The Fastest, Cheapest, Cleanest Way To Reduce Oil Dependence

Increasing America's Fuel Economy

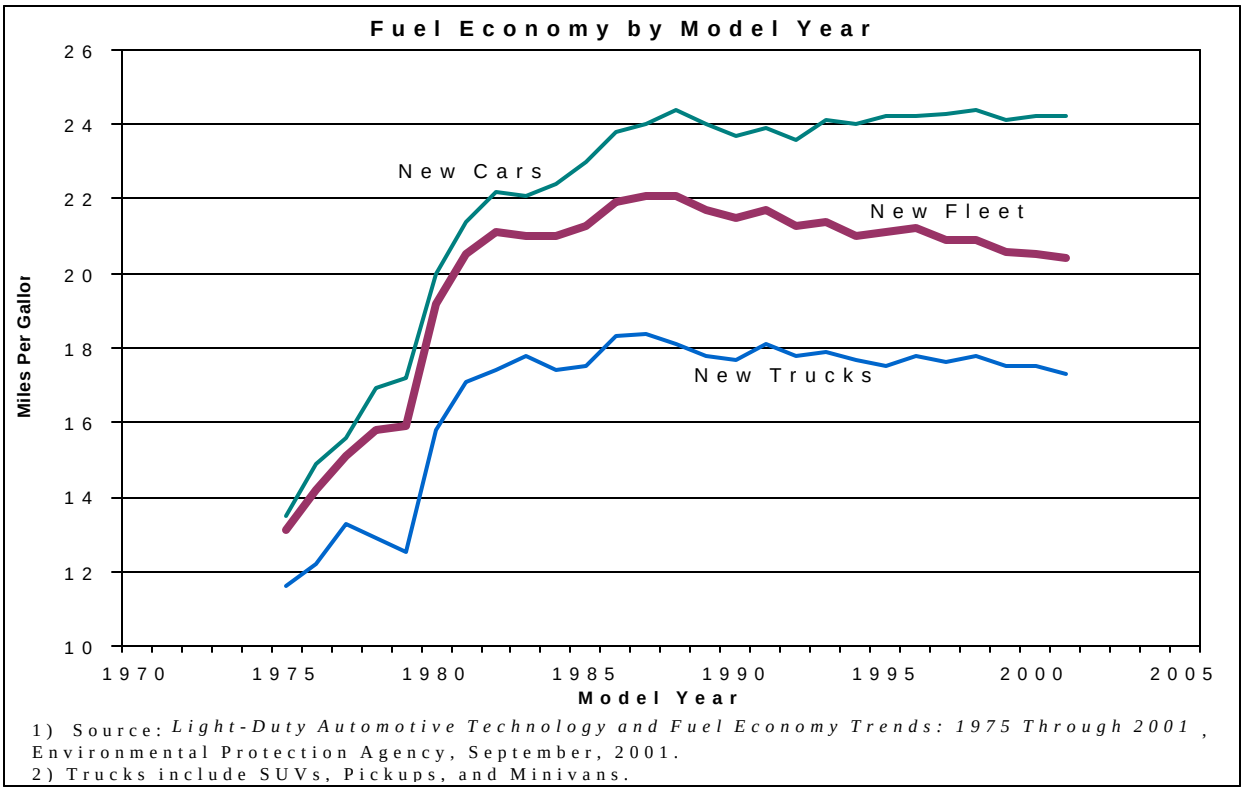
"Improved fuel economy has reduced dependence on imported oil, improved the nation's terms of trade, and reduced emissions of carbon dioxide, a principal greenhouse gas, relative to what they otherwise would have been."

— National Academy of Sciences, July 2001

Alliance to Save Energy • American Council for an Energy-Efficient Economy
Natural Resources Defense Council • U.S. Public Interest Research Group
Sierra Club • Union of Concerned Scientists

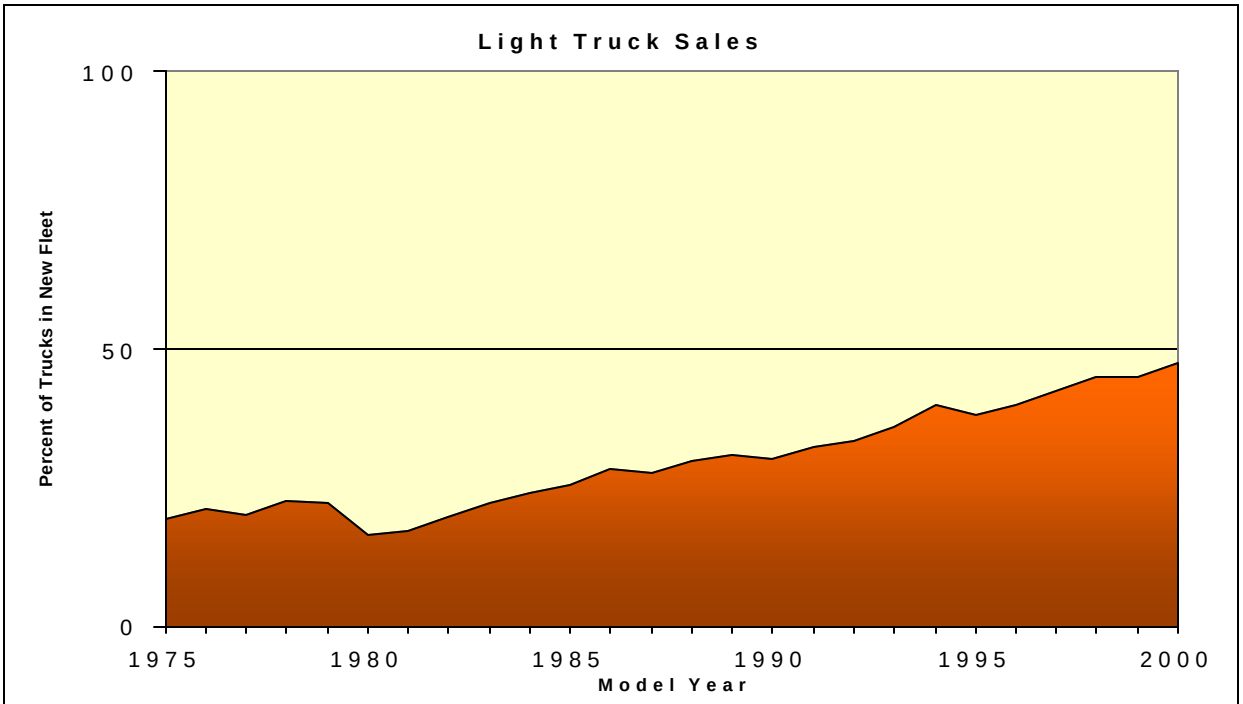
FEBRUARY 2002

Fuel Economy Sinks to Lowest in 21 Years



1) Source: *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2001* , Environmental Protection Agency, September, 2001.
2) Trucks include SUVs, Pickups, and Minivans.

Light Truck Sales Near 50% of the Market



1) Source: *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2001,* Environmental Protection Agency, September, 2001.
2) Light Truck includes SUVs, Pickups, and Minivans.

