S. HRG. 107–1137

CORPORATE AVERAGE FUEL ECONOMY (CAFE) REFORM

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

DECEMBER 6, 2001

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ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

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CORPORATE AVERAGE FUEL ECONOMY (CAFE) REFORM

THURSDAY, DECEMBER 6, 2001

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 9:30 a.m., in room SR–253, Russell Senate Office Building, Hon. John F. Kerry, presiding.

OPENING STATEMENT OF HON. JOHN F. KERRY, U.S. SENATOR FROM MASSACHUSETTS

Senator KERRY. Good morning. The Commerce Committee hearing on the subject of CAFE standards will now come to order, and I welcome our colleagues. This morning, I will make a brief opening, and I am confident Senator McCain will want to say just a few words. We will try to move along. We have a very ambitious, full schedule today on a topic of enormous importance, and we really want to try to maximize the expertise of the panels that are here, so we want to try to keep it moving.

Let me just begin by saying that the hearing today seeks to focus on corporate average fuel economy standards. I readily acknowledge to all the panelists that we are well aware that there are other possibilities, other ways of trying to deal with average fuel economy—or, not average fuel economy, but at any rate, fuel economy itself. Whether it is through tax incentives or cappage programs or biomass fuels, there are other options, and we have been discussing them as we meet, and will continue to meet, over the course of the next month or so. That is not what we are here to talk about today, and I am going to keep bringing us back to the fundamental issue, which is the CAFE standards themselves.

Some of those other policies, let me say, may well make sense. They may well be part of a mix, of an intelligent policy to try to approach this issue over the long term, but we are focusing on CAFE because CAFE is going to be one component of it, and it is one of the most pressing and onerous of policy questions that we face.

All of us know that this CAFE program was created specifically in response to the 1973–1974 Arab oil embargo as part of the Energy Policy and Conservation Act. It was signed into law by President Gerald Ford, I might remind everybody, a Republican from Michigan, who years later said that enacting CAFE was the right decision, and that he found it was a program that had been reasonably fair and produced significant benefits.

When President Ford signed that bill, the principal reason for signing it was to reduce oil dependence and increase the overall economic efficiency and conservation. Today, we have also come to recognize that CAFE provides us with environmental benefits as well. The accumulation of greenhouse gases has been one of the most important considerations in the fuel economy debate, and to a great extent CAFE has been successful in achieving technical efficiency, economic efficiency, and reducing pollution.

We have built more efficient vehicles. In 1974, the average car sold in America got 13 miles per gallon. By 1988, fuel economy climbed to a peak of almost 29 miles per gallon, a 120 percent increase in fuel economy over 14 years. Light trucks climbed from 18 miles per gallon in 1979 to a peak of almost 22 miles per gallon, an increase of almost 20 percent in 9 years.

We reduced oil consumption as a consequence of this. The National Academy of Sciences estimates that the United States' gasoline use would be 43 billion gallons per year more, 2.8 million barrels per day higher than it is today, were it not for this program. As a result, the use by cars and light trucks today is roughly one-third lower than it would otherwise be, and overall oil consumption is 5 percent lower.

We have also reduced pollution. The National Academy of Sciences estimates that without these advances, carbon dioxide emissions would be more than 100 million metric tons higher each year than they are now. That is a 7 percent cut in emissions, and as we consider the importance of global warming, it is something to keep in mind as we go forward.

Now, there are important concerns raised on both sides, and Senator McCain and I, Senator Hollings, our Chairman, and others on the Committee are determined to do the best job we can as a Committee fairly and thoughtfully listening to all the sides of this issue as we proceed forward.

I have not arrived at an overall CAFE figure, a number that should be the goal or standard. I have not even arrived yet at what the structure might be, and there are several different proposals on the table with respect to that, but I think it is important to all of us to understand that some of the arguments we are hearing are very similar to arguments that were posed when this program was first proposed.

We hear from the Alliance of Automobile Manufacturers strenuous opposition to the CAFE program, including concerns that there is a negative economic impact on individual companies and the industry as a whole, that the public has not made a decision to buy in these directions, and that you cannot force consumer decisions. They question whether CAFE is the most effective policy to achieve the goal of reducing oil consumption, and are concerned with the impact that a fixed figure with a specific set of time that is not reasonable might have on the industry as a whole, and therefore on jobs and on the economy of this country.

I want to make it as clear as I can I think every Member of this Committee is deeply concerned about the economy of the country, and obviously, none of us wants to adopt a policy that appears mindless and geared to putting people out of work. But many of us believe that there are ways to avoid those kinds of dire predictions

and consequences, and that is precisely what this hearing is geared to try to examine.

I think by the same token there are some exaggerated claims on other sides of the ledger, and we need to examine those also as we go forward. Let me just close by saying one thing. After a decade of the CAFE standards being frozen in place, there has been a decrease in the overall fleet economy, and we are coming back to a place where we have been before. Many of us have been deeply concerned that the agencies responsible for trying to help work us through this problem have literally been prohibited by congressional mandate from even being thoughtful about what the options might be.

As we all know, in 1995 the Administration was prohibited from even an evaluation of what might take place with further CAFE standards. So we come to this debate mindful of the restraints under which we have been forced to operate, and I also remind people that there is a track record here. During the Reagan and Bush Administrations, it is interesting that some of those who opposed CAFE looked to NHTSA to be the operating entity, and then when people perhaps viewed as being less friendly to their interests were in power, suddenly Congress became the empowered entity, and now once again we see those people who oppose CAFE looking to NHTSA to try to be the governing entity.

So there is a track record here of people forum-shopping, and I think I am certainly going to encourage this Committee to not be impressed by those forum-shopping efforts, and to try to do what the Congress of the United States ought to do, which is to show some leadership and try to set a standard.

There is a lot on the table today, and I will try to keep to my own restraints here.

Senator McCain, do you have some opening comments?

STATEMENT OF HON. JOHN MCCAIN,
U.S. SENATOR FROM ARIZONA

Senator MCCAIN. Thank you, Mr. Chairman. I want to thank you for having this hearing, and I want to thank you for your long involvement in this issue. I welcome our Senate colleagues, as well as Congressman Boehlert, who has been a staunch leader in this effort as well as in other environmental issues. We are pleased you came over to discuss this issue with us today, Congressman Boehlert. And again, I want to thank you, Senator Kerry. With all of the other issues that we are facing here, I think it is important that we have this hearing, because I think it is important that we act next year, and I think you would agree that we probably have enough information to move some legislation, at least, through the Commerce Committee.

The issue is a significant one. I hope today's testimony will provide the Committee with an in-depth look at how best to address the issue and balance consumer interests and environmental issues. The debate is complex because it involves the environment, public safety, and the economy. It involves a tension between the consumer's choice to drive vehicles that perform to the owner's standards and the environmental consequences that result from those choices.

Moreover, higher CAFE standards may now play a more significant role in our discussions regarding efforts to decrease U.S. independence on the importation of foreign oil.

The recent NAS report concluded that the benefits resulting from CAFE-type programs clearly warrant government intervention in the market. The report points out that CAFE has produced many positive results, including a reduction in the emission of greenhouse gases, a decreased dependence on foreign oil, and lower fuel consumption. At the same time, NAS reported that CAFE standards have probably resulted in increased traffic fatalities due to the down-sizing and down-weighing of vehicles by manufacturers in their efforts to comply with the standards.

To properly address this issue requires careful evaluation of new technologies and the costs associated with incorporating them into the fleet. I am hopeful that today's testimony will enable this Committee to learn more about the technology that exists to increase CAFE standards, and how the auto industry can implement that technology at minimal cost to the consumer without compromising safety or performance. In particular, I hope the industry will speak to the research and development in which they are currently engaged in their efforts to develop vehicles that are more fuel-efficient.

In conclusion, let me say that it is imperative that the Commerce Committee examine this issue in a comprehensive manner, and formulate a balanced approach that achieves better fuel economy, and at the same time, provides consumers with choice and enhanced vehicle performance.

I thank you, Mr. Chairman. I thank you for your involvement, and I thank you for holding this hearing, and I know we will probably have to have some more, but I hope next year that we can take some action. We have been reviewing it for a number of years now.

I thank you, Mr. Chairman.

Senator KERRY. Thank you very much, Senator McCain.

Let me just say for everybody's edification, the schedule of the Committee will essentially be accelerated because, as everybody knows, there have been a few skirmishes on the floor of the Senate with respect to energy policy, and clearly, CAFE will be a component of that policy. It will be unavoidable that when we have energy on the floor of the U.S. Senate, there is going to be some effort to deal with this issue, and so we are putting ourselves on an accelerated schedule to try to deal with it.

In that light, I met with Senator Daschle, we talked about it, we met with Senator Bingaman, the Chairman of the Energy Committee, Senator Feinstein, other interested parties, and it will be our intention to try to complete our task within this Committee in time to be relevant to that debate and to make our recommendations, and that will be sometime late January, obviously.

Senator Smith.

STATEMENT OF HON. GORDON SMITH, U.S. SENATOR FROM OREGON

Senator SMITH. Thank you, Mr. Chairman. As a Member of both the Energy Committee and the Commerce Committee, I join Sen-

ator McCain in thanking you for holding this hearing. I think it is timely and very, very important. In the interest of time, I would ask my full testimony be included in the record. I will sum up my remarks by saying that in the past I voted to lift the moratorium on CAFE standards, and I am open to a reasonable approach to increasing CAFE standards or to any alternative plan that can achieve the same policy objectives.

Our challenge as we craft the legislation will be to proceed in the manner that preserves consumer choice, protects passenger safety, and does not impair the competitiveness of the domestic auto industry. I believe we can do all this while maintaining and increasing our environmental stewardship, and I note that the National Academy of Sciences recently reported that technologies exist that can significantly reduce fuel consumption within 15 years, especially for light trucks. If it exists, let us get on with it. Let us keep the trucks rolling. Let us roll.

