as strong as today's common designs but use much less steel (American Iron and Steel Institute, 1998). Such reductions in weight, if applied across all truck categories, would be expected to increase occupant deaths in light trucks but might reduce deaths among car occupants with whom they crash.
- Manufacturers could increase the sales of the lightest and most fuel economical categories of trucks to offset sales of larger, heavier, less fuel economical but more profitable trucks. This strategy could comply with increased CAFE but would have an adverse effect on safety by increasing the diversity of vehicle weights.
- A strategy related to the previous one would be to modify designs of future lightweight vehicles to permit their classification as trucks rather than cars for purposes of light truck fuel economy. For example, the Chrysler PT Cruiser, a throwback in appearance to 1940's car designs, is sold as a light truck and counts toward light truck CAFE requirements. This strategy does nothing to improve fleet fuel economy and can be inimical to safety if it permits the sale of ever more powerful and heavier large sport utility vehicles (SUVs) and pickups.

It is likely that any manufacturer's approach to higher CAFE requirements for light trucks -- or cars -- would involve a combination of the four strategies outlined. To the extent that the latter three strategies are common, and all three are now being used,

we can expect additional fatalities and injuries from downweighting or increased diversity of weights in the vehicle fleet.

Weight or Size Indexing as an Attribute-Based Standard

NHTSA's notice asks for comment on the NAS report's suggestion that an attribute-based standard -- in particular, fuel economy requirements that vary inversely with vehicle weight -- could remove the incentive for downweighting or downsizing of vehicles. The Institute supports the NAS suggestion. In fact, for reasons that have been described in detail in a recent issue of our newsletter *Status Report* (attached), we believe that a system of fuel economy requirements indexed to vehicle weight clearly removes vehicle downweighting as a strategy for compliance, forcing manufacturers to use new technology for fuel economy rather than increased power or other attributes unrelated or even inimical to vehicle safety or fuel economy. The principal questions to be answered concern possible adverse economic impacts on vehicle manufacturers as a whole or domestic vehicle manufacturers in particular.

In this comment, the Institute simply would point out that the agency may be construing too narrowly the ways in which an attribute-based (weight-indexed) system could be realized. NHTSA's notice says, "in an attribute-based system, each manufacturer might have to meet an overall production-weighted fuel economy average, and/or each manufacturer might have to meet a different fuel economy average for the vehicles that were produced in each specific size, weight or load class" (page 5772). There is at least a third option, namely that each automaker would meet a manufacturer-specific production-weighted average derived from the specific combination of vehicle types/weights sold by that manufacturer. The agency would determine the target fuel economy for each vehicle weight, and the sum of any manufacturer's deviations from the target would have to be zero or negative. This is numerically equivalent to the current CAFE requirement, except that the target for all light trucks is 20.7 mpg, and the sum of a manufacturer's deviations from 20.7 mpg must be zero.

This latter option retains manufacturers' current flexibility to average fuel economy across all vehicles they sell. At the same time, it does not penalize any manufacturer that has specialized in vehicles with clear business uses whose required designs make them less fuel economical, as NHTSA's first option could if all manufacturers were held to a common requirement. It also need not establish large weight, size, or load classes across which products might be averaged. For example, if fuel economy requirements were to be indexed to 500-pound categories, there would be an incentive for manufacturers to build vehicles as close in weight to the lower threshold as possible

in order to maximize fuel economy. Vehicles as much as 500 pounds different in weight have demonstrably different safety records, so again an incentive to downweight would be introduced that could unnecessarily damage safety, though much less so than the current CAFE structure, which has no weight indexing. The Institute urges NHTSA to consider such a weight-indexed CAFE as well as the two options indicated in the notice requesting comments.

Attribute-Based Standard to Replace Car/Truck Distinction

In the notice, NHTSA correctly points out that "the functional distinction between cars and trucks (cars for personal use and trucks for work cargo use) has broken down" (page 5772). In fact, as pointed out earlier in this comment, an increase in light truck CAFE could have the effect of creating new "crossover vehicles," vehicles that look and function like cars but, with minor features included (e.g., removable rear seats), could be classified as light trucks in order to meet an increased light truck CAFE requirement.