BACKGROUND

A responsible energy policy must reduce our dependence on oil. Cars, SUVs and other light trucks now consume 8 million barrels of oil every day. Raising fuel economy standards for new cars, SUVs and other light trucks to an average of 40 miles per gallon (mpg) over the next 10 years would save nearly 2 million barrels of oil every day (mbd) in 2012 and nearly 4 mbd by the end of the next decade—more oil than we import from the Persian Gulf each day and could expect to get from the Arctic National Wildlife Refuge, combined. This responsible step would save consumers billions of dollars at the gas pump and reduce heat-trapping carbon dioxide (CO_2) emissions that cause global warming.

History

The U.S. Congress established Corporate Average Fuel Economy (CAFE) standards in 1975, largely in response to the oil embargo of 1973. Gasoline prices skyrocketed and the U.S. was caught flat on its feet. Cars and light trucks were heavy and inefficient with cars averaging 13.5 mpg and trucks averaging 11.6 mpg. Congress established a phase-in of new fuel economy standards that brought cars up to 27.5 mpg. Congress delegated to the Department of Transportation (DOT) the responsibility for setting standards of light trucks—SUVs, minivans and pickups–-now set at 20.7 mpg.

SUV loophole.

At the time that Congress passed the CAFE law, light trucks were allowed to meet a lower fuel economy standard because they constituted only 20 percent of the vehicle market and were used primarily as work vehicles. Today, light trucks comprise nearly 50 percent of the new vehicle market, and are primarily used as passenger cars. In 2001, the average fuel economy of new vehicles sold was at its lowest point since 1980.[1] The proliferation of SUVs takes advantage of a loophole that allows what are essentially passenger cars to comply with the lower light truck standards, driving up the use of oil.

> *"CAFE rules helped compel automakers to improve the overall mileage of new vehicles from 16 mpg in 1975 to 25 mpg in l988. That not only saved drivers money, it moderated U.S. oil demand, which weakened OPEC…"*
>
> Gregg Easterbrook, The New Republic
> October 2001

[1] *Light-Duty Automotive Technology and Fuel Economy Trends, 1975-2001*, Environmental Protection Agency, September 2001, http://www.epa.gov/otaq/fetrends.htm .

The Bryan-Gorton Bill

In 1990, Senators Richard Bryan and Slade Gorton tried to reverse the downward trend in fuel economy by sponsoring a bill to raise fuel economy standards for both cars and light trucks over 10 years. The bill called for a 40 percent increase in CAFE standards. Had this bill become law, today's cars would average 40 mpg and light trucks 29 mpg. This year, the U.S. would be saving 1 mbd, on the way to saving 3 mbd. Instead, the average fuel economy of new vehicles sold in the U.S. is at a 21-year low.

Fuel economy standards frozen

Starting with Fiscal Year l996, members of the House of Representatives inserted a rider on the DOT appropriations bill, in effect, freezing CAFE standards at their current levels. The 'CAFE freeze rider' prevented the DOT from even studying the need and the technological feasibility of new CAFE standards. In 1999, Senators Slade Gorton (R-OR), Dianne Feinstein (D-CA) and Richard Bryan (D-NV) sponsored a Sense of the Senate Resolution opposing the House-based rider, which 40 Senators supported. These same Senators sponsored a similar resolution opposing the freeze rider on the 2001 DOT funding bill. Just before the vote, however, Senators representing the interests of the auto industry agreed to break the freeze on studying fuel economy standards. Congress ordered a study by the National Academy of Sciences (NAS) to determine the effectiveness of the CAFE program and make recommendations for moving forward with new standards.

NAS fuel economy report—fuel economy standards would reduce oil dependence

Issued in July of 2001, the NAS fuel economy report concludes that the current standards save 2.8 mbd. Looking forward, the NAS fuel economy report indicates that, using existing technology, the passenger vehicle fleet could reach an average of nearly 40 mpg. The report finds that the auto industry could meet higher fuel economy standards while maintaining auto safety. The report also finds that new fuel economy standards could cost-effectively reduce our dependence on oil, improve the nation's terms of trade, and reduce global warming pollution from passenger vehicles.

The House of Representatives: next to nothing on fuel economy

The House of Representatives passed its energy bill, HR 4, in August 2001. This bill includes a fuel economy provision crafted by Representatives Tauzin (R-LA) and Dingell (D-MI). This provision directs the DOT to set new fuel economy standards for light trucks that would save at least 5 billion gallons of gasoline between model years 2004 and 2010. This amounts to saving less than one day's worth of oil per year for each of those years and an increase in light truck fuel economy of less than 1 mpg. Furthermore, the HR 4 provision extended the dual-fuel vehicle program that allows manufacturers to garner credits toward

meeting fuel economy standards by producing vehicles that can run on alternative fuels. Due to a small number of fueling stations, few of the ethanol-capable vehicles that gave automakers these CAFE credits ever run on ethanol. While the goal of this program was to reduce oil consumption, it has evolved into yet another loophole as automakers use their credits to sell more inefficient light trucks. The NAS fuel economy report similarly concludes that extending this program will erode the minimal oil savings promised in HR 4.

The Senate Energy Bill—An opportunity to increase fuel economy standards

As in 1975, the American auto industry continues its intensive campaign to defeat proposed legislation to raise CAFE standards. The following information addresses auto industry concerns and provides factual support for increasing fuel economy standards. Additional analysis will follow to keep this notebook up to date as the debate progresses. For the sake of America's national and environmental security, Congress must significantly increase vehicle fuel economy standards.

"The United States sends nearly $200,000 overseas each minute to buy foreign oil."

Based on Union of Concerned Scientists analysis

"The three major oil price shocks over the last 30 years all coincided with recessions. Periods of falling oil and gasoline prices only worsen the situation as consumers lose some of their incentive to conserve fuel, only to be hit harder when prices eventually rise again."

Oak Ridge National Laboratory

"For 70 years, oil has been responsible for more of America's international entanglements and anxieties than any other industry… The most decisive war we can wage on behalf of national security and America's global image is the war against our own oil gluttony."

Rob Nixon, New York Times
October 29, 2001

"What is needed here is a sense of history. The oil shocks of 1974 led not only to the creation of the Strategic Petroleum Reserve but also to the first set of fuel economy standards. This crisis should lead to equally enlightened results."

New York Times Editorial
October 22, 2001

FUEL ECONOMY AND ENERGY SECURITY

The September 11th tragedy focused national attention on the need to increase U.S. energy security by curbing our dependence on oil from unstable regions. Oil dependence limits our ability to follow a foreign policy that is in the best interest of the American people. Our heavy reliance on oil also leaves us vulnerable to oil embargos and price spikes. To improve our nation's energy security, we must act now to reduce our dependence on foreign oil. We cannot drill our way out of reliance on unstable oil sources. To curb our foreign oil dependence, we must reduce our overall oil consumption by increasing the fuel economy of cars and light trucks.

Fuel economy standards successfully reduce U.S. oil dependence.