Thank you, Mr. Chairman.

[The prepared statement of Senator Smith follows:]

PREPARED STATEMENT OF HON. GORDON SMITH, U.S. SENATOR FROM OREGON

Mr. Chairman, I want to thank you for holding this timely hearing on Corporate Average Fuel Economy (CAFE) standards. I believe this hearing will be very helpful in the upcoming debate on national energy legislation, and I look forward to hearing from the witnesses today.

I have voted in the past to remove the moratorium on raising CAFE standards, and am open to a reasonable approach to increasing CAFE standards or to an alternative plan for achieving the same policy objectives.

Our challenge as we craft legislation will be to proceed in a manner that preserves consumer choice, protects passenger safety, and does not impair the competitiveness of the domestic auto industry. I believe that all of this can be attained while we simultaneously enhance our environmental stewardship.

Combating global climate change must involve the transportation sector in order to succeed. In addition, our dependence on imported oil continues to grow, and is expected to reach 66 percent by the year 2010. To put that in context, the U.S. imported just 35 percent of its oil at the time of the 1973 oil embargo.

As the recent National Academy of Sciences report found, technologies exist that can significantly reduce fuel consumption within 15 years, especially for light trucks.

We need to apply American ingenuity to improving fuel efficiency, without sacrificing human safety. This is where the debate on this issue has largely centered—fuel efficiency versus the increased traffic fatalities that resulted from the downsizing and downweighting of vehicles that occurred in the 1970s and 1980s.

As a society, we are all the poorer for these deaths. Who knows what these individuals might have achieved, had they lived.

We should not, and need not, impose on auto manufacturers fuel efficiency standards that will lead to more fatalities. However, even under existing fuel standards, today's vehicles within the same class vary widely in their safety records. We need to ensure that the safest designs are incorporated, and that auto safety requirements are adequate, regardless of the outcome of the CAFE debate.

There are a variety of technologies, such as turbo-charged engines, that are already available to increase our fuel efficiency without sacrificing performance.

1 am a co-sponsor of S. 760, sponsored by Senator Hatch, a bill to amend the tax code to encourage and accelerate the production and sale of vehicles powered by fuel cell technology, hybrid technology, alternative fuels or other advanced vehicle technologies.

I believe these tax credits can spur the commercial development of these vehicles as effectively as the federal funds we spend on research.

I look forward to hearing more from the witnesses about the effectiveness of the current CAFE standards. I think that in the coming months the Congress and the Administration should also explore the alternative approaches that, in the Academy's findings, could accomplish the same policy objective at lower cost, while providing more flexibility to manufacturers.

I also appreciate the report's recognition that technology changes require very long lead times to be introduced into the manufacturers' product lines. We must ensure that any policies or actions taken relative to fuel economy reflect these lead times, and don't place U.S. auto manufacturers at a competitive disadvantage to foreign automakers.

I look forward to hearing from the witnesses today, and to working with my colleagues in the coming months to craft an effective policy on this important issue.

Senator KERRY. Thank you, Senator Smith, and without objection your full statement will be placed in the record.

It is my understanding that Congressman Boehlert and Senator Feinstein both have to leave early. Is it all right with Senator Bingaman—as Senior Member, I just wanted to ask you if we could proceed with them first.

Senator Feinstein, would you lead off then, and then Congressman Boehlert. We are delighted to have you here, and Senator Snowe as well. Thank you for taking time to be with us, and we look forward to your testimony.

STATEMENT OF HON. DIANNE FEINSTEIN,
U.S. SENATOR FROM CALIFORNIA

Senator FEINSTEIN. Thanks very much, Senator Kerry, Senator McCain, Senator Smith.

Senator Kerry, this is the second time I have had the privilege of appearing before you to speak about fuel efficiency standards for SUVs. I am delighted that the Chairman of the Energy Committee on which I am proud to serve is here, and my cosponsor in the legislation I am going to speak about this morning, Senator Snowe from Maine, is also going to testify and, of course, Congressman, we welcome your support.

Senator Snowe and I have introduced legislation which is very straightforward and, as Senator Smith said, we believe a reasonable piece of legislation. That legislation would bring the fuel efficiency standards for SUVs and light trucks into conformance with those standards on sedans, our legislation says, in 6 years. The National Academy of Sciences said that the time period—actually, a report that was leaked was much more aggressive, but the final report said within 10 to 15 years.

I, for one—I have not had a chance to discuss this with Senator Snowe, but it seems to me that this can be well-accommodated within a 10–year period, and I would like to explain why.

At the time original CAFE legislation was introduced in 1975, people did not drive SUVs. When the automotive companies began to manufacture SUVs, they built them to meet truck specifications. As a result, the vehicles were not held to the same fuel economy standards as regular passenger vehicles. Now the rub is that today, almost half of all new passenger vehicles sold in this country are SUVs, or light duty trucks, so today they are used as passenger vehicles, and yet they get the lower fuel efficiency standards.

The United States contains only 3 percent of the world's oil reserves, and we consume 25 percent of oil produced worldwide. We use about 19 million barrels of oil a day, about 10 million of which are imported. 40 percent of the oil we use in the United States goes into our motor vehicles. The Feinstein-Snowe legislation saves 1 million barrels of oil a day, reducing our dependence on foreign oil

by 10 percent right off the bat. There is no bigger bang for the buck than that.

The fuel economy for automobiles has not improved since 1987. That is 14 years with no progress. Meanwhile, SUVs and light trucks have not improved since 1981. That is 20 years with no progress. As I have said, since almost half of the vehicles on the road are SUVs and light duty trucks, fuel economy today has reached its lowest overall level in 20 years. That is why we are here.

I really believe that the Feinstein-Snowe legislation, which would phase in an increase in fuel economy standards for SUVs and light duty trucks and also increase the fuel economy of our government fleet, may be the single most important energy policy we can implement right now, today.

Additionally, closing what is called the SUV loophole would prevent about 240 million tons of carbon dioxide—that is the top greenhouse gas the single biggest cause of global warming—from entering the atmosphere each year, so it is one of the best steps we can take to help combat global warming.

I think all we have to do is sit here on this brilliant December day in Washington and see cherry blossoms beginning to bloom to understand that global warming is, indeed, a real phenomenon.

So why have we not raised CAFE standards? The short answer is because of the automotive industry. The industry has opposed fuel economy standards in 1975, and they have essentially recycled the same arguments to oppose any new standards. They argue they will cost jobs. They argue they will jeopardize safety. They argue that they do not have the technology to improve fuel economy.

Let me just briefly respond. There is no evidence that improving fuel economy will result in the loss of a single job in the United States. The National Academy of Sciences was directed to assess whether fuel economy would cost jobs. They found that it did not. In fact, I believe the biggest threat to jobs will be the continuing loss of market share by the Big Three to Toyota and Honda and other foreign manufacturers who are producing more efficient vehicles.

Second, the automotive industry argument that the only way to improve fuel economy would be to make vehicles lighter and thus less safe is simply not true. The Academy of Sciences report points out that there are other ways to improve fuel economy and safety at the same time, and this is significant.

For instance, you can encourage weight reduction using advanced lightweight materials that will not only keep light duty trucks safe, but also improve the safety of all vehicles on the road. The academy report also points out that improvements in drive train and engine technologies can greatly increase fuel economy without changing a vehicle's weight.

So the issues of fuel economy and safety can easily be both accommodated and separated. If you want to talk about safety, you should talk about the SUV rollover and roof crush standards, not the CAFE loophole.

Last, the automotive companies argue they do not have the technology to do this. Again, the academy report says that substantial fuel economy gain can be made in 10 to 15 years, and the summary

of the draft report, as I also mentioned, was even more aggressive in that direction.

In Europe, where regulations and the threat of regulations are much stronger, the European automotive manufacturers, which include Ford, GM, and Chrysler, have promised to decrease carbon dioxide emissions of all their new vehicles by 25 percent by 2005. Ford has pledged a 25 percent improvement in fuel economy of its domestic SUV fleet by 2005. That is here in the United States, and the other automotive companies have pledged to follow suit, so it seems the technology, indeed, is there to do this.

I strongly believe, and I think Senator Snowe and Senator Bingaman join me in this, that global warming is real. It is a threat, and it may well be the greatest environmental threat facing us in our lifetime, and the single most effective action we can take at this time is to limit reliance on foreign oil and to reduce global warming by increasing the fuel economy of our vehicles.

I thank you, Mr. Chairman.

Senator KERRY. Thank you very much, Senator Feinstein.

Congressman Boehlert.

STATEMENT OF HON. SHERWOOD BOEHLERT, U.S. REPRESENTATIVE FROM NEW YORK

Mr. BOEHLERT. Mr. Chairman, thank you for your invitation to appear here today. It is good to be here with you again in common cause, and with my classmate and partner in so many adventures, Senator McCain and the other Senators with whom I enjoy an outstanding working relationship.

I want to congratulate you on holding this hearing, because raising CAFE standards is the single most significant step we could take as a Nation to reduce our dependence on foreign oil, improve our national security, protect our environment and our economy, and assist our consumers. Even a very moderate increase in CAFE standards would save more oil than would be produced by drilling in the Arctic National Wildlife Refuge under the most optimistic scenarios.

In part, that is because transportation is the sector of our economy most dependent on oil. 43 percent of the oil the Nation used in the year 2000 was consumed as gasoline. We are simply never going to kick our dependency on foreign oil if we do not use less fuel in our cars. That is why, when the House considered its energy bill, H.R. 4, I proposed along with Mr. Markey that we phase in a single CAFE standard for all cars and light trucks of 27½ miles per gallon over 5 years.