The ultimate irony of this process is that it limits any potential safety benefits that could accrue from increasing light truck CAFE requirements. NHTSA has noted "NAS found that if future weight reductions occur in only the heaviest of the light duty vehicles [i.e., the heaviest trucks], that can produce overall improvements in vehicle safety" (page 5771). This expectation occurs because the increased fatality risk for occupants of the downweighted trucks is offset by reduced fatality risks to other road users with whom they may crash. However, if the new vehicles designed to replace today's cars are increasingly classified as light trucks, then there need be no downweighting of heavier SUVs and pickups to meet CAFE. Moreover, if all cars are reclassified as light trucks, then an increased fuel economy standard for light trucks might have neither safety nor fuel economy benefits.

The Institute believes it is possible to replace the increasingly artificial CAFE distinction between cars and trucks with a single CAFE that is indexed both to a vehicle's weight and its cargo capacity. Essentially, as the weight of a vehicle increases, its allowable fuel consumption should be allowed to increase. However, as weight increases, fuel efficiency -- the amount of fuel used to move that weight -- also could increase, thereby limiting the allowable increase in fuel consumption. In other words, NHTSA could require heavier vehicles to be more fuel efficient (pound for pound) in transporting people and cargo. This is a combination of the "weight specific" (i.e., weight indexed) and "load specific" approaches to measuring and regulating fuel consumption, discussed in Attachment 3A of the NAS report. Such a system would require, for example, that the ratio of

fuel consumed per mile to gross vehicle weight (loaded weight) decline as vehicles became heavier. The system would treat similarly a 4,000 pound station wagon and a 4,000 pound SUV, in that their allowable fuel consumption would depend first on their weight. However, if the SUV were able to carry more cargo or tow more weight, it would be allowed slightly higher fuel consumption because in its use as designed it is more fuel efficient per pound transported. Thus, additional allowable fuel consumption would be based on its rated ability to do work -- the presumable reason for the car/truck distinction.

Obviously, a load-specific, weight-indexed CAFE is a complex system that requires further study. However, its potential to replace the artificial distinction between cars and trucks with a more logical way of allowing for the different use characteristics of these vehicles could be beneficial. At a minimum, it removes the possibility of using a vehicle like the Chrysler PT Cruiser -- which has a maximum load capacity little different than a small car -- to offset the fuel inefficiencies of some large, heavy SUVs and pickups. In so doing, it helps bring pressure on manufacturers to reduce the weights and horsepower of those vehicles, which would have a net societal safety benefit.

Sincerely,

Adrian K. Lund, Ph.D.
Chief Operating Officer

Attachment: Insurance Institute for Highway Safety. 2002. *Status Report* 37(4). Arlington, VA.

cc: Docket Clerk, Docket No. NHTSA 2002-11419

Reference

American Iron and Steel Institute. 1998. Ultralight steel auto body, final report. Washington, DC.

STATUS REPORT
INSURANCE INSTITUTE FOR HIGHWAY SAFETY
Vol. 37, No. 4, April 6, 2002

Improve fuel economy without NEGATIVE SAFETY CONSEQUENCES

The overall fuel economy of the passenger vehicles on U.S. roads has deteriorated in recent years, largely because of the surge in popularity of sport utility vehicles. This is prompting legislators and others to call for dramatic changes in federal fuel economy requirements. The potential environmental and safety

implications of the proposed changes are being debated in Washington right now.

Back in 1973, Congress established the corporate average fuel economy (CAFE) program, which required each auto manufacturer to achieve an average of 27.5 miles per gallon across its car fleet by the 1985 model year. The legislation authorized the U.S. Department of Transportation to set CAFE standards for light trucks (sport utility vehicles, minivans, and pickups). Current requirements, which Congress froze in 1996, are 27.5 miles per gallon for cars, 20.7 for light trucks.

The debate going on now isn't the first one since CAFE began that has invoked calls for major changes (see *Status Report*, Sept. 8, 1990). But this time around the potentially negative safety effects of tougher CAFE requirements are attracting more attention.