- In response to the 1973 oil embargo, Congress enacted CAFE standards that doubled the fuel economy of American new cars in ten years.
- The NAS fuel economy report concludes: "If fuel economy had not improved, gasoline consumption (and crude oil imports) would be about 2.8 million barrels per day higher than it is, or about 14 percent of today's consumption."[1]

When fuel economy standards went flat, U.S. oil imports grew.

- Today's fleet of new cars and light trucks is at a twenty-one year low in fuel economy.[2]
- U.S. oil *consumption* rose 15 percent in the last decade.[3] In 2001, the U.S. consumed nearly 20 mbd.[4]
- U.S. oil *imports* rose 28 percent in the last decade.[5] In 2001, the U.S. imported 53 percent of the nation's oil.[6]
- Unless Congress acts to increase fuel economy standards, oil imports will continue to grow. The Energy Information Administration (EIA)

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[1] *Effectiveness and Impact of Corporate Average Fuel Economy Standards*, National Research Council, July, 2001.

[2] *Light-Duty Automotive Technology and Fuel Economy Trends, 1975-2001*, Environmental Protection Agency, October, 2001, www.epa.gov/otaq/fetrends.html

[3] 1990 U.S. Oil Consumption=16,988 thousand barrels per day. 1999 U.S. Oil Consumption=19,519 thousand barrels per day, *World Petroleum Consumption, 1980-1999*, Energy Information Administration, http://www.eia.doe.gov/pub/international/iealf/table12.xls

[4] *World Oil Demand*, First and second quarters of 2001, Energy Information Administration, http://www.eia.doe.gov/emeu/ipsr/t24.txt

[5] 1990 U.S. Oil Imports=7.161 million barrels per day. 1999= 9.912 million barrels per day, *Total Net Oil Imports into Individual OECD Countries and Total OECD, 1990-2000*, Energy Information Administration, http://www.eia.doe.gov/emeu/ipsr/t47.txt

[6] Stacy C. Davis, *Transportation Energy Data Book: Edition 21*, Oak Ridge National Laboratory, Oct. 2001.

estimates that on the current trajectory, U.S. oil imports will rise to 64 percent by 2020. [7]

U.S. oil dependence is costly.

- The U.S. currently sends $200,000 overseas each minute to pay for oil products.[8]
- According to the U.S. Department of Energy, price spikes from 1979 to 1991 cost the U.S. economy about $4 trillion**,** almost as much as we spent on national defense over the same period. Each price spike in the last three decades was followed by an economic recession.[9]
- Reducing overall oil dependence would minimize the economic impact of price spikes while continuing to save consumers money when prices are stable. Consumers could invest this money in the economy instead of sending it overseas to buy oil.

Drilling for oil in the Arctic National Wildlife Refuge and other special places would not curb our dependence on foreign oil.

- The U.S. holds only 3 percent of the world's oil reserves and uses 25 percent of the world's produced oil.[10]
- Persian Gulf countries hold over 65 percent of the world's oil reserves.[11]
- The total projected yield from the Arctic Refuge would increase world oil reserves by less than one-third of 1 percent.[12]
- Opening the Arctic Refuge today would not produce oil until at least 2010 and, based on the current rate of consumption, would yield only a six-month supply of oil over 50 years. Phasing in a fleet wide fuel economy standard of 40 mpg by 2012 would save more oil in the next dozen years than the total projected yield from the Arctic Refuge.[13]
- The Arctic Refuge would only reduce U.S. imports from 64 percent to 62 percent in 2020.[14]

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[7] *Annual Energy Outlook 2002 with projections to 2020*, DOE/EIA-0383(2002), December, 2001, Energy Information Administration, www.eia.doe.gov/oiaf/aeo/#production

[8] UCS analysis, http://www.ucsusa.org

[9] *Oil Dependence and Energy Security*, Department of Energy, http://www.fueleconomy.gov/feg/oildep.shtml

[10] Persian Gulf Oil and Gas Exports Fact Sheet, Energy Information Administration, February 2001. http://www.eia.doe.gov/emeu/cabs/pgulf.html

[11] *OPEC Crude Oil Production*, Energy Information Administration, September, 2001, http://www.eia.doe.gov/emeu/cabs/opec.html#CAPACITY
International Crude Oil Reserves Data Reserves Data By Region for Most Countries and World Total, Energy Information Administration, January, 2000, http://www.eia.doe.gov/emeu/iea/table81.html
Oil Consumption of Selected OECD Countries, Total OECD, and World Total, 1970-2000, Energy Information Administration, http://www.eia.doe.gov/emeu/ipsr/t46.txt

[12] David Doniger, et al, *Dangerous Addiction: Ending America's Oil Dependence*, Natural Resources Defense Council & Union of Concerned Scientists, January, 2002.

[13] UCS analysis, http://www.ucsusa.org

[14] *Annual Energy Outlook 2002 with projections to 2020*, DOE/EIA-0383(2002), Energy Information Administration, December, 2001, http://www.eia.doe.gov/oiaf/aeo/#production

"Finding all the oil we need here at home 'was a failed notion under Richard Nixon, and it's certainly a failed notion today… We're a declining oil province and have been for 25 years.'"

Exxon Mobil CEO Lee Raymond

- Domestic oil production is expensive. While it costs deepwater drillers like Exxon Mobil or Conoco roughly $6 to $8 to produce a barrel in the Gulf of Mexico or the North Sea, producing oil in Saudi Arabia or Kuwait costs a fraction of that—$1 a barrel or less.[15]
- Increasing domestic oil production would not protect the U.S. from price spikes because there are no regional markets for oil, only global. If world oil prices spike, so do domestic oil prices.
- Domestic oil infrastructure is itself vulnerable to terrorism, as illustrated by the effects of a single bullet shot into the trans-Alaska pipeline, which caused a spill of 6,800 barrels or 285,600 gallons of oil.[16] A more concerted effort could easily disrupt domestic supplies and have serious economic impacts.

Raising fuel economy standards is the most effective way to reduce overall oil dependence.

- Cars and light trucks account for 40 percent of U.S oil use—8 mbd. [17]
- Raising fuel economy standards for new cars, SUVs and other light trucks to an average of 40 mpg over the next 10 years will save nearly 2 mbd in 2012 and nearly 4 mbd by the end of the next decade. This is more oil than current imports from the Persian Gulf and the projected yield from the Arctic Refuge, combined.
- Raising fuel economy standards for cars and light trucks to 40 mpg over the next decade would yield cumulative oil savings of 3 billion barrels by 2012 and more than 12 billion barrels by 2020.[18]

"Environmentalists want to reduce air pollution and greenhouse gas emissions. Defense groups want to limit our vulnerability to oil cutoffs or blackmail. A common denominator is the need to control cars' gasoline use."

Robert J. Samuelson, Washington Post
October 11, 2001

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[15] Nelson D. Schwartz, *Breaking OPEC's Grip*, Fortune, November 12, 2001.