As you know, 27½ miles per gallon is the current standard for cars. The approach we took, a single average for all vehicles, provides maximum flexibility for automobile manufacturers. They can choose to make cars more efficient, or SUVs and light trucks more efficient, or some combination of both.

I would encourage the Senate to move forward with this proposal. Moving ahead should be easy, because in many ways it is hard to argue against tighter CAFE standards. We all know that we have to become less dependent on oil, and that CAFE standards unarguably would contribute to that. Moreover, fuel standards can

save consumers money, which is one reason why pollsters consistently find public support for raising them.

Indeed, the case for tighter standards is so self-evident that their opponents sometimes reach for scare tactics and sophistry to combat them. For example, opponents argue that CAFE standards represent interference with the marketplace, but there is no way for consumers to send a market signal that they want more fuel-efficient SUVs. If you want an SUV, you have to buy gas guzzlers. There are no other choices. This is a classic market failure, a case in which individual choices cannot express a collective desire for vehicles that use less energy.

Other arguments are less philosophical and even easier to refute, thanks to the study released this past summer by the National Academy of Sciences, and that is a well-read study, and it should be read by a lot more people. This study was so damning for opponents of CAFE standards that the automobile industry actually tried to argue that the academy, the Nation's most prestigious scientific body, did not understand physics. Not surprisingly, just this week the academy reiterated that it was sticking to its conclusions, and what did they conclude?

First, the National Academy of Sciences said having separate standards for cars and SUVs had been stretched well beyond the original purpose, and makes no sense. You can refer to pages ES 4 and 5 through 10 of the academy report for confirmation.

Second, the Academy said that raising fuel economy standards will be a net savings for consumers. Look at page 4 through 7 to check that one out.

Third, the Academy said raising fuel economy standards will not hurt American workers, and that is particularly important, and they base that on the real experience of the past decades. That is on page 2 through 16.

Fourth, the Academy said that improved fuel economy is perfectly feasible even with current available technology, technology that is on the shelf, ready to be put to use, and capable of achieving higher standards than Mr. Markey and I have proposed. That is on page ES 5.

You can also look at the May 14, 2001 issue of *Automobile News* and find a list of the technologies that auto companies already have to make dramatic improvements in fuel economy.

Fifth, and most important of all, the Academy said that increases in fuel economy can be achieved without degradation of safety, and let me emphasize that, without degradation of safety. In fact, the report says that some available technologies can even improve fuel economy and increase safety at the same time. That is on page 4 through 26.

In the House, I knew I won the debate on merit but I was going to lose the vote on emotion when the opponents to increase CAFE standards said in their closing arguments passage of this amendment will result in the loss of thousands of lives on our Nation's highways. That is unmitigated nonsense. Ask the National Academy of Sciences.

In short, raising CAFE standards can make our Nation more secure without harming workers or compromising safety. In the aftermath of September 11, we no longer have the luxury of hesitating

to take simple, painless, and proven steps of raising CAFE standards.

Thank you very much, and good luck with your most important work.

Senator KERRY. Congressman, thank you very much. I would like to ask you a couple of questions, and I meant to do so with Senator Feinstein. I did not realize she was going to leave immediately.

But let me sort of put to you the industry point of view in response to what you just said. First of all, you made the argument that we are not going to kick our dependency on foreign oil if we do not improve fuel economy. Don't we have to be careful of that? I mean, if we are using 25 percent of the world's oil resources, 50 percent of which go to transportation, and we have only 3 percent of the reserves in the U.S., it seems unlikely that CAFE standards are ultimately going to affect our dependency in any major way.

Mr. BOEHLERT. It will lessen the dependency significantly.

Senator KERRY. Significantly, you say? How is that? I am just trying to understand.

Mr. BOEHLERT. Well, if we just had more fuel efficient automobiles we are not going to consume as much oil.

Senator KERRY. Correct. But while I am in favor of reducing our consumption by 2.5 million barrels per day, I just do not want to overplay an argument here.

Mr. BOEHLERT. Neither do I, Senator.

Senator KERRY. But reducing dependence on foreign oil is not going to ultimately affect our need for fuel economy. Even if you bring all the Alaska oil and everything else online, we are still never going to be able to produce enough oil in this country. We are still dependent.

Mr. BOEHLERT. But we do not have to have an economy exclusively dependent on oil for energy.

Senator KERRY. That raises the larger question, which is, which of these arguments do you want to accent?

Mr. BOEHLERT. Well, I have so many valid arguments in support of increasing CAFE standards that I will choose from the menu.

Senator KERRY. Well, let me give you the opportunity to do that. The auto industry comes in and says, look, the first grab bag of mileage was relatively easy. We were able to come in with lighter vehicles, we were able to change the power train, different kinds of engines, aluminum, so forth and so on. But their argument is that those economies of scale have now been gained, and they disagree with the National Academy of Sciences that they can gain these additional readily available technologies on a scale that is going to make a difference. What do you say to that?

Mr. BOEHLERT. Well, I would point—and I have a chart right here from *Automotive News*. This was a front page story with a chart, and I would command your attention to some of the items on there. It is probably too small for you to read from afar, but they say, if we have adaptive automatic transmissions, we optimize transmission performance. That will get a fuel economy gain of 5 to 7 percent. Now, that would increase the cost of the vehicles, admittedly, by an average of $2 a vehicle, not a bad investment.

They talk about improved aerodynamics, and that is in the lower right-hand corner, changes to bumper and wheel covers and exte-

rior mirrors reduces wind drag. That improves the economy by 5 percent. That might cost a little bit more, $20 or so per vehicle.

The point is, the technology is there, it exists in the marketplace, at a very modest cost to increase the fuel efficiency, and I say get on with the job.

I would also say that we do not have to have an economy exclusively dependent upon oil, no matter where the source. It is particularly abhorrent that so much of it is foreign-based. We can have alternative fuel vehicles.

I am involved in a little venture right now with the U.S. Postal Service. The U.S. Postal Service is right now in the first phase of a contract to purchase 500 electric vehicles for use in areas like the Los Angeles Basin, which is an area of non-attainment in clean air standards. It is going to use electric vehicles. Coincidentally, they happen to be manufactured by a consortium of Ford Motor Company and Baker Electromotive in my congressional district, so understandably I am a cheerleader, but not just because it provides jobs in my district.

It is innovative. It is something for the future. It is so because it lessens our dependence on foreign sourced oil, at the same time helping us to meet the high Clean Air Act standards that we all want to meet.

Senator NELSON. Mr. Chairman, I would like Congressman Boehlert to put back up that chart where you compared it to ANWR as another means of answering your question on, if you just close the light truck loophole look how much per day you are saving, as compared to how much you would be getting if you drilled in ANWR.

I think when Senator Bingaman testifies he is going to tell you that most of our energy consumption is in the transportation sector, and if, in fact, we make a significant difference by utilizing technology and increasing the miles per gallon you are going to see a significant lessening of dependence on foreign oil.

Senator KERRY. My point was not that there would not be a lessening. My point was that independence is a difficult word, and so I am drawing a distinction there.

Let me ask you one final question, and then we will go to my colleagues. The auto industry also comes in and makes the point that the essential ingredient of profit within the industry today is almost exclusively within SUVs. Other automobiles are actually sold at a loss, but that is made up for and the profitability in the industry comes from the current configuration of SUVs.

They then make the argument that if there is a mandate with respect to the size and marketability of the current SUV, they could be significantly disadvantaged in the marketplace, with loss of jobs.

What is your comment to that?

Mr. BOEHLERT. If you buy that argument, I would encourage you to go over to the House side and listen to the Judiciary Committee and the Commissioner of Baseball making the sad commentary that baseball is losing $500 million a year. Give me a break.

The fact of the matter is, the auto industry is a profitable sector. I want the auto industry to continue to be a profitable sector. I just want them to be wiser, and I would point out that the auto industry is the industry that told us many years ago, when we initiated

CAFE standards, do not do it, Congress. If you do that, we are going to be a Nation driving compacts within a decade. Guess what? It is hard to find a compact on the open road today. SUVs are all over the place.

The fact of the matter is, profit is not a dirty word. I encourage profit. Business goes into business to make a profit, but I want the business to be responsible, and the fact of the matter is, it will enhance the competitive position of the domestic auto industry if they follow some of the other manufacturers from abroad who are much farther ahead in this area, and if you look at the future, and the consumer is convinced that buying a more fuel-efficient vehicle will save the family budget a lot of money, the consumer is going to go to the marketplace option that provides that increased fuel efficiency.

Senator KERRY. Do any other colleagues have any questions?

Senator MCCAIN. I just have one. Mr. Chairman, the American people overwhelmingly have decided they want to drive SUVs. If standards were changed, which then would force changes in SUVs, would we be denying the American people a choice?

Mr. BOEHLERT. Not at all, because as the National Academy of Sciences study has conclusively proven, not only can you continue to have SUVs, you do not have to sacrifice weight. There are a number of things you can do to increase the fuel efficiency of SUVs. I do not want to deny the consumer the option in the marketplace that he or she would exercise. I just want to make certain that the vehicles are more fuel-efficient for all the right national security reasons for the country, and all the right reasons for the family budget.

In the final analysis, the consumers are going to say, you have done us a great favor, because now we can pull up the new, more fuel-efficient SUV that we voluntarily selected in the marketplace to the gas station and instead of requiring frequent visits to that gas station, there will be less frequent visits, and they will require less gasoline consumption, so the budget will be favorably impacted.

Senator MCCAIN. As an SUV owner, I look forward to that day.

Senator KERRY. Let me remind everybody, we do have a lot of ground to cover, and we have two colleagues waiting.