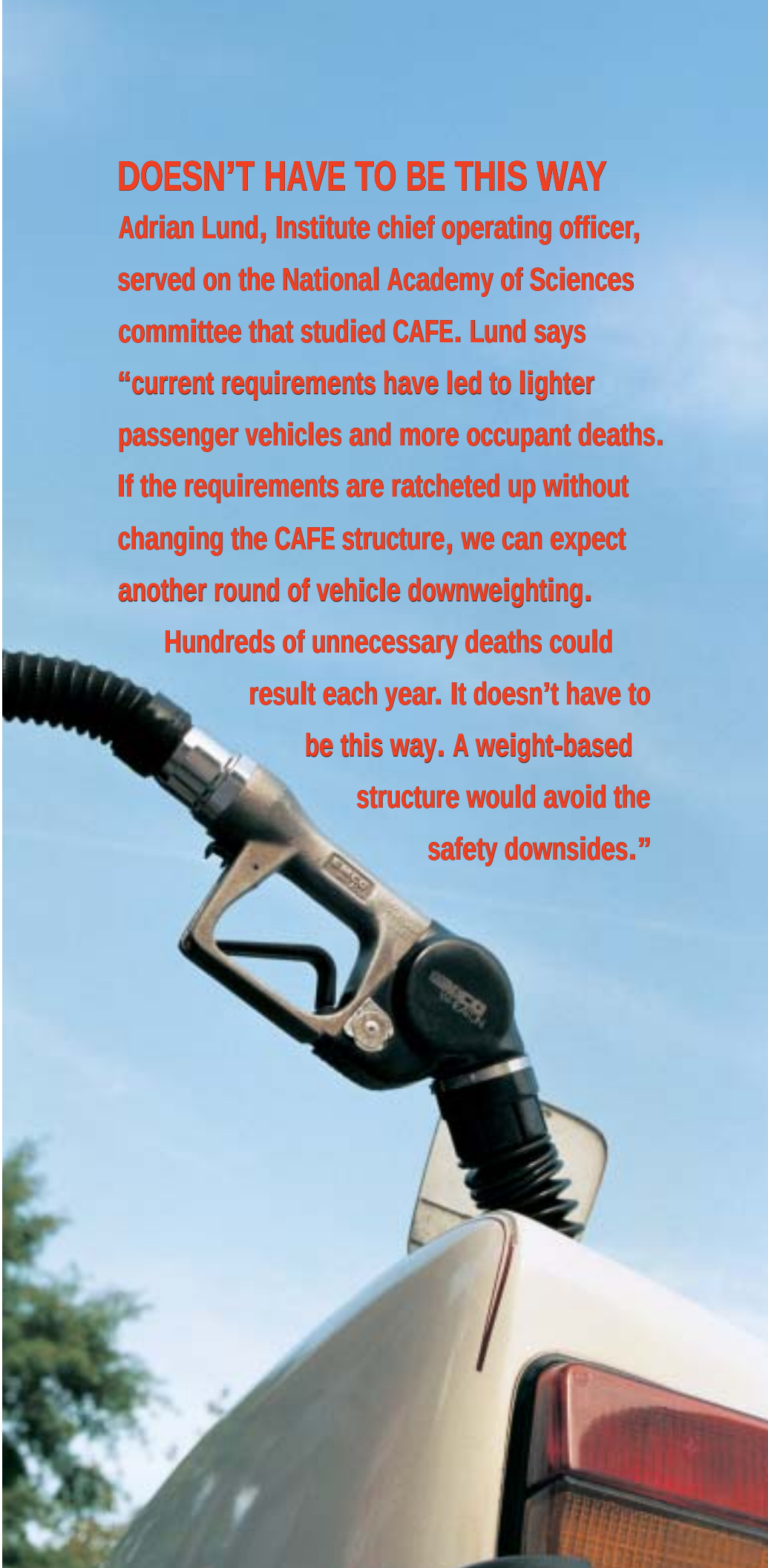
At the request of Congress, last year the National Academy of Sciences studied the CAFE program, including an examination of its effects on vehicle occupant safety. The study report found that CAFE "has clearly contributed to increased fuel economy of the nation's light duty fleet during the past 22 years." Another finding is that "the downweighting and downsizing that occurred in the late 1970s and early 1980s, some of which was due to CAFE standards, probably resulted in an additional 1,300 to 2,600 traffic fatalities in 1993."

Fuel economy requirements can have adverse safety consequences because the vehicles that get the most miles per gallon typically are the smallest and lightest ones. They're also the least protective in crashes.