[16] *TAPS Bullet Hole Release*, Report # 19, Spill # 01309927701, ADEC, Division of Spill Prevention and Response Prevention and Emergency Response Program, 2001, http://www.state.ak.us/dec/dspar/perp/011004301/index.htm

[17] *Annual Energy Outlook*, Energy Information Administration, 2000.

[18] UCS analysis, http://www.ucsusa.org

"The worst thing about the Bush plan is its silence on the primary energy-efficiency question of the moment: the need for higher gasoline mileage across the board –not in a few hybrids but in the cars, SUVs and light trucks everyone drives."

Gregg Easterbrook, The New Republic
October 2001

"The technology... has the potential to significantly improve the fuel economy of light-duty trucks and sport utility vehicles (SUVs), which could reduce U.S. dependence on imported oil, reduce greenhouse gas emissions and save consumers money at the pump."

Ford Motor Company

FUEL ECONOMY AND TECHNOLOGY

The technology exists today to cost-effectively boost the fuel economy of cars and light trucks to 40 mpg by 2012. This can be done while maintaining the power, performance and safety that consumers demand. By using technologies such as variable valve engines and continuously variable transmissions in a higher percentage of vehicles than are available to consumers today, the auto industry could be putting its technological know-how to work improving the fuel economy of the nation's vehicle fleet.

Detroit was capable of raising fuel economy in the past.

- When Congress enacted CAFE standards in 1975, automakers used new technology to nearly double passenger car fuel economy over ten years.[1] Technological developments did not stop when fuel economy standards were effectively frozen; instead vehicle technology continued to evolve. In the absence of higher standards, technology went into increasing power and performance.

Three national reports have recently concluded that there is a wide array of technologies available today to cost-effectively improve the fuel economy of cars and light trucks.

- Mid–range estimates from the recent NAS fuel economy report indicate that the fleet average could approach 40 mpg using existing and emerging technology in the next 10 to 15 years.

- The American Council for an Energy Efficient Economy laid out a package of technologies that would raise the average fuel economy of vehicles to over 40 mpg in the same time frame, while improving safety and keeping vehicle costs below new car trend prices[2].

- The Union of Concerned Scientists concludes in their recent report, *Drilling in Detroit*, that increasing the fuel economy of the nation's fleet of new cars and trucks to 40 mpg by 2012 can, on average, save drivers more than $2,200 over the lifetime of the vehicle.

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[1] Between 1975 and 1985. David L. Greene, *Why CAFE Worked*, Oak Ridge National Laboratory, 1997.

[2] John DeCicco, et al, *Technical Options For Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010-2015*, American Council for an Energy-Efficient Economy, 2001, http://www.aceee.org

Existing Technologies for Improving Fuel Economy[3]

Vehicle Technologies	Engine Technologies	Transmission Technologies
• Aerodynamic improvements • Low-resistance tires • Safety enhancing weight reductions • Efficient accessories • 42 Volt electric system • Integrated starter / generator	• Low-friction lubricants • Multi-valve, overhead camshaft • Variable valve control • Cylinder deactivation • Engine downsizing and supercharging • Intake valve throttling • Camless valve actuation • Variable compression ratio engine • Low-emission direct injection gasoline engine	• 5 and 6-speed automatic transmission • Continuously variable transmission • Motorized gear shift transmission • Optimized shift schedule

Most of these technologies are in production today.

- **Variable valve control engines**: Sixty percent of the cars and trucks that Honda sells in the United States use their "VTEC" engine, enabling them to stay out in front on fleet fuel economy. Not only does the VTEC offer variable valve control for the more precise control of fuel, but it has other technology enhancements that boost fuel economy, such as a multi-valve design, low-weight engine components, and low friction. All of these engine improvements combine to produce better fuel economy, more power, and lower emissions than traditional engines.

- **Lightweight aluminum engines**: GM has designed an aluminum four-valve overhead cam engine that will be available in several 2002 models, such as the Chevrolet Cavalier and Oldsmobile Alero. The modular design of this engine

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[3] *Effectiveness and Impact of Corporate Average Fuel Economy Standards*, National Research Council, July, 2001.
David Friedman, et al. *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*, Union of Concerned Scientists, 2001.
John DeCicco, et al, *Technical Options For Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010-2015*, American Council for an Energy-Efficient Economy, 2001, http://www.aceee.org

also makes it possible to incorporate variable valve timing. GM is also moving forward with their displacement on demand (cylinder cut-off) engines, turning their 8-cylinder engines into 4-cylinder engines to save fuel when the power is not needed.

- **Five speed automatic transmission**: Introduced in the late 1990s, the extra gear provided in five speed automatic transmissions offers more opportunities to run the engine closest to its "sweet spot" of high efficiency for better overall fuel economy. About 7 percent of today's vehicles use five speed automatic transmissions, including the Ford Explorer. This small market penetration means the opportunities for expanding this technology (and the even more efficient six speed transmissions) are great.

- **Continuously variable transmission**: Even better than multiple gears are the "infinite" number of gears available by moving to a continuously variable transmission (CVT). CVT has been available for years in versions of the Honda Civic HX. Audi has also offered a CVT version of its A6 car since 1999, which they boast has superior performance to its other A6 designs. General Motors is expected to be introducing CVTs in their vehicles over the next few years, including in the SUV fleet.

- **Lightweight materials**: Aluminum or high strength steel can be used to reduce the weight of vehicles while maintaining their size and strength, leaving them just as safe or even safer than what consumers drive today. Ford produced and successfully crash tested several prototypes in the early 1990s based on an aluminum intensive design. Volvo, owned by Ford and widely recognized as a leader in safety, has been incorporating high strength steel and aluminum to reduce vehicle weight and improve safety. Audi has also followed the aluminum path in several of its A series cars.

As stated in *Automotive News* – The auto industry has many existing technologies that can be used to increase fuel economy.

Without government action, these technologies are more likely to continue to go to boosting power over improved fuel economy.

- The Environmental Protection Agency states in its September 2001 Fuel Economy Trends Report that:

More efficient technologies—such as engines with more valves and more sophisticated fuel injection systems and transmissions with lockup torque converters and extra gears—continue to penetrate the new light vehicle fleet. The trend has been to apply these new technologies to accommodate

increases in average new vehicle weight, rising average horsepower and a lower 0 to 60 mph acceleration time.[4]

- The auto industry's record for voluntarily installing environmental and safety technologies is poor, as evidenced by the industry's history of opposition to catalytic converters, seat belts, and air bags.

"The Camry 'hasn't improved from a fuel economy standpoint over the last decade. I understand that the car has gotten bigger and more powerful and for the fuel economy to stay the same the fuel efficiency has improved greatly, but this is exactly the enviros' point.'"

Draft Testimony of James Olson, Senior Vice President
Toyota Motor North America, Inc
to the Senate Committee on Commerce,
Science and Transportation, Dec. 6, 2001
as reported in the Washington Post,
Dec. 6, 2001, Page A37

[4] *Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2001*, Environmental Protection Agency, September, 2001.

"81 percent of Americans 'Approve of the government requiring car manufacturers to meet higher fuel efficiency standards than they do now.'"