STATEMENT OF HON. JOHN ENSIGN,
U.S. SENATOR FROM NEVADA

Senator ENSIGN. I just wanted to say—I think that everybody would—in an ideal world, love to see more fuel efficiency from all of our vehicles. I mean, I would love to be able to drive a Suburban that got 100 miles to the gallon and was just as safe and just as comfortable, and be able to drive the family around and all that.

I just wanted to challenge you, Congressman Boehlert, about your comment about the market. You said that there is not a true market force out there because there are no fuel-efficient SUVs to be able to choose from, but it seemed a little inconsistent because in your arguments, when you were talking about foreign competition, you stated that we were going to lose jobs to foreign competition because Toyota and Honda were going to produce more fuel-efficient vehicles like this and take jobs away from the Big Three.

Well, if that is the case, why is that not happening today with SUVs? In other words, why are they not building more fuel-efficient SUVs of the same size and taking market away? Last time I checked, business is in business to get as much market share as they can and be as profitable as they can, and so why wouldn't they do some of the simple things at $2 a car, or $20 a car that you mentioned today, to gain an advantage in the marketplace? I mean, these people are not stupid.

Mr. BOEHLERT. You are right, and they are beginning to move in that direction. The American public is patient. I happen to believe that basically the American public wants to buy American, but the patience will wear thin. If you cannot buy American that is fuel-efficient, then you look to other options, and that other option will be across the sea, and that is not very favorable for us.

The biggest-growing SUV sector is smaller SUVs, where the Japanese have an advantage.

Senator ENSIGN. OK, but is that not the market? In other words, isn't the market then starting to work? Back in the 1970s, I remember we built some pretty lousy cars here in America, and the Japanese came over and started outcompeting us, especially during the oil crisis. People became much more conscious. They forced American cars to become better. Well, is that not the way the market works? Are those not what market forces are all about?

Mr. BOEHLERT. But Senator, you know, there are a lot of other factors here. We want the consumer to have the choice in the marketplace. What I am suggesting to you is that the American consumer essentially is patient, waiting. But I am wondering how long they can wait before they say, "buy America is a good notion. It provides jobs for our neighbors and our communities." But I think we are going to have to look elsewhere, and I do not want to do that.

Senator KERRY. Colleagues, I have got to interrupt this if I can.

Senator Burns, are you urgent on your question?

STATEMENT OF HON. CONRAD BURNS, U.S. SENATOR FROM MONTANA

Senator BURNS. Well, I want to follow up on light trucks, and thank you, Mr. Chairman, for this hearing, and I will put my statement in the record this morning.

[The prepared statement of Senator Burns follows:

PREPARED STATEMENT OF HON. CONRAD BURNS, U.S. SENATOR FROM MONTANA

Thank you, Mr. Chairman, and thank you to our witnesses for being here today to discuss the National Research Council's report on The Effectiveness and Impact of CAFE Standards, or Corporate Average Fuel Efficiency Standards. As a Member of both the Energy and Commerce Committees, this is a subject which is important to me in many different aspects.

There is no doubt among any of us that today's auto is cleaner, safer, and more efficient than those made 30 years ago. While some would like to give the credit for that to the U.S. Congress for all the rules and standards it has developed, I would rather give credit where credit is due and thank the automakers. I would say technology and competition have brought to where we are today much more than any rule has.

Coming from Montana, I have a different way of looking at cars and trucks than many of my colleagues. Performance in Montana has a much different meaning than it does on the Beltway. Yes, we have a lot of big cars and trucks to haul equipment,

but remember, people are hauling a lot more than boats and RV's in Montana. We are moving livestock around, or carrying ranch or farm equipment from one place to another. And it might be 80 or 100 miles from one town to the next. For that kind of a job you need a reliable truck, and you need to have the confidence that it will get you and your merchandise without any trouble. Not for fun, or because it looks cool, but because it's your life.

Before we get too far into this, I ask my colleagues to take into consideration the different situations that drivers in different parts of the country face. Larger vehicles cannot and should not be classified into some sort of luxury status. Without the use of those vehicles at an affordable price, the American West would be a very different place than it is today. By asking that automakers place fuel efficiencies over any other goal, I fear that a big chunk of the burden will fall on the people who need these vehicles most to make a living. These are the farmers and ranchers who feed this country, but are being squeezed from every direction. They are facing higher prices for the goods they buy including fuel and fertilizer, and lower places for the goods they sell. Ranchers and farmers are interested in fuel efficiency, because that hits them in the pocketbook. But they are also dependent on a lot of other features that cars and trucks provide. By focusing purely on fuel efficiency, we are minimizing the importance of reliability, safety, and performance.

Today's automakers have no choice but to build a better car or truck next year than they did this year just to stay ahead of the competition. I have no doubt they will continue to do this with or without a change in CAFE standards. However, if we make changes in the standard without thinking about what the other effects will be that is a big mistake. For example, by forcing manufacturers to pour all their resources into fuel efficiency, what do we trade for it in safety and reliability that may have been achieved otherwise?

The report estimates that 1300 to 2600 highway fatalities in 1993 alone may be attributable to smaller, lighter cars that resulted partly from strict CAFE standards. Fuel efficiency, or any other attribute come at a cost. We need to know what those costs are.

I support the continued research and development of technologies that may not undertaken without federal support. The technology cycle can be drastically cut when we are willing to undertake this research for the public good before it is feasible in the marketplace. I would like to recommend that we focus on research before we focus on restrictions because this gives our American automakers a chance to compete in the global marketplace.

I am glad that the time and energy was put into producing this report because it answers some questions about what CAFE standards have and have not accomplished. It guides us in deciding how to make these standards more fair and effective. But it does not answer all my questions, and I am glad to have the witnesses here today to answer some of them.

Senator BURNS. Congressman Boehlert, I will be right honest with you, I would drive a compact today if I could get in the damn thing with a hat on.

[Laughter.]

Senator BURNS. I would probably drive a light truck that got good gas mileage if it would get me to the back pasture and back. That is the problem here. And if you want to worry about your patience, I will tell you what will drive the market to that lighter SUV, is when gasoline goes back to $2.50 a gallon. It will not be because we pass a law, and make companies or the people drive what we, here in this 17 square miles of logic-free environment, think that they should, because we are smarter than they are when we are not.

I will tell you, it is hard to buy a new vehicle for rural America that you can go down the road and use and get any kind of longevity out of it, and let it operate at any kind of efficiency.

What is happening in agriculture today, I mean, the cost of what it takes to do business, to raise a crop and to run a ranch, is unbelievable, and vehicle expense—and I have got old friends that they do everything the old way. They do not truck, they trail. I mean—and they still make money maybe, but then they wear out more

leather than we do socks, and that kind of gets hard on the hide, but nonetheless, that is one thing, and I think if you talk about patience, when gasoline goes back to $2.50 a gallon, then John over here is exactly right, and that is what will happen, and it will not happen because we pass a law or require some things to be done.

Now, I want to ask you one question. Whenever you convert to electricity, or electric plus, you know, some sort of a hybrid situation, what does that do, the impact on the need for electrical power, of which over 50 percent of it is produced by coal-fired generators?

Mr. BOEHLERT. Well, first of all, you have natural gas, which is becoming increasingly more important in terms of generating electricity. There are other ways to generate energy, Senator, as you well know, and there are a number of Members of this panel I have worked in partnership with to deal with wind energy, solar energy, geothermal energy, hydro energy. There are a number of sources. We cannot focus all our attention exclusively on oil, which because of circumstances a disproportionate share is elsewhere, and we have to import that into our market. That does not work very favorably for the American economy.

Senator KERRY. Senator, we have got a number of panels, and really we have tested the patience of our colleagues, and I think we do need to move on. Congressman, thank you very, very much.

Mr. BOEHLERT. Thank you, Senator. I do want to point out that hybrids are self-generating. That is very important to remember.

Senator KERRY. We will leave the record open for any further questions.

Senator Snowe and Senator Bingaman, thank you very much for hanging in and waiting.

Senator Snowe, if you would lead off, then Senator Bingaman, and then we will engage in a very brief round of questions.

STATEMENT OF HON. OLYMPIA J. SNOWE,
U.S. SENATOR FROM MAINE

Senator SNOWE. Thank you, Mr. Chairman. I certainly will be brief. As a Member of this Committee, I do not want to overextend my time, but I am delighted to be here today. Most importantly, thank you, Mr. Chairman, and Senator McCain and Members of this Committee, for holding a hearing to examine and explore the most vital issue of vehicle fuel economy.

And I am very pleased to join Senator Feinstein in cosponsoring her legislation to explore the issues concerning the SUV loophole for CAFE standards, and also to be here with Senator Bingaman, who is Chair of the Energy Committee. His leadership has been exceptional, as well as Congressman Boehlert, who has really provided the legislative leadership in the House of Representatives on closing the loophole regarding sport untilty vehicles, or SUVs. This is precisely why we are here today, Mr. Chairman, because the current disparity that exists between the standards for light trucks and passenger vehicles no longer makes sense the way it did when CAFE standards went into effect in 1978.

Back then, the term SUV was not even coined, and, in fact, light trucks were more likely to be delivering corn from the field than coffee from Starbucks. Twenty-one years ago, light trucks comprised less than 20 percent of the market. For the first time in his-

tory, however, we are likely to see the sales of light trucks—minivans, SUVs, and pickup trucks—to exceed the sales of passenger cars nationwide this year. That is the kind of change that has occurred in the marketplace.

In fact, this percentage of change has already been registered in 36 States across this country. We also see zero percent interest financing that has been offered by the automobile industry to consumers that has produced a record-breaking SUV sales month in October, and so it is likely that the number of these vehicles sold will be pushed even higher.

I happened to read recently where Volvo is intending to make an SUV for eight passengers, three rows. That prompted Jay Leno to say, "That is what we used to call a bus."