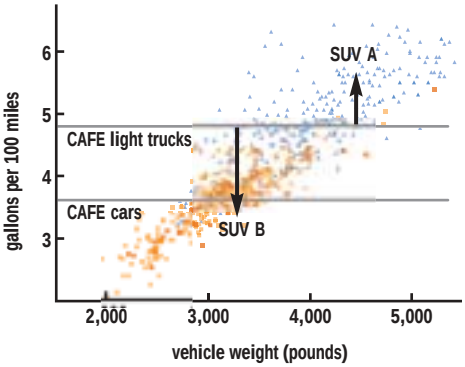
This points to the fundamental weakness of the current CAFE system — it doesn't force a vehicle manufacturer to improve the average fuel economy of its fleet by adopting fuel-saving technologies. Instead, a manufacturer can reduce vehicle weights and/or increase the sales of lightweight vehicles, including selling such vehicles at a loss. Another option is to decrease sales of heavier vehicles, but this isn't realistic. Manufacturers aren't likely to deliberately depress sales of the largest and heaviest vehicles, which are by far their most profitable products.

DOESN'T HAVE TO BE THIS WAY

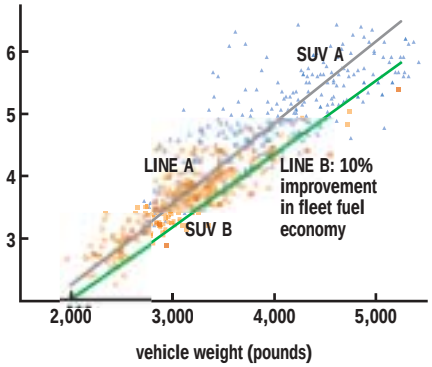
Adrian Lund, Institute chief operating officer, served on the National Academy of Sciences committee that studied CAFE. Lund says "current requirements have led to lighter passenger vehicles and more occupant deaths. If the requirements are ratcheted up without changing the CAFE structure, we can expect another round of vehicle downweighting. Hundreds of unnecessary deaths could result each year. It doesn't have to be this way. A weight-based structure would avoid the safety downsides."



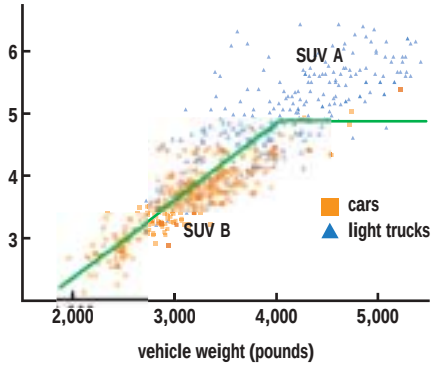
ALTERNATIVE CAFE STRUCTURES: GALLONS OF FUEL PER 100 MILES DRIVEN, BY VEHICLE WEIGHT



CURRENT SYSTEM: CAFE targets are 3.64 gallons per 100 miles (27.5 mpg) for cars and 4.83 per 100 (20.7 mpg) for light trucks, regardless of weight. An automaker selling SUV A, which uses more fuel than the target for light trucks, still can meet the federal standard by selling offsetting numbers of SUV B, which uses less fuel than the target. Sales of lighter vehicles thus offset heavier vehicle sales.



WEIGHT-BASED SYSTEM: Line A indicates the current relationship between vehicle weight and fuel consumption. If line B were adopted as the federal CAFE standard, fleet fuel consumption could decrease by 10 percent. New fuel-efficient technologies would have to be used to achieve the reductions. The fuel economy of SUV B no longer could offset SUV A's because fleet fuel use would be indexed to weight.



ENHANCED WEIGHT-BASED SYSTEM: Leveling off weight-based fuel economy requirements for the heaviest passenger vehicles (those weighing 4,000 pounds or more) would encourage manufacturers to downweight these vehicles — a safety plus because, as vehicles get heavier and heavier, the benefits of the added weight become small relative to the harm to others on the road.

As the report from the National Academy of Sciences concluded, some earlier fuel economy improvements resulted from vehicle downweighting. If current CAFE requirements are dramatically ratcheted up, the likely result will be more downweighting or more sales of lighter vehicles and, once again, negative safety consequences.

Some advocates of tougher CAFE requirements acknowledge that the result might be lighter vehicles, but they claim the safety disadvantages can be offset by imposing tougher federal safety standards. However, the safety disadvantages of small, lightweight vehicles are inherent, and the laws of physics cannot be repealed by new safety standards.