CBS / New York Times
June 2001

"81 percent of Americans strongly support more fuel efficient vehicles."

ABC / Washington Post
June 2001

"Increasing fuel-efficiency standards for automobiles to 40 miles per gallon - a reasonable expectation, even with existing technology - would save about 2.5 million barrels a day by 2020. That is considerably more than the [ANWR] refuge can be expected to yield in the same time frame. As it happens, 2.5 million barrels is just about what we are now importing every day from the Persian Gulf."

New York Times Editorial
October 22, 2001

FUEL ECONOMY AND CONSUMER SAVINGS

America's dependence on oil costs the nation in many ways. With citizens driving farther every year and the average fuel economy of new vehicles at its lowest point since 1980, Americans now spend more than $500 million per day to fuel our cars and trucks. On a national scale, passenger vehicles account for 40 percent of the oil products the nation consumes each year. The best way to protect consumers from costly price shocks and lower their overall energy bill is to reduce the demand for oil. Boosting the fuel economy of the nation's fleet of cars and trucks does just that.

Stagnant fuel economy standards burden consumers with excess gasoline costs.

- While the average fuel economy of the cars and trucks on the road is at a twenty–one year low, prices at the pump have fluctuated, soaring most recently to $2.00 per gallon.
- Americans now spend more than $500 million per day to fuel our cars and light trucks.
- Raising fuel economy standards will save consumers money at the gas pump. Automakers have the technology today to produce a fleet of cars and light trucks that averages 40 mpg. The modest increase in sticker prices will be more than offset by the fuel savings. On average, drivers will save more than $2,200 over the lifetime of the vehicle.
- When fully implemented in 2012, the 40 mpg standard would save consumers $16 billion annually. These savings will continue to increase as vehicles with higher fuel economy replace remaining older vehicles.

Increasing fuel economy standards results in a win-win situation for consumers and the environment. In the model below, fuel economy standards result in a net cost of carbon dioxide reduction of -$49/ton of carbon dioxide avoided. In other words, consumers are paid to reduce their impacts on the environment while simultaneously reducing our oil dependence.

***Fuel Economy and Lifetime Savings from Conventional Technologies*[1]**

	CAFE Rated Fuel Economy[1] *(mpg)*	*Real World Fuel Economy*[2] *(mpg)*	*Fuel Economy Improve-ment vs. baseline*	*Cost of Fuel Economy Improve-ment*[3]	*Lifetime Fuel Cost Savings*[4]	*Net Savings*	*Green-house Gas Savings (tons)*	*Avoided Toxic Emissions (lb.)*	*Smog Precur-sor Savings (lb.)*
Small car	48.4	38.7	57 %	$1,125	$2,595	$ 1,470	30	16	35
Family Car	45.8	36.6	75 %	$1,292	$3,590	$ 2,298	42	23	49
Pickup	33.8	27.0	61 %	$2,291	$3,964	$ 1,673	46	25	54
Minivan	41.3	33.0	85 %	$2,134	$4,534	$ 2,400	53	28	61
SUV	40.1	32.1	98 %	$2,087	$5,346	$ 3,259	62	34	72
Fleet Average	**41.8**	**33.4**	**74 %**	**$1,693**	**$3,900**	**$ 2,207**	**45**	**24**	**53**

1. Source: David Friedman, et al, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*, Union of Concerned Scientists, 2001. Based on vehicle analysis by DeCicco, An, and Ross. *Technical Options for Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010-2015*, American Council for an Energy Efficient Economy, 2001.
2. CAFE fuel economy reduced by 20 percent.
3. Assumes a 15-year, 170,000-mile vehicle lifetime and a 5% discount rate. Average life based on scrappage rates from Davis 2000. Vehicle mileage based on 1995 National Personal Transportation Survey (NPTS) data.
4. Based on an average gasoline cost of $1.40 per gallon (EIA 2000a).

Projected Consumer Savings from Raising Fuel Economy Standards to 40 mpg by 2012, By State (US 2000 dollars)

State	Fraction of National Gasoline Use	Annual Net Consumer Savings in 2012 *(million dollars per year)*	Cumulative Net Consumer Savings by End of 2012 *(million dollars)*	State	Fraction of National Gasoline Use	Annual Net Consumer Savings in 2012 *(million dollars per year)*	Cumulative Net Consumer Savings by End of 2012 *(million dollars)*
AK	0.2%	26	57	NC	3.2%	399	865
AL	1.9%	237	513	ND	0.3%	34	74
AR	1.1%	137	297	NE	0.7%	82	178
AZ	1.8%	226	489	NH	0.5%	64	139
CA	11.0%	1,390	3,011	NJ	3.0%	379	821
CO	1.5%	192	416	NM	0.7%	90	196
CT	1.2%	146	317	NV	0.7%	89	192
DC	0.1%	16	35	NY	4.4%	549	1,189
DE	0.3%	38	82	OH	3.9%	495	1,073
FL	5.7%	713	1,545	OK	1.4%	177	384
GA	3.6%	451	976	OR	1.2%	149	324
HI	0.3%	36	79	PA	3.8%	482	1,045
IA	1.2%	148	320	RI	0.3%	40	86
ID	0.5%	64	139	SC	1.7%	217	470
IL	3.9%	487	1,055	SD	0.3%	41	89
IN	2.4%	297	643	TN	2.3%	286	620
KS	1.1%	136	294	TX	7.9%	995	2,156
KY	1.6%	207	449	UT	0.8%	95	205
LA	1.6%	203	441	VA	2.8%	348	754
MA	2.1%	261	566	VE	0.3%	32	68
MD	1.9%	234	508	WA	2.1%	258	560
ME	0.5%	67	144	WI	1.9%	241	522
MI	3.9%	496	1,075	WV	0.6%	80	173
MN	1.9%	244	528	WY	0.3%	32	69
MO	2.3%	290	628				
MS	1.2%	156	338				
MT	0.4%	47	102	Total	100%	12,600	27,300

Notes: gasoline use data for 1999 from: *Transportation Energy Consumption Estimates 1999*, Energy Information Administration, 2001, ftp://ftp.eia.doe.gov/pub/state.data/html/summ7.htm Gasoline cost projections obtained from: *Annual Energy Outlook 2000*, Energy Information Administration, 2000. Consumer Savings based on predicted future consumption levels and other national results from: David Friedman, et al, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*, Union of Concerned Scientists, 2001.

"61 percent of labor union households endorsed a statement that 'increasing fuel efficiency is the single most effective action that could reduce national dependence on foreign oil.'"

Mellman Group
October 30, 2001

"75 percent of predominantly Republican and Independent voters in New Hampshire favored increasing fuel economy to address global warming, even at an extra cost of $300."

Zogby International
August 1999

FUEL ECONOMY AND JOBS

Raising fuel economy would create new jobs in the automotive sector as a result of large-scale production and use of up-to-date technologies and materials. The modest increase in sticker prices for fuel-efficient cars would be more than offset by consumers' gas savings, which would be spent on products and services, creating new jobs throughout the economy. On the other hand, if fuel economy continues to stagnate, the next oil shock could mean big trouble for the U.S auto industry.