The point of it is that we have now seen that the SUV loophole is not only an anachronism, but it is also a threat to our environment, it is a threat to our national security and oil interests, and the ongoing war on terrorism with a pronounced instability in the Middle East. Now is the time to begin taking steps to reduce oil consumption. We know it is not going to eliminate our reliance on imported foreign oil, but reducing it is a national imperative.

In closing, the SUV loophole is one of the single best steps that we can take to reduce our reliance by more than 1 million barrels a day. That represents 5 percent of the 20 million barrels of oil that we consume on a daily basis. We currently import half of our needs for oil, 10 million barrels a day. That is 300 million barrels a month. That is what we have to import from one of the most unstable regions in the world—10 percent of our daily usage.

In fact, 2 weeks ago, OPEC was threatening to curb production in order to drive up prices. Fortunately for us, Russia thwarted that effort because it refused to join the OPEC cartel in that endeavor. But we know those threats are going to be repeated over and over again, not only in the short term, but also in the long term.

One of the fastest, most efficient, and cleanest ways that we can reduce our dependency on imported oil is to improve the fuel economy of SUVs and minivans. These are the vehicles that are now dominating our Nation's highways. This loophole issue is multidimensional. First of all, it provides benefits as well to our environment, as it has already been mentioned. It will reduce the amount of carbon dioxide emissions by more than 200 million tons of carbon dioxide—a greenhouse gas that contributes to global warming.

Just to put that into perspective, 200 million tons of carbon dioxide is the equivalent of the weight of 92 million Ford Explorers, and as you well may know, SUVs and minivans, light truck category, can emit 27 to 49 percent more in the way of carbon dioxide.

For benefits to the consumer, we know that it will enhance the savings for the consumer in the long term. There was a report done in 1999 that indicated that if we had established the equivalency with respect to fuel economies between the passenger vehicles and light trucks, that it would have produced a savings to the consumers of more than $13.6 billion in the previous year. But, instead, what has happened is that the overall economy of all the model year 2001 vehicles on the highway has fallen to an average of 24.5 miles per gallon. That is the lowest in 20 years.

We are moving in the wrong direction, and it is the wrong road to take.

Now, we have the ability to at least intervene and weigh in on this issue to make a difference. It is not going to happen without congressional action. That is abundantly apparent. The only way in which we have had CAFE standards is when Congress has weighed in and passed legislation.

And, we know it is doable. The National Academy of Sciences has said so in its own report that was requested by Congress last year to examine these issues. We know it is doable from the industry standpoint. In our original legislation, we were saying, let us improve fuel efficiency by 33 percent by the year 2007. Ford Motor Company has pledged to make those improvements of 25 percent by the year 2005—25 percent. That is 4 percent higher than our goals for that particular year in our legislation.

Chrysler and General Motors have indicated they also would be willing to make improvements, and so we know that there is the ability to do it.

The National Academy of Sciences said in their report that it is doable within 10 to 15 years to achieve a 40 percent fuel efficiency—40 percent—and the cost could be recoverable for the consumer over the lifetime of the ownership of that vehicle, without sacrificing performance.

The Chairman of the National Academy of Sciences, when he appeared before this Committee in August, indicated that he believed—and every member of the report committee agreed—that it is possible to begin to achieve increased fuel economies within 3 to 4 years, but we have to start that process. We have to create the lead time.

Senator Feinstein and I are willing to work with the industry to achieve realistic timeframes and mandates. We are not saying this is an all-or-nothing proposition and mutually exclusive. It is going to take a combination of efforts in order to reduce reliance on imported oil and to make the difference in terms of what we are talking about, in terms of our environment as well as on saving in the consumption of gasoline.

The fact of the matter is, without the CAFE standards, we would have seen a consumption of gasoline 14 percent higher. Importantly, the National Academy of Sciences said in its report that it could not be done without a mandate in the CAFE standards. That is the reality.

And finally, with respect to the technologies, they exist. There are some already on the table. If you look at the list that was provided by the report, they are all available today. They probably could achieve just what we are establishing in our legislation, and there are many more that are in the stages of being researched and in development that could be available within the 10–year margin we are talking about in the National Academy of Sciences report to achieve a 40 percent increase in fuel economy.

But even then, in each of these new technologies that are being developed, you can achieve improvements in fuel economies from 3 to 6 percent. Some are even higher. I do not think anybody believes that America does not have the technological know-how. It is indisputable. It is already being deployed by manufacturers, as Senator

Feinstein indicated, in Europe and in Japan, because the incentive for fuel economy in those countries is because of the higher gasoline prices at $4 to $5 per gallon, and so they are already being deployed. It can be done.

So I thank you, Mr. Chairman and Members of the Committee, for giving me this opportunity to testify. I do not think that there is any doubt that this effort is just one aspect to many things that we may ultimately have to achieve and accomplish. But this one effort alone will be of benefit to consumers, to the environment, and there is no question of benefit to our national security. We have to begin to reduce and sever this kind of vulnerability that we have with our overwhelming reliance on imported oil.

And lest there be no doubt, let me just add one more point. Our imported oil back in 1980 was 37 percent. Today, it is 55 percent, and running higher—55 percent. In my region of the country and your region of the country, Mr. Chairman, it is more than 80 percent, so it is undeniable what the stakes are on this issue.

Thank you, Mr. Chairman.

Senator KERRY. Thank you very much, Senator Snowe.

Chairman Bingaman, thank you for your patience. We look forward to your testimony.

STATEMENT OF HON. JEFF BINGAMAN,
U.S. SENATOR FROM NEW MEXICO

Senator BINGAMAN. I will be very brief, Mr. Chairman.

We do have a very real interest in this in the Energy Committee, as, of course, some of your Members are with me on the Energy Committee, and they are very familiar with this, but in the energy bill that was introduced by Senator Daschle and myself yesterday along with many of our colleagues, we left a place there for this Committee to make a recommendation as to what should be done with CAFE standards, and we think this is a very important part of what has to be dealt with if we are going to be responsible in the area of national energy policy.

This chart that we put up here I think makes the case very dramatically. It shows U.S. oil consumption, millions of barrels per day. I take several conclusions from it. The green line down toward the bottom, that represents domestic oil production. You can see that we peaked in domestic oil production in about 1970. It has been coming down since then. It will continue to come down, and that is just because we do not have a lot of reserves. We have got something like 3 percent of the world's reserves.

If the Congress and the President decide to go ahead and open ANWR to drilling, that will improve our situation as far as domestic production, and that is the little red line down there you can see, the uptick on domestic oil production, but still the inevitable long-term trend of declining U.S. production will continue, and that is, I think, agreed to by all.

The total oil demand has been increasing, and by far the largest factor in that increase, the growth in demand, is in the transportation sector, and that is what you are talking about today, gasoline for fueling our cars and trucks, and SUVs, so what you propose is going to be crucial as to whether or not we can take that middle line, that transportation demand line and begin to flatten that out.

Frankly, that is what we are talking about. The Chairman is right, we are not going to become independent of foreign sources of oil any time in the foreseeable future, but we can reduce the growing dependence. We can flatten out the demand, the growth in the demand, and that, I think, is a very major accomplishment.

Some suggestions that been made that let the market solve this problem. The problem with that is, the market will not solve this problem. There is a very interesting chart in the report that the National Research Council, or the National Academy of Sciences National Research Council issued its figure 2–4, and I do not have copies for everybody, but I am sure you have a copy of that report.

What it does, it shows passenger and light truck fuel economy from 1965 through the year 2000. It is very interesting, for the first 10 years of that, 1965 through about 1977, the first 12 years of that, the fuel efficiency is essentially static. That is because we did not have in place any requirement for it to improve.

Then Congress came along in response to the Arab oil embargo and required improvement, adopted the CAFE requirement, and you did substantial improvement up until about 1988, when the requirements for improvement each year stopped, and since 1988, or 1989, it has been again steady, just like it was back between 1965 and 1977. It has been steady and, in fact, has declined somewhat. The fuel efficiency has declined somewhat, and so that is left to its own devices.

The truth is, you can buy gasoline in Albuquerque, New Mexico, for $1.00 a gallon today, and when gasoline is $1 a gallon there is very little financial incentive for people to go out and worry about the fuel efficiency of cars and trucks and SUVs. It will be back at $2.50 a gallon, but it is extremely volatile, and that means that the market signals that people need are not going to be there to solve this problem, so we need to put in place policies if there is going to be continued and persistent attention to this problem, and I think frankly we have a great experiment coming up here in this next session, this last session of this Congress, and the experiment is, can the Congress adopt an enlightened policy that serves our country's best interest with regard to fuel efficiency in a circumstance where you have very low prices for gasoline? That is exactly the circumstance we are in.

Last time we did this, we had the Arab oil embargo, which was a crisis situation that prompted action by Congress. This time we do not have that crisis situation. I commend the President and the Vice President for making energy policy a real priority for the Congress and for the Administration, but frankly, they have not made improvement in vehicle fuel efficiency a priority, and the question is, will we have the will to do that in this Congress?

I think we need to, and I hope this Committee will do that, and I hope we will come up with a proposal that we can all adopt on the Senate floor.

Senator KERRY. Well, Senator Bingaman, thank you very much. Thanks for your leadership, particularly on the Committee and on the energy bill, and we look forward to that debate in January and to your leadership then.

There are two colleagues who need to go to another Committee, and they have asked the indulgence of the Committee just to make

2 minutes of comments each before they have to go. I would recognize Senator Boxer, then Senator Nelson to do that, and Senators, could you stay just for a moment? I think there may be a couple of questions.