Another claim is that people riding in small, light vehicles are at greater risk only because of collisions with heavier vehicles. According to this line of thought, eliminating the heavier vehicles would solve the problem. But it wouldn't. Occupants of small, light cars are at greater risk in all kinds of crashes, not just collisions with heavier passenger vehicles. Almost 60 percent of all deaths in the lightest cars occur in single-vehicle crashes, crashes with big trucks, and crashes involving more than two vehicles.

In crashes involving two passenger vehicles of differing weights, two effects are at work. The extra weight of the heavier vehicles reduces the risks for the people riding in those vehicles but also inflicts extra risks on the people in lighter vehicles. So there's a tradeoff. Because the benefits to occupants of the extra vehicle weight diminish as their vehicles get heavier and heavier, the very heaviest passenger vehicles (4,000 pounds or more) actually have a small negative effect on society. The additional harm they inflict on people in lighter vehicles in two-vehicle crashes more than offsets the benefits for their own occupants.

To avoid negative safety consequences and possibly reap some safety benefits, new fuel economy requirements should force the use of technologies and promote downweighting of only the heaviest vehicles. These goals could be accomplished by indexing the new requirements to vehicle weight, as detailed in the National Academy of Sciences report.

Under this plan, fuel economy requirements would slide according to vehicle weight. Because allowable fuel consumption would decrease as vehicles get lighter, there would be no incentive to downweight the lightest vehicles. The option of selling lightweight vehicles to offset sales of heavier ones would be removed. Instead, manufacturers would have to use innovative technologies to improve fuel economy.

To further enhance safety, the sliding fuel economy requirements could end at around 4,000 pounds. Each manufacturer's fleet of vehicles above this weight would be required to achieve a fixed fuel economy target. By holding all vehicles above this weight to a common value, manufacturers would be encouraged to reduce the weights of the heaviest vehicles.

The National Academy of Sciences report identified a number of vehicle and engine technologies that could be developed and implemented over 12 to 15 years to increase fuel economy without downweighting or sacrificing vehicle performance. If these technologies were applied to meet weight-based fuel economy requirements, small cars could go an estimated 11-12 percent farther on the same amount of fuel. Large cars could go 27 percent farther, and large pickups could go 38 percent farther.

But these technologies aren't cheap, and nothing in the current *(continues on p.6)*

Souped-up golf carts hit the streets

Golf carts used to be just for the links. About a decade ago, resort and retirement communities in Arizona, California, Nevada and elsewhere started to experiment with allowing golf carts on the streets. Then new environmental incentives began encouraging manufacturers to introduce a whole new class of golf cart-like vehicles marketed expressly for on-road use.

They're known as neighborhood electric vehicles (NEVs), and what's different about them is their higher speed and dressed-up exteriors. Basically they're glorified electric golf carts, and the concern is that significant numbers of them are going to end up on public streets instead of controlled environments.

Clean air laws are pressuring for dramatically increased sales of electric vehicles including NEVs, and many states aren't adequately controlling where the NEVs can be used. Several states have passed laws essentially allowing such vehicles on streets with speed limits up to 35 or even 40 mph.

Under federal safety standards, NEVs belong in the class of "low-speed vehicles," which the National Highway Traffic Safety Administration defines as having top speeds of 20 to 25 mph. Any golf cart or other four-wheeled motorized vehicle with a top speed in that range qualifies for the class. (Golf carts typically have top speeds below 20 mph, although it's possible to get ones that go about 25 mph.)

Low-speed vehicles including NEVs are exempt from almost all safety standards applying to cars. All that's required is some basic safety equipment — windshield, mirrors, headlights, signal lights, tail and brake lights, reflectors, safety belts, and a parking brake. Low-speed vehicles don't have to have doors or bumpers, and they're not required to meet any crashworthiness tests.

In other words, NEVs aren't going to do much to protect their occupants in any kind of crash. It's easy to imagine what would happen if such a vehicle weighing 1,300 pounds were to get hit by a sport utility vehicle weighing three or four times as much. The NEV wouldn't even fare well in a collision with a small car, which still would outweigh the NEV by a thousand pounds or more.