Higher fuel economy standards would mean more auto industry jobs.

- Due to increased investment in the industry, a standard of 40 mpg by 2012, rising to 55 mpg by 2020 would create 40,000 new jobs in the automotive sector by 2010, and 104,000 by 2020.[1]

Fuel economy improvements put money into consumers' pockets, creating jobs across the economy.

- If fuel economy reached 40 mpg by 2012, consumers would save $16 billion in annual fuel costs. The resulting spending would generate job increases in almost all sectors—72,000 new jobs in ten years and 244,000 jobs in twenty years. The retail trade, agriculture, restaurant, health services, construction, and other industries would all gain between 20,000 and 80,000 new jobs in twenty years.[2]
- While an increase in fuel economy would result in a decline in oil drilling and refining jobs, the energy sectors are among the least labor-intensive in the US economy, and much of our oil spending goes overseas. Transferring dollars from oil production to other sectors produces a net increase in employment.

The auto industry's claims that higher fuel economy standards mean fewer jobs are based on faulty assumptions.

- In 1992, proposals to raise CAFE standards for cars from 27.5 mpg to 40 mpg by 2000 were met by claims from the auto manufacturers' association that such a step would mean the loss of 150,000 to 300,000 jobs. A Los Angeles Times investigation revealed the claim assumed that assembly lines and entire plants producing cars that did not meet the new standards would simply be shut down.[3] This extreme scenario does not reflect the reality that car and truck models will be improved, *not eliminated,* and that the standards will be gradually introduced.

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[1] David Friedman, et al, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles,* Union of Concerned Scientists, 2001, p. 45.

[2] John Decicco, et al, *Energy Efficiency and Job Creation,* American Council for an Energy-Efficient Economy, 1992.

[3] Jack Doyle, *Taken for a Ride,* Four Walls Eight Windows, 2000, pp. 370-371.

- In 2001, GM urged the St. Louis City Council to pass a resolution against fuel economy improvements using the same specious argument. GM argued that it would respond to a 3 mpg increase in light truck fuel economy standards simply by eliminating the least efficient existing products causing the loss of 36,200 UAW/GM jobs.
- CAFE standards apply to fuel economies averaged across automakers' fleets and do not restrict production of individual vehicle models. Manufacturers would have time and flexibility to adapt to new standards.

U.S. manufacturers can't afford to be industry laggards.

- Oil price hikes in the 1970s hit domestic automakers hard, because foreign automakers such as Honda and Toyota then led the Big Three on fuel economy. High oil prices in the future could hit American automakers hard, just as happened in the 1970s. A planned, phased-in increase of fuel economy standards will provide critical insurance against a repeat of this scenario.
- After the oil shocks of the 1970s and early 1980s, Chrysler, in a temporary departure from the Big Three's customary point of view, saw fuel-efficient cars as an important market to capture and opposed efforts to roll back CAFE standards. According to a 1985 Chrysler ad, "…CAFE protects American jobs. If CAFE is weakened now, come the next energy crunch American manufacturers will not be able to meet the demand for fuel-efficient cars…again. And American workers—both in the Auto Industry and in the other industries that serve it—will be out on the street. Many of their jobs—as was true for the last two times around—will disappear forever."[4]

[4] New York Times, August 11, 1985, Chrysler advertisement, p.45.

Fuel Economy and Lifetime Savings from Conventional Technologies[1]

	CAFE Rated Fuel Economy[1] *(mpg)*	*Real World Fuel Economy*[2] *(mpg)*	*Fuel Economy Improvement vs. baseline*	*Cost of Fuel Economy Improvement*[3]	*Lifetime Fuel Cost Savings*[4]	*Net Savings*	*Greenhouse Gas Savings (tons)*	*Avoided Toxic Emissions (lb.)*	*Smog Precursor Savings (lb.)*
Small car	48.4	38.7	57 %	$1,125	$2,595	$ 1,470	30	16	35
Family Car	45.8	36.6	75 %	$1,292	$3,590	$ 2,298	42	23	49
Pickup	33.8	27.0	61 %	$2,291	$3,964	$ 1,673	46	25	54
Minivan	41.3	33.0	85 %	$2,134	$4,534	$ 2,400	53	28	61
SUV	40.1	32.1	98 %	$2,087	$5,346	$ 3,259	62	34	72
Fleet Average	**41.8**	**33.4**	**74 %**	**$1,693**	**$3,900**	**$ 2,207**	**45**	**24**	**53**

1. Source: David Friedman, et al, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*, Union of Concerned Scientists, 2001. Based on vehicle analysis by DeCicco, An, and Ross. *Technical Options for Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010-2015*, American Council for an Energy Efficient Economy, 2001.
2. CAFE fuel economy reduced by 20 percent.
3. Assumes a 15-year, 170,000-mile vehicle lifetime and a 5% discount rate. Average life based on scrappage rates from Davis 2000. Vehicle mileage based on 1995 National Personal Transportation Survey (NPTS) data.
4. Based on an average gasoline cost of $1.40 per gallon (EIA 2000a).

FUEL ECONOMY: THE BIGGEST SINGLE STEP TO CURBING GLOBAL WARMING AND IMPROVING AIR QUALITY

Emissions from cars and light trucks threaten our environment and public health. There is a scientific consensus that the average global temperature is rising, and that humans are responsible for this change.[1] Burning oil in passenger vehicles releases CO_2 that builds up in the atmosphere and works like a blanket that traps heat near the earth's surface. This causes the average global temperature to rise. Since America's enormous fleet of passenger vehicles accounts for one-fifth of all U.S. CO_2 emissions, raising CAFE standards is the single biggest step our country can take to curb global warming. Raising CAFE standards would also help reduce key air pollutants, improving public health and helping cities and states meet clean air standards.

Cars and light trucks account for a significant portion of U.S. global warming pollution.

- Consuming one gallon of gasoline releases 24-28 pounds of CO_2 into the atmosphere—19 pounds directly from the tailpipe and an additional 5-8 pounds from upstream sources that include transporting gasoline and refueling.[2,3]
- U.S. cars and light trucks alone produce more CO_2 pollution than all but three other countries worldwide: China, Russia and Japan.[4] This amounts to almost 5 percent of total world CO_2 emissions from fossil fuels.
- If current trends in fuel economy go unchecked, passenger vehicle fuel use will increase by 56 percent over the next two decades. Under this scenario, annual greenhouse gas emissions from the U.S. passenger vehicle sector will rise from 1,450 million tons of CO_2 to 2,260 million tons of CO_2.[5]

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1 *Second Assessment Report*, Intergovernmental Panel on Climate Change, http://www.ipcc.ch/

2 UCS analysis, http://www.ucsusa.org

3 M.A. Deluchi, Emissions *of Greenhouse Gases from the Use of Transportation Fuels and Electricity*, Report ANL/ESD/TM-22, Argonne National Laboratory, Center for Transportation Research, 1991.