STATEMENT OF HON. BARBARA BOXER,
U.S. SENATOR FROM CALIFORNIA

Senator BOXER. Thank you very much, Mr. Chairman. I will be brief and very much to the point. I really want to say to this panel, two of whom are still here, how important their work is and how pleased and proud I am that a bipartisan group can get together and make such a coherent case for what I consider to be a no-brainer, frankly. Listening to you, you just laid it right out there.

The President has asked us all to help in this war against terrorism, and I think you are really helping because clearly, if we can all get into more fuel efficient cars and reduce our dependence on that area of the world which we are now fighting, it makes us a stronger country, and we should in this Committee, I hope, lead the way as well.

I remember—and I probably should not say this—when cars got 10 miles to the gallon, 12 miles to the gallon, and the auto companies said, "Oh, my God, we really cannot do better, it is impossible." And they could not make seat belts, and they could not make airbags. So when one of my colleagues, Senator Burns, whom I greatly admire and respect, says we do not have to do it, I would respectfully disagree.

In closing, let me just say a quick personal story.

In 1993, I bought a car here in Washington, DC., and I made a big mistake. I got a very comfortable gas-guzzler, and every time I drive it I have regrets. Now, and in California, I decided to make things better, because when gas prices went up over $2 a gallon—well over $2 a gallon, we bought a hybrid car.

Now, it is true, I am a little person, and I fit very comfortably in there, but other people who are not little people fit very comfortably in that car, this hybrid car. My regret is I could not get an American car because they do not make them yet. They keep saying they are going to make the SUVs pretty soon as hybrid vehicles, and this is going to be a big breakthrough.

I have worked with a number of colleagues, including Senators McCain, Wyden, and others, on pushing the regulatory agencies to crack down on what we call "zone pricing" and these ridiculously high prices that even the agencies themselves say are not warranted. We cannot get anywhere—I mean, my view is that—and excuse me for saying this as bluntly as I will, that the special interests really weigh heavily on those agencies.

Therefore, the answer, Mr. Chairman, to not energy independence, but less dependence on the Middle East. And the answer to avoid these terrible prices is to reduce demand, and I am very excited about this panel and very pleased that you have brought us together today.

Senator KERRY. Thank you, Senator Boxer.

Senator Nelson.

STATEMENT OF HON. BILL NELSON,
U.S. SENATOR FROM FLORIDA

Senator NELSON. Thank you, Mr. Chairman. I drive an SUV. By the way, when I bought it—a Jeep Grand Cherokee—a couple of years ago, it was an American company and it is now a foreign company. And you all can see my SUV, because since we do not have an office in Hart and we are spread out everyplace, sometimes I park it in front of the Senate steps, and I hail forth with staff and cell phones and so forth.

Senator KERRY. Does it have a for sale sign on it?

[Laughter.]

Senator NELSON. Well, as a matter of fact, I have always gotten an American car, and I am in the market for another American car. You automobile manufacturers do a great job, and you do a terrific product for us. But there is no reason why you would oppose increasing miles per gallon, which with all the testimony here—and we have not heard your testimony, but we have heard four of our colleagues, two Democrats and two Republicans at the table—telling us of the logic of this and what we can do to lessen dependence on foreign oil.

Now, mark my word, with everything that is going on in this world with regard to terrorism, sooner or later, a terrorist is going to try to sink a tanker in the Strait of Hormuz, and when that occurs, and the free flow of oil out of the Persian Gulf to the free world stops, you are going to have another great energy crisis, and we could well be on the road to solving it.

As Senator Bingaman has pointed out by his chart, most of the energy consumption is in the transportation sector, and what better way than right here, and this is about as common sense as it can be.

And Senator Burns, speaking of common sense and agriculture, I think you ought to have every right, with your hat, to get into a vehicle that you feel like that you have the room, and the marketplace will determine that. But the marketplace ought to have choices, and if you want to drive an SUV, you ought to have the choice of an SUV that does not have nearly as much consumption of miles per gallon when technology would allow us today to offer another choice.

Thank you, Mr. Chairman.

Senator KERRY. Thank you very much, Senator.

We are going to have a very brief round of questions, because we need to move to the next panel. We have got several panels, and I think we can get into a more exhaustive examination of some of the objections and conflicts that exist here. Let me raise one of them, if I can, Senator Snowe, with you.

The testimony that you will not hear unless you are sitting with us at that time, from Honda, from Ed Cohen, who is going to testify, he says the following: We caution that if cars and trucks are combined into a single fleet with a single standard, or if the same standard is adopted for both cars and light trucks, there must be sufficient lead time.

Your lead time currently is 2007 in the bill.

Senator SNOWE. It is incremental, 26 mpg by 2005 and 27.5 mpg by 2007.

Senator KERRY. 2007 is the final, 6 years from now. It then says, technology will help, but the lead time must be sufficient. Time frames reflected in the NAS report appear to be more reasonable, and this is the important sentence: but we know of no technology or imminent breakthroughs that can take CAFE to 39 or 40 miles per gallon, as some have proposed, in a decade or so without severe marketplace disruptions.

Now, that will be essentially the testimony of almost all of the automobile manufacturers today. Are we missing something? Are you missing something?

Senator SNOWE. Well, first of all, Mr. Chairman, in our legislation we move to 27.5 miles per gallon, which is the equivalent to what passenger vehicles have to meet, so I do not think that that is an unrealistic timeframe.

Obviously, as Senator Feinstein indicated, we are even willing to adjust the timeframe to meet that standard, but Ford Motor Company—let me repeat that, and I have not read anything differently since Ford's announcement, the Ford Motor Company pledged to improve, to reach their goal of 25 percent improvement by the year 2005. That brings them to 25.815 miles per gallon, which actually is even 4 percent higher than our goal for that particular year.

So the point, obviously, for Ford Motor Company to make that type of commitment, is an indication that the technology does exist, and going back to the National Academy of Sciences report, it does really enumerate a number of technologies that exist that could bring the industry to a certain point.

There are obviously other technologies that go to the 39 or 40 percent increase, and obviously it is going to require the development of other technologies that are in the research and development stage.

Senator KERRY. You are saying, then, that you believe the SUV capacity could reach the passenger vehicle standard, as opposed to the overall CAFE standard, because as we know, the CAFE standard applies to the whole fleet. It is a fleet average and not individual, and so you are suggesting, then, that the SUVs are a particular target of opportunity that somehow can be greater, it could be greater gain there than otherwise?

Senator SNOWE. That is correct, and also I think that Congress really ought to look at doing this in multiple stages in timeframes that are achievable, and working with the industry, because it does take significant lead time to accomplish these objectives. No one is suggesting it can be done overnight, but obviously, the industry has already developed many modifications to automobiles over time, but to the exclusion of fuel economy.

I mean, there has not been any adjustments in fuel economy on a voluntary basis.

Senator KERRY. Senator Ensign.

Senator ENSIGN. Just very briefly, Chairman Bingaman, in your graph—because I think, Mr. Chairman, the point you were making about not being able to be energy independent is a valid point, and I just wanted to pursue that just a little further, and that is, with these CAFE standards being raised, are there studies that have been done as part of the National Academy of Sciences, that would obviously—people feel that there would be savings involved

percentagewise. What does that do to your graph? In other words, how much of a difference does it make to your graph? Do you have other graphs that suggest that it is going up, that it is going to continue to go up, because it goes up just a little bit slower, and in that, is that worth what we are going to do, I guess?

Senator BINGAMAN. Well, I do not have alternative graphs this morning, but we could try to develop some of those statistics for you. I think the main change here is that after some period of years, and that relates to how quickly any additional CAFE requirements would be phased in, but after some period of years you would begin to see transportation demand flatten to some extent, and the inexorable increase that we see on this chart would be mitigated, and that is the single largest thing we can do to reduce our dependence on foreign oil.

Senator ENSIGN. Just to further a point, and this may be something we cannot answer right now, I am a big believer in alternative fuels. I think we are way too dependent on oil, and hopefully we will be developing more of the technologies, the hybrid vehicles, fuel cells, all kinds of different things that are out there today. I hope that we become less dependent on our cars just running on gasoline.

In that vein, if we become less dependent on oil, that means the price is going to go down, which, is there a perverse incentive, or lack of incentive, then, to develop some of these alternative fuels?

Senator BINGAMAN. Well, as I tried to indicate before, I do think that the market does not send us very consistent signals about what people—what their priorities ought to be and where their financial interest lies, and that is one reason why you need to put policies in place in order to provide some of those outcomes.

I think you are exactly right that, as the price of oil goes down, there is less incentive to develop alternatives, and less incentive on the part of people to buy alternatives, and I think that is why something like a CAFE standard has been required in order to give some priority to the issue of how much fuel we are going to use in our vehicles.

Senator ENSIGN. Just last, Mr. Chairman, the reason I bring up that point is because, yes, we put in CAFE standards, but they did not fully go into effect when you saw those drops. The reason that we saw in the late, or basically the 1980s was a change in consumer behavior. I was one of those concerned. I had a Mustang that got about 8 to 10 miles to the gallon, and the energy problem was hitting, the price of gasoline went up, and I bought a Honda, and dramatically changed, because the price of gasoline—I mean, in those days it was the price.

I guess that is a question I think we have to ask ourselves is, are we going to affect, with policies that we put into place, a significant enough change in behavior to affect those lives, because it would seem to me that those lives are the most critical parts of this, not only environmental things, but also those lives as far as energy, less energy dependence in the future.

Senator BINGAMAN. Those are excellent questions.

Senator KERRY. Senator Dorgan.

STATEMENT OF HON. BYRON L. DORGAN,
U.S. SENATOR FROM NORTH DAKOTA

Senator DORGAN. Mr. Chairman, first of all, let me thank my colleagues. I worked with Senator Bingaman on the energy plan we have introduced, and I am anxious to work in this Committee on this other aspect of it.