State emissions laws are spurring sales: Although NEVs aren't cars, they're being pushed on the market along with electric cars under California's mandate for zero emissions vehicles. (The mandate goes into effect next year, and similar laws have been enacted in Massachusetts and New York.) To comply with this law, electric vehicles must account for 2 percent of an automaker's total car sales in California. NEVs count toward the quotas, and any electric vehicle sold before 2003 earns extra credits. So there's an incentive to sell NEVs in volume — and do it soon, perhaps selling tens of thousands this year alone.

So far two major automakers have gotten into the business. DaimlerChrysler is selling vehicles called GEMs through its recently acquired subsidiary, Global Electric Motorcars. Ford has the Th!nk Neighbor. Independent manufacturers including Lee Iacocca's Lido Motors, Western Golf Car, and Columbia ParCar also are producing NEVs.

Besides zero emissions laws, tax incentives for electric vehicles in California and other states are helping to spur NEV sales. Close to 6,000 NEVs were sold in Arizona, for example, when the state briefly offered a $10,000 tax credit toward the purchase of zero emissions vehicles.

Street legal doesn't mean street safe: The problem with all this pressure is that many states don't have adequate NEV laws. California and 12 other states have laws allowing low-speed vehicles or NEVs on streets with speed limits of 35 mph or less. Kansas allows these vehicles on streets with speed limits up to 40 mph. Other states haven't enacted any specific laws.

Light and flimsy NEVs would be out of their league in crashes with other vehicles going 35 mph. Besides, actual speeds on streets with 35 mph limits frequently are a lot higher. Speeding is widespread, and when drivers speed they often exceed posted limits by a significant margin. For example, 30 percent of drivers in a recent District of Columbia survey were exceeding posted limits by at least 11 mph.

"NEVs are a safety problem waiting to happen," says Institute president Brian O'Neill. "Souped-up golf carts aren't cars, and they don't belong on streets and roads with regular traffic. If they really start catching on, we'll have to run some crash tests to demonstrate their lack of protection."

GM petitions for federal action: General Motors' executive director of safety integration, Bob Lange, points out that this is a "huge problem for highway safety. If we presume a collision rate equal to that of cars and trucks, there will be a couple of thousand crashes annually involving low-speed vehicles. That could result in several hundred serious or fatal injuries, none of which would happen if the states would behave responsibly and limit the operating environments of these vehicles."

General Motors has taken the lead among automakers to bring this issue to government attention, lobbying California officials to change state laws to restrict low-speed vehicles to streets with 25 mph speed limits or less. The company also recently petitioned the federal government to change the safety standards. General Motors wants two new requirements — labels identifying the safety hazards associated with operating low-speed vehicles in mixed traffic and additional conspicuity features that would make these vehicles more visible. Another request is to monitor crashes and inform state agencies of the potential for a safety problem.

There still aren't many NEVs on the streets, so their crash experience is limited. However, the National Highway Traffic Safety Administration has looked at golf cart crashes, finding at least nine deaths on public roads between 1993 and 1998. Eight of the nine deaths occurred when the golf carts collided with cars or trucks. The young male driver of the cart shown above died when his vehicle was struck in the side by a sport utility vehicle.

(continued from p.3) CAFE structure encourages manufacturers to apply the technologies to improve fuel efficiency. Instead automakers could — and probably would, at least to some extent — go the potentially cheaper routes of subsidizing lightweight vehicle sales and downweighting to meet

tougher CAFE requirements. A weight-based approach would close off these routes because the requirements would go up as vehicles get lighter.

What's going on in Congress: A weight-based approach isn't part of any legislative proposal to toughen CAFE requirements. However, a bill approved by the House of Representatives directs the U.S. Department of Transportation to study this approach.

In the Senate, an ambitious plan that would have raised CAFE requirements to 36 miles per gallon for cars and light trucks was bypassed in favor of a more modest approach. The Senate voted to give the transportation department two years to develop new CAFE standards, directing the department to consider safety in the process but specifically exempting pickups from tougher fuel economy requirements.