4 Data on US vehicle CO2 emissions from: *Inventory Of U.S. Greenhouse Gas Emissions And Sinks: 1990 – 1999* EPA 236-R-01-001, Environmental Protection Agency, April, 2001, http://www.epa.gov/globalwarming/publications/emissions/us2001/index.html
Data on international emissions from EPA's Global Warming Emissions site, international section: http://www.epa.gov/globalwarming/emissions/international/inventories.html

5 David Friedman, et al, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*, Union of Concerned Scientists, 2001.

Fuel-related pollution from cars and light trucks poses a significant health hazard.

- The amount of fuel a vehicle uses accounts for nearly half of air pollution from passenger vehicles. Cars and light trucks produce an amount of U.S. air pollution that is second only to electricity generation.
- Existing fuel economy standards avert 500,000 tons of hydrocarbon emissions from gasoline production, distribution, and vehicle fuel tanks. Hydrocarbon emissions are a key source of smog, and many of them are toxic and potentially carcinogenic.[6]
- Each year, the production and distribution of gasoline to fuel U.S. passenger vehicles causes the emission of 392,000 tons of benzene-equivalent and 848,000 tons of smog-forming hydrocarbons and nitrogen oxides.[7]
- A recent UCLA study linked air pollution and birth defects in Southern California for the first time, finding that pollutants are transferred to the fetus through the umbilical cord.[8]

Congress must raise CAFE standards to protect our future.

- When fully phased in by 2012, a fleet wide fuel economy standard of 40 mpg would avert:[9]
  - 345 million tons of CO_2 emissions.
  - Up to 187 million pounds of toxic emissions.
  - Up to 404 million pounds of smog forming pollutants.
- When fully phased in by 2020, a fleet wide fuel economy standard of 55 mpg would avert:[10]
  - 888 million tons of CO_2 emissions.
  - Up to 481 million pounds of toxic emissions.
  - Up to 1,039 million pounds of smog-forming pollutants.

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6 David L. Greene, et al, *Motor-Vehicle Fuel Economy: The Forgotten Hydrocarbon Control Strategy?*, Transpn. Res.-A, Vol. 28A, No. 3, 223-244, January, 1994.

7 The production, refining, and delivery of each gallon of gasoline in the United States emit an estimated 6.4 grams (0.014 pounds) of smog-forming pollution (Wang 1999). Upstream activities also release harmful toxic pollution into the air that poses a major health hazard near refineries, along distribution routes, and at gasoline stations. For every gallon of gasoline delivered, 2.9 grams (0.0065 pounds) of benzene-equivalent toxic emissions are produced (Winebrake, He, and Wang et al. 2000; Wang 1999).

8 Beate Ritz, et al, *Ambient Air Pollution and Risk of Birth Defects in Southern California*, American Journal of Epidemiology, 2002, 155: p. 17-25.

9 UCS analysis, http://www.ucsusa.org

10 UCS analysis, http://www.ucsusa.org

"Simply increasing safety belt use by 10 percentage points would overwhelm almost any effect of reasonable weight reduction in these types of crashes."

Union of Concerned Scientists

"Thousands of lives would be saved by reducing the mass differential between cars and trucks."

Ross & Wenzel, 2001

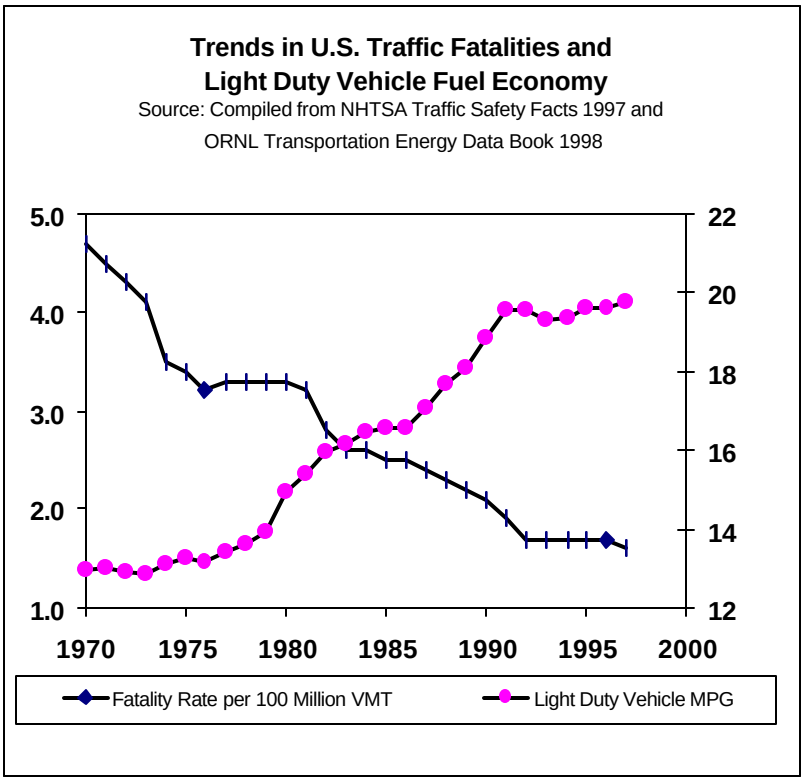
"A reduction in light truck weights of 100 lbs., also accompanied by proportionate size reductions, would reduce motor vehicle fatalities by 0.3 percent."

National Highway Traffic Safety Administration, 1997

FUEL ECONOMY AND SAFETY

Since 1974, the safety of automobiles has increased dramatically while the fuel economy of cars doubled. The fatality rate declined from 3.4 per hundred million vehicle miles traveled (VMT) in 1975 to 1.6 per hundred million VMT in 1999. The auto industry—the same industry that fought air bags, safety belts, fuel system integrity, madatory recalls, side-impact protection and roof strength and rollover standards—claims that increasing fuel economy standards will compromise vehicle safety. New fuel economy standards can and should be designed to improve highway safety.

During the debate over the original fuel economy standards in 1974, Ford Motor Company testified in Congress that: "This proposal would require a Ford product line consisting of either all sub-Pinto-sized vehicles or some mix of vehicles ranging from a sub-sub-compact to perhaps a Maverick."[1] Needless to say, this prediction proved wrong. Manufacturers met the current standards while providing consumers with a full range of safer vehicles from which to choose.



Safety is a function of design.

- Safety features such as seat belts and air bags that were mandated by law are a far greater factor than size or weight in the reduction of fatalities. Better technology and design such as expanded crush space, better airbags, seat belts and stronger roofs improve crashworthiness in vehicles of all sizes.
- Fatality rates for many model year 1994 to 1997 passenger cars are better than those for the SUVs the auto industry touts as safe. For example, the Honda Civic at 2500 pounds has a driver death rate of 47 per million

[1] Testimony of Helen Petrauskas, Vice President for Environment and Safety, Hearing on Energy Conservation Working Paper Before the Senate Committee on Committee, 93rd Cong., 2nd Session, 1974, p. 177.

registered vehicle years while a 5500-pound 4-wheel drive Chevrolet Suburban has a death rate of 53 per million registered vehicle years. Other popular SUVs are more lethal with the 4-door Blazer at 72 and the shorter wheel base 2-door Blazer at an appalling 153, the Explorer at 76, the Jeep Grand Cherokee at 52 and the Toyota 4Runner at 126 deaths per million registered vehicle years.[2]

Poor design affects vehicle safety.