I do not think the choices are between doing nothing and doing the wrong thing, as some seem to imply. If we will do something, we will do the wrong thing, that is not the choice at all. I think that things have changed here in this country in a fundamental way, and we would be foolish to believe that this is all about convenience and nothing is changed in our future.

If, God forbid, tonight some terrorist interrupted oil supply tomorrow, our economy, because of our dependence on foreign source energy, would be in devastating shape, and so I think we need a balance of interests here. I am not quite sure how we should come out of this, but we need to balance the interests and understand that we have a role to play in public policy.

I like all of the talk about the marketplace. I used to teach economics, and I respect the marketplace, but it is not perfect. It has certain perverse influences. Judge Judy, that cranky little judge on TV, makes $7 million a year, and a Texas shortstop is paid $50 million, so that is the marketplace, too. The marketplace works sometimes and does not work so well other times.

Let me tell you, if you roll those cowboy hats up on the sides you can get more in a pickup truck in Montana, but aside from that, let me just make this point. It is the responsibility of this Committee to address the subject, and that is why Senator Bingaman and I and others on the Energy Committee left a place-holder in the energy bill.

We would be ill-advised, given the time and place, to do nothing. We ought to do something. The question is what, how do we make it thoughtful, and how do we balance the interests, but I think there is a significant role to play in public policy here, and one of the pieces of testimony we will receive shortly, I think, is from General Motors. I was reading some of the testimony and they were talking about CAFE standards they are not very happy about, but there were other policies, replacing, for example, the older and less-efficient cars, getting them off the road more quickly. That makes sense.

I stopped at a donut shop about 3 days ago, I was telling Senator Breaux, and there was this wonderful circumstance—not for the two drivers—but there was the largest black Mercedes that you can buy with the big chrome on the bottom, and then there was a 20–25 year old Dodge with the bumpers hanging and no paint left, and the Dodge was backing out of the parking lot by this donut shop and it grazed the fender, ever so slightly, of this Mercedes, and the two drivers were standing there with their engines running, and the old Dodge was belching all of this blue stuff out the back end.

I had my window down just a bit, and I heard them discussing the fact that the guy in the Dodge did not have insurance, and I did not finish my donut and listen to the conversation, but I was thinking about the paradox here of this old car, relatively ineffi-

cient car, and he backs into probably the wrong vehicle to back into.

But the testimony I was reading last night about getting the less-efficient cars off the road, the older, less-efficient cars, makes sense. That is one part of the policy. There are several things we can do that are important, one of which, I think, is CAFE standards, in a way that is thoughtful in a way to try to pull and to push public policy along, because Senator Bingaman has the chart that says it all. Transportation demand is the relentless upward push of our consumption for oil, and if we do not address that, if we do not address that in some meaningful way and thoughtful way, we will not, in my judgment, serve this country's energy interest.

I did not ask a question, but I did want to make a statement, because I came late. Thank you, Mr. Chairman, for holding the hearing.

Senator KERRY. Thank you very much, Senator. Let me just say to everybody we are going to take as long today as we need to to make sure that we are not going to give any panel short shrift. I think it is an important topic, and we do want to run through the questions.

Senator Breaux.

STATEMENT OF HON. JOHN B. BREAUX,
U.S. SENATOR FROM LOUISIANA

Senator BREAUX. Thank you, Mr. Chairman, and I thank our Members and colleagues for being with us.

You know, I think that many times all of us seek simple solutions to difficult problems and think that there is one answer, and there really in this business is not a single answer. There are some who advocate that the solution to America's energy problem is very simple, just produce more energy. Others say no, it is simple, but that is the wrong answer. The right answer is to consume less energy, and in reality it has got to be a combination of both those things.

We have to produce more. What we do today is intolerable, in the sense that we import about 57 percent of our energy from foreign countries, many of which are not friendly to us, many of which are engaged in activities in setting the prices that if they did that while they were in this country they would go to the penitentiary, because they regularly fix prices, and that is illegal, and yet we allow this country to buy from people who would go to the penitentiary. Were they doing the same thing every day in this country it would send them to the pen, but some people say, well, it is cheap, so that is fine.

That is intolerable and cannot be continued. We have to have energy bills that allow for a rational production and rational production in all parts of the country, and do it in an environmentally safe manner, which we can. Also, I am a believer in alternative fuels, and I believe in solar power and geothermal power and any other kind that we can possibly produce. That is not going to solve the problem, but it should be a part of the ingredient and ultimate solution to the problem.

My concern—and also using less, obviously, is also important, and trying to make sure that the trucks and cars we use get the

best bang for the buck and the greatest miles for the gallon that we possibly can, seeing that there is a limit, though.

If we require everybody in America to drive the little new vehicle I saw on Good Morning America, the little scooter—you lean forward, and it goes forward. You lean back, and it goes backwards, and you can probably solve America's problem real quick, but I doubt whether Americans would put up with that, and so there has got to be a degree of how far we can go in making cars smaller and littler and lighter before you start adversely affecting safety and convenience.

The question I would have maybe for either one of you maybe just to comment on, because you have given a great deal of thought to this, I notice in one of the comments from one of the manufacturers that they quote that the National Academy of Sciences concluded that downweighting and downsizing of the vehicles in the 1970s and 1980s in which there was a very aggressive effort to do so, probably resulted, according to the National Academy, in an additional 1,800, or 1,300 to 2,600 traffic fatalities in this country, and so there is a concern here from a safety standpoint.

We could make them a lot smaller and get 100 miles to the gallon probably easy if we put everybody in scooters, but where is the breaking point? Where is the dividing point between concern for safety and concern for greater mileage efficiency? How do we get to that point and say, look, we can make it a lot cheaper to operate, but that is not going to be as safe? What is the dividing line?

Senator BINGAMAN. I cannot tell you where the line is. That is your job here on this Committee to figure that out.

Senator BREAUX. We need your help, though.

Senator BINGAMAN. I think you can make a good case that if all of us drove Humvees we would be better off safetywise. I do not think that is a practical solution. I do not think it makes sense for the country to have everybody in military vehicles.

Senator BREAUX. I agree with that.

Senator BINGAMAN. But the question is, how much safety is enough safety, and of course there are a lot of things you could do to improve safety with additional requirements on driver training and other things.

There are all sorts of ways to improve safety on the highways, and I favor virtually all of them, but it is a question of how much is enough, and at some point you have other policies that you also need to factor in, and that is my view on it. I think you could have a very safe vehicle. I think the hybrid vehicles that are in the market today are safe vehicles. I think they provide adequate safety.

You also have this problem of escalating weight, in the sense that it is almost like the nuclear arms race, in the sense that if everybody on the road is going to be driving an enormous, extremely heavy vehicle, that it does become less safe for people to drive a normal-sized vehicle.

So do you say the solution is to ratchet everybody up to that same level? I do not know. I do not think it is necessarily the right answer.

Senator SNOWE. I would also like to address that question, because obviously, that is one that has been raised consistently, even in the course of the National Academy of Sciences report, and these

issues, again, are not mutually exclusive. In fact, there is in a stage of developing composite materials that are lightweight with high strength that could address the question of weight. You could also look at the question of the current weight of SUVs. If you are hit by an SUV and you are in a smaller size car, who is likely to be the victim? There are statistics that support that argument as well,when you are talking about traffic fatalities.

But I do think that this is a question that ought to be addressed to resolves people's questions concerning this issue. In fact, the National Academy of Sciences recommendation, their seventh recommendation, does suggest having the National Highway Traffic and Safety Administration conduct research on this issue between fuel economy and safety, and I would recommend, Mr. Chairman, that the Committee pursue that recommendation and I make a request of the National Highway Traffic Safety Administration today to research this particular issue.

Senator KERRY. They are the next people to testify, and they are hearing your request.

Senator SNOWE. Let me just make one further comment, and that is that one member of the National Academy of Sciences said there is no fundamental scientific reason why increasing fuel economy should be deadly compensated.

Senator KERRY. Should be what?

Senator SNOWE. Deadly compensated, so we are not saying you should accomplish fuel economy at the expense of safety, and it does not necessarily have to be that way even the modest goals we are establishing in the Feinstein-Snowe legislation do not sacrifice safety. In fact, the National Academy of Sciences would indicate that as well.

Senator BREAUX. Well, I just want to comment, I think this is an issue we cannot dodge and cannot ignore. It is easy to meet the standards if you make the cars smaller and lighter and smaller and lighter, but an awful lot of families and people are very concerned that what are they going to do in a smaller and smaller car that is lighter and lighter when they are on the highways with 18-wheelers and everything else going 70 miles an hour plus? I mean, it is not a comfortable feeling.

Thank you all very much for your contribution.

Senator KERRY. Just to follow up on that, again—and I am just now posing questions to draw the issue out and create the record, but the auto industry would point out that under the requirements of the original CAFE standards, station wagons as we knew them ceased to be manufactured, and that is why people shifted into SUVs, because it met the market demand for size, for family, for numbers of seats, et cetera, and they were able to provide the size the market wanted. How do you respond to that? Should there be a mandated ratcheting down of that demand?

Senator SNOWE. Not necessarily, because I think that they possess sufficient ingenuity and technological know-how to accomplish both goals.

Senator KERRY. But they say they do not. We are going to have to wind our way through this issue.

Senator SNOWE. We are talking about setting reasonable goals, and obviously the Ford Motor Company recognizes that improving

fuel economies by 25 percent by the year 2005 must be a reasonable goal, because it is one that they said they are striving for, so obviously it can be done, and why not give consumers a choice to purchase an SUV that gets better gas mileage.

I just cannot believe that in today's corporate environment, that they cannot develop an SUV or a minivan that provides comfortable choices for the consumer and also achieves some fuel economy savings. I just cannot believe it.