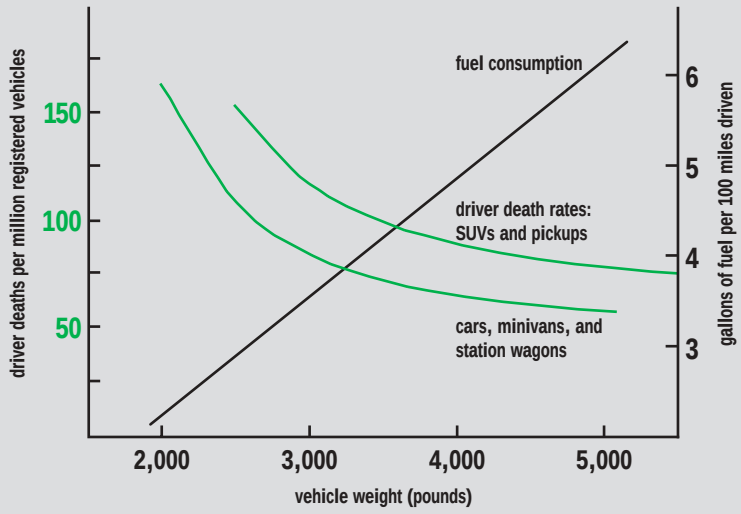
From 1996 until this year, the transportation department was banned from considering new CAFE requirements. Now the Bush administration, citing the National Academy of Sciences, is asking Congress for "the necessary authority to reform the CAFE program." In a letter to Congressional leaders, Transportation Secretary Norman Mineta expressed concern "about the adverse impact the current CAFE program has had on safety."

A weight-based approach could reverse the adverse impact as well as improve fleet fuel economy. It's an idea worth considering.

Passenger vehicle size, weight, fuel consumption, and occupant safety

Small, light vehicles consume less fuel to go the same distances as larger, heavier vehicles. At the same time the light ones afford much less protection in crashes. This is why it's important to find ways to conserve fuel without promoting small, lightweight vehicles. Any regulatory action that increases sales of such vehicles will increase injury risk in crashes. The graph (below) shows relationships between vehicle weight and driver death rates (deaths per million registered vehicles) and fuel consumption (gallons per 100 miles). The highest death rates and lowest fuel consumption are for the lightest passenger vehicles. Heavier vehicles have lower death rates and greater fuel consumption. However, the safety benefits of additional vehicle weight (to the occupants of those vehicles) diminish as vehicles get heavier and heavier. Still their fuel consumption continues to increase. The optimum fleet mix to enhance safety would eliminate both the lightest and heaviest passenger vehicles. By far the bigger benefit would come from eliminating the lightest ones, which are hazardous to their occupants in all kinds of crashes. Eliminating the heaviest ones would enhance safety in crashes between two passenger vehicles, but the overall safety effect would be much smaller. In considering how to improve fuel economy, it makes sense to look for ways that don't promote lightweight vehicles and that would encourage downweighting of only the heaviest vehicles (those weighing about 4,000 pounds or more).

RELATIONSHIPS BETWEEN VEHICLE WEIGHT AND DRIVER DEATH RATES AND FUEL CONSUMPTION



Note: Relationships between death rates and vehicle weights reflect fatal crashes of 1995-99 models during calendar years 1996-2000. The rates were adjusted to account for some differences in driver age and sex within and between vehicle types. Remaining differences in vehicle use patterns and driver demographics may account for some of the death rate differences within and between vehicle types.

Fewer airbag deaths; risk is reduced in newer vehicles

Ever since it became clear in the mid-1990s that inflating airbags were causing some deaths and serious injuries, efforts have been aimed at reducing the problem. New information from the National Highway Traffic Safety Administration (NHTSA) indicates the efforts are paying off in declining numbers of deaths investigated by NHTSA and attributed to inflating airbags.

The worst years were 1997, when 56 deaths occurred, and 1998 with another 47 deaths. In contrast, 8 deaths were attributed to airbags last year, even as more cars on the road were equipped with airbags. (Tolls include deaths confirmed by NHTSA to have been caused by inflating airbags plus deaths under investigation. Most such cases eventually are confirmed as airbag deaths). Deaths have declined in all occupant groups.

"The problem is on the wane, and there's no mistaking why. A major effort to educate drivers about airbag risks plus a variety of airbag design changes have made a difference," says Susan Ferguson, Institute senior vice president for research.

A concern in earlier years involved drivers sitting very close to their steering wheels and, therefore, close to an airbag as it begins to inflate. In 1997-98, a total of 9 female drivers 5-foot-2 inches or shorter died from airbag injuries. Only 2 such deaths occurred in 2000 (another female driver death, as yet unconfirmed, apparently occurred in 2001, but information isn't available about her height).