- An Oak Ridge National Laboratory study found that "[b]ased on a comparison of fatality data for SUVs to other vehicles, the registered-vehicle-fatality rate (defined as number of fatalities per number of registered vehicles) for SUVs is higher than the registered-vehicle-fatality rate for other vehicles."[3]
- Rollovers are a major cause of fatalities in SUVs. A high center of mass, narrower width and stiffness of suspension largely determine propensity to rollover, and light trucks are far more likely to roll over than cars because they have these characteristics. In 1999, the rate of rollover fatalities per mile driven was more than twice as great for light trucks as for cars.[4]
- Roof strength is a critical issue in rollover accidents. SUVs have inadequate roof strength for their heavier weight and tend to crush inward on SUV occupants during rollovers.
- SUVs have stiffer frames and do not crumble to absorb energy in a crash as do passenger cars. SUVs have worse crash test ratings on NHTSA 35 mph frontal crash tests than do passenger cars.

Heavy vehicles pose a threat to smaller vehicles.

- While heavier vehicles are not necessarily safer to their occupants overall, they do put smaller cars at a disadvantage in a two-car collision. If two cars collide head-on and one is twice as heavy as the other, the risk to the occupants of the lighter car is 8 to 16 times greater than to those in the heavier vehicle.[5] This risk is a function of the relative weights, not of the total or individual weights of the vehicles involved.
- Light trucks are currently being used in the same capacity as cars. This "substitution effect" results in more than 2,000 deaths annually due to vehicle weight disparities.[6]

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[2] Insurance Institute for Highway Safety, Highway Loss Data Institute, http://www.highwaysafety.org/sr_ddr/sr3507_detail.htm#2uvh

[3] Stacy C. Davis, *An Analysis of the impact of Sport Utility Vehicles in the United States*, Oak Ridge National Laboratory, p.24.

[4] *Transportation Energy Data Book: Edition 21-2001*, Oak Ridge National Laboratory, Table 6.5 *Traffic Safety Facts 1999*, Table 37, http://www-fars.nhtsa.dot.gov/pubs/1.pdf

[5] *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards*, National Academy of Sciences, 2001, p. A-4.

[6] Tom Wenzel, et al, *Losing Weight to Save Lives: A review of the Role of Automobile Weight and Size in Traffic Fatalities*, 2001, p. 19.

Vehicles in Fatal Crashes

Year	Number of Passenger Cars	Involvement Rate per 100 Million VMT	Number of Light Trucks	Involvement Rate per 100 Million VMT
1994	30273	2.1	16353	2.3
1995	30940	2.1	17587	2.3
1996	30727	2	18246	2.3
1997	30059	2	18628	2.3
1998	29040	1.9	19363	2.2
1999	28027	1.8	19959	2.2

NHTSA, FARS Trends Report

Fuel economy standards result in a safer vehicle fleet mix.

- A more uniform fleet is a safer fleet as shown in the recent NAS fuel economy report and as researchers have known since at least 1974 when NHTSA sponsored its first conference on vehicle mix and compatibility.
- Increasing fuel economy makes the fleet mix become more compatible because auto makers obtain a better improvement in their fuel economy average by improving the fuel economy of the largest, least efficient, vehicles than that of the smallest vehicles. A 5 mpg increase in fuel efficiency of a 20 mpg gallon vehicle will result in a higher CAFE improvement than a 5 mpg increase in the fuel economy of a 40 mpg vehicle.
- Moving to a higher fuel economy standard for all vehicles will force auto makers to make similar changes to SUVs as they did to passenger cars to achieve the current standards—make the largest SUVs lighter and put improved technology in all vehicles. Making the largest SUVs lighter will improve the vehicle mix in the first decade of the 21st Century just as the passenger car fuel economy standards did after 1975.

Weight reduction is a relatively small element of fuel economy improvement, and need not affect vehicle size.

- The fuel economy of cars doubled between 1974 and 1991. Technological improvements account for 86 percent of that increase.[7]
- Before CAFE standards, cars 2500 lbs. or less were 10.8 percent of cars sold. Today, only 2.8 percent of cars sold are 2500 lbs or less.[8]
- According to the NAS fuel economy report, significant increases in fuel economy could be achieved with no reduction in vehicle sizes and weights.
- Weight reduction to improve fuel economy would be brought about primarily through substitution of aluminum, plastics and lighter steels for steels used today. Thus, a more efficient car might be lighter than the prior model but have the same size passenger compartment and crush

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[7] *The Safe Road to Fuel Economy*, MCR Technology, Inc and Center for Auto Safety, April 1991, p. i.
[8] Robert Heavenrich, et al, *Light-Duty Automotive Technology and Fuel Economy Trends 1975 Through 2000*, p.G-2. Report # EPA420-R-00-008, December 2000.

zones.

- If fuel economy improvements were implemented in such a way as to reduce the weight of the heaviest vehicles, weight disparity would become a less significant factor in two-vehicle crashes, and overall safety would improve.
- Redesigning SUVs to make them safer and more fuel efficient does not mean making them smaller any more than did making passenger cars smaller to meet the 1975 CAFE standards. Better materials and design can make SUVs lighter while retaining capacity and utility. More efficient engines with the same or improved performance have lighter weight and require less secondary or supporting weight with no effect on vehicle size.

We need to improve vehicle safety while we improve fuel economy. Many simple, inexpensive safety measures are available to improve vehicle safety.[9]

- Effective seat beat use inducements could save 6,000-10,000 lives annually. A recent study of seat belt usage reported in The Lancet concluded that lives of front seat passengers could be saved if rear seat passengers had been wearing seat belts. As reported in the New York Times, 80 percent of deaths of front-seat riders wearing seat belts might have been avoided in the five years [studied]. That amounts to 742 deaths, and it does not include the 1,520 severe injuries that may also have been prevented.[10]
- Stronger roofs, improved seat belt design, interior padding as required by a new federal standard, and window curtain air bags could eliminate another 3,000-5,000 deaths due to rollovers. The first three features emulate the extremely effective rollover protections in racing cars and should cost less than $100 for most new vehicles.
- Stiff frames and high bumpers, which can intrude into the passenger compartment of a lower vehicle, are features of SUVs that can and should be changed to improve vehicle crash-compatibility, reducing the dangers of car-truck collisions.
- As manufacturers modernize SUVs for better fuel economy, they can redesign them to improve safety, just as was done with passenger cars. Using high-strength, lightweight materials will help make SUVs lighter to improve their fuel economy. Making them lower will reduce their rollover and making them softer will improve their energy absorbing capacity to protect their own occupants; both of these steps will also help to protect occupants in other vehicles involved in crashes with SUVs.

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[9] This section largely based on: David Friedman, et al, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles,* Union of Concerned Scientists, 2001.

[10] New York Times, January 15, 2002, D7.

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