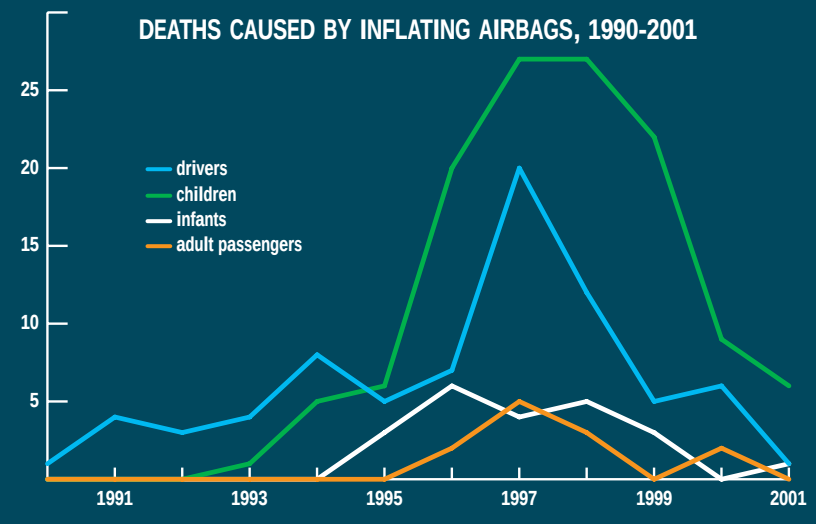
Kids in the back: A majority of deaths from inflating airbags have been infants in rear-facing restraints positioned in front of passenger airbags or children riding either unrestrained or improperly restrained so they were out of position (too close to airbags) during the first stages of inflation. Once this problem was identified in the mid-1990s, a push began to advise of the importance of putting kids, properly restrained, in rear seats, away from the risks. "The rear is safer anyway," Ferguson points out.

The national effort has included not only educating motorists but also amending child restraint laws. Delaware, Louisiana, New Jersey, New Mexico, North Carolina, Rhode Island, South Carolina, and Washington have changed their laws to require children to ride in the back seats of vehicles if available.

Airbag design changes: Another approach involves the airbags themselves. Beginning with 1998 models, NHTSA changed the rules for compliance testing so manufacturers could install airbags with less power (but still enough to protect people in serious crashes). Since then improvements beyond depowering have been introduced (see *Status Report*, Nov. 29, 1997 and Oct. 10, 1998; on the web at www.highwaysafety.org).

The design changes are beneficial. Among the 202 deaths NHTSA has confirmed since the mid-1990s, three-quarters have occurred in 1994-97 models. Only 11 have occurred in 1998 and newer models. Eight of the 11 were children, and 7 of the 8 were unrestrained.

What happens when older cars with the more powerful airbags are bought by new owners who don't know about the risks? Will deaths in these cars go up? So far there's no evidence of this. A substantial proportion of the 1994 models still on the road, for example, presumably aren't being driven by original owners. Yet only 2 airbag deaths occurred in these vehicles in 2000 versus 12 in 1997.



Deaths attributed to inflating airbags have declined in all occupant groups. Infant deaths declined from 9 in 1997-98 to 1 in 2000-01. During the same years, child deaths declined from 54 to 15. Seven driver deaths occurred in 2000-01, down from 32 in 1997-98, and deaths of adult passengers decreased from 8 to 2. A total of 8 airbag deaths occurred last year, so the problem isn't solved. But with education and airbag redesign, this isn't nearly as big a problem as it used to be. Note: number of deaths include confirmed airbag inflation deaths plus deaths for which the cause still is under investigation.

STATUS REPORT

INSURANCE INSTITUTE FOR HIGHWAY SAFETY

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Church Mutual
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The Progressive Corporation
Prudential Financial
Response Insurance
Rockingham Group
Royal & SunAlliance
SAFECO Corporation
SECURA
Shelter Insurance Companies
State Auto Insurance Companies
State Farm Insurance Companies
The St. Paul Companies
Tokio Marine
USAA
Virginia Farm Bureau
Virginia Mutual Insurance Company
Yasuda Fire & Marine of America
Zurich North America