Senator KERRY. We are going to explore that with them thoroughly. We have a terrific panel from the auto industry and we are certainly going to explore those questions.

The one thing I would point out, as I thank both of you very, very much for the length of time you have spent and for your efforts on this, it seems to me that we have got to frame this discussion perhaps differently than we have in the past. I think one of the most significant arguments made for reducing the level of oil consumption is the resulting reduction in carbon dioxide emissions tonnage. The gains with respect to the environment are perhaps more compelling and more important than the relative level of, quote, energy independence.

The reason I say that is, when we began this debate in 1973 we were 30 percent dependent on oil from the Middle East and elsewhere, foreign oil. Now we are over 50 percent dependent, and in the same breath, many people make an argument that you should not drill in ANWR, because if you were going to drill there, it is going to make a tiny dent in independence, ultimately maybe 2 to 3 percent maximum. You are still going to be 50 percent dependent, so even if you drive the industry most significantly to improve fuel economy, you are still likely to be almost 50 percent dependent on foreign oil, and that is unacceptable from a national security point of view.

So the real argument is not how do you marginalize your reduction of oil. All of us know we are going to be using oil for the next 30, 40, 50 years. The question is how much oil should we use and for what purposes? In the transportation sector we should be talking about how we reduce oil consumption altogether, and that is what the hydrogen fuel cell race is about, that is what the hybrid is about and so forth, and it seems to me that is a more compelling place for us to go. The question is not how do you fractionalize this dependency, but how do you reduce dependency on oil altogether with respect to transportation sector. That is where I think the debate ought to move.

I want to thank both of you for being here, and we will move right away to the next panel if we can. Dr. Runge and Dr. Gravatt, if you would both come to the table.

Administrator Runge, thank you very much for your patience, and Dr. Gravatt, thank you for being with us. Would you lead off with your testimony?

STATEMENT OF HON. JEFFREY W. RUNGE, ADMINISTRATOR, NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION; ACCOMPANIED BY ROBERT SHELTON, EXECUTIVE DIRECTOR

Mr. RUNGE. Mr. Chairman, thank you very much, Members of the Committee. I am Dr. Jeff Runge, Administrator of the National Highway Traffic Administration. On my left is Mr. Robert Shelton, who is the Executive Director of the National Highway Traffic Safety Administration. On behalf of the U.S. Department of Transportation, I want to thank you for the opportunity to contribute to your deliberations of automobile fuel economy.

Mr. Chairman, I have submitted written testimony for the record, and with your permission I would like to summarize my comments.

Senator KERRY. Without objection, your full testimony will be in the record.

Mr. RUNGE. The Department of Transportation has the responsibility to administer the CAFE program. The CAFE standard for passenger cars is set by statute at 27.5 miles per gallon, whereas the CAFE standard for light trucks is set for each model year by the Department through the rulemaking process. Since fiscal year 1996, as you mentioned, Congress has frozen the standard for light trucks at the level of 20.7 miles per gallon through provisions in the appropriations acts.

There were significant improvements in fuel economy during the early years of the CAFE program in the 1970s and 1980s, with strong public demand for energy-efficient vehicles. Since the mid–1980s, however, gasoline prices have typically been declining, and consumer demand has shifted toward vehicle performance and utility, away from fuel economy, with the result that the fuel economy level for the passenger vehicle fleet as a whole has declined from its peaks.

Senator KERRY. Do you mind if I interrupt as we go along? Why did that shift occur? Is that market-driven, or was that a relaxation of the enforcement of standards?

Mr. RUNGE. We believe it was market-driven. As the price of fuel declined, people began to value performance and space and size over fuel economy.

Senator KERRY. And in a sense the rules empowered them to push for those attributes because there was no constraint, there was no target, there was no goal, there was nothing that constrained their ability to just do what they wanted to do, even if it was bad policy?

Mr. RUNGE. Yes, sir. To the extent that the industry could make cars to comply with the rules, I suppose that is true.

Senator KERRY. But they do not comply with the rules. In fact, the real-world fuel economy is 17 percent lower than the CAFE certified fuel economy level, so they do not comply, so it comes down to mechanism enforcement and structure, does it not, to some degree?

Mr. SHELTON. Mr. Chairman, if I may elaborate, they do, of course, literally comply with the rules, since the statute said we were to use the EPA test procedure to determine the fuel economy level for compliance, but certainly there has been a recognition

since the program started that vehicles do not achieve the level on the EPA cycle in the real world. There is, like you say, around a 15- to 17-percent difference.

Senator KERRY. Right, but that is the bottom line, the real world.

Mr. SHELTON. Yes, absolutely.

Senator KERRY. OK, but it seems to me that makes a compelling argument that, (1) you need enforcement; (2) you need a structure that is adequate to enforce, and then you condition some of the market behavior.

Mr. RUNGE. Well, thank you for that comment.

Senator KERRY. You agree with me, then, and I am sorry to screw up your day.

[Laughter.]

Senator KERRY. Go ahead.

Mr. RUNGE. I am just glad I have my technician here to my left.

As you indicated, today's drivers are, indeed, using more petroleum than if the fuel efficiency program had continued as it did in the early years of the CAFE program. Fortunately, the appropriations act passed by you all this week does not continue the prohibition on our CAFE rulemaking, so the agency will be free to begin rulemaking to set the light truck standard at the maximum feasible level for the upcoming model years.

We welcome the lifting of the restrictions so we may now fulfill our statutory duty to set the fuel economy standard for light trucks this summer. When it was apparent the restriction was likely to be lifted, Secretary Mineta urged the Congress to do so before the end of the fiscal year so that we would have sufficient time to begin such rulemaking to effectuate changes for model year 2004, rather than waiting for the fiscal year 2002 appropriations act to be enacted. Unfortunately, this did not occur.

The CAFE law requires the standard be set at the maximum feasible level. We are further required to issue any standard for a given model year at least 18 months before the model year begins, which for model year 2004 would be April 1, 2002. Therefore, because of the lateness of the date, and although we began our work the day the freeze was lifted, the rulemaking for model year 2004 will not likely result in a significant increase in fuel economy for that model year.

However, if the agency concludes through its processes that the maximum feasible model year 2004 fuel economy standard is higher than 20.7, we will not hesitate to set such a higher standard. Therefore, our primary focus will be gathering and analyzing data so that we can determine the maximum feasible levels for model year 2005 and beyond.

At the beginning of the Administration, the President directed a review of these issues which is contained in the President's national energy report. It recommends that fuel economy standards should be based on sound science and should consider passenger safety, economic concerns, and the impact on the U.S. versus the foreign fleet of automobiles. We will consider both the National Academy of Sciences report and the National Energy Policy report as we review those alternatives available to improve fuel economy.

The NAS report also points out the potential adverse safety consequences of improving fuel economy by measures that simply re-

duce the size and weight of vehicles. I want to assure you we will consider vehicle safety in any rulemaking that we undertake on CAFE consistent with our obligations to meet statutory criteria governing the CAFE program. As an agency whose primary mission is safety, we are committed to the safety of Americans on the Nation's highways.

We want to further assure the Committee we will carry out our responsibility under the CAFE law to the best of our ability toward the goal of improving fleet fuel economy and with the gains we have made in passenger safety over the last 20 years.

This concludes my statement. Mr. Chairman, I will be glad to answer any question I can.

[The prepared statement of Mr. Runge follows:]

PREPARED STATEMENT OF HON. JEFFREY W. RUNGE, ADMINISTRATOR, NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

Mr. Chairman and Members of the Committee: On behalf of the U.S. Department of Transportation and Secretary Mineta, I welcome the opportunity to contribute to the Committee's consideration of automobile fuel economy. This is a matter of great importance to the economy, our national energy security, and passenger safety.

The Department administers the corporate average fuel economy (CAFE) program as its principal contribution to energy conservation in the light-duty vehicle fleet. Enacted in 1975 in response to the energy crisis caused by the 1973–1974 oil embargo, the CAFE program requires motor vehicle manufacturers to ensure that their new-vehicle fleets meet a specified average level of fuel economy in each model year. The CAFE standard for passenger cars is set by statute at 27.5 miles per gallon (mpg), whereas the CAFE standard for light trucks is set by the Department by regulation for each model year. The light-truck CAFE standard has been frozen at the model year 1996 level of 20.7 mpg (through model year 2003) by provisions in the Department's annual appropriations acts.

The early years of the CAFE program were marked by significant improvements in fuel economy, as the public demand for energy-efficient vehicles during the late 1970s and early 1980s was strong. This was in part caused by the downsizing of vehicles, as well as by improvements in vehicle technology. Since the mid-1980s, however, gasoline prices have typically been stable or declining (in constant dollars) and consumer demand has tended to favor vehicle utility, safety, and performance over fuel economy, with the result that the fuel economy level for the passenger car fleet has leveled off. Lower gasoline prices and consumer preferences have attracted buyers away from passenger cars into less fuel-efficient vehicles such as minivans and sport utility vehicles. These vehicles filled the public's desire for vehicles that can accommodate family and sporting activities, such as carrying numbers of children, and play and sports equipment. The result is that the average fuel economy for the new light duty vehicle fleet as a whole (the fleet of vehicles with a gross vehicle weight rating of 8,500 pounds or less) has declined from an all time high of 26.2 mpg in model year 1987 to 24.5 mpg in model year 2001. Under actual driving conditions, as shown by the Environmental Protection Agency's annual Fuel Economy Trends report, the new-car fleet fuel economy was 22.1 in model year 1987 and 20.4 in model year 2001.

This decline means that today's fleet is using more petroleum, an increasing percentage of which is imported, than it would if fuel efficiency had continued to improve beyond the early years of the CAFE program.

The Department welcomes lifting the restrictions on CAFE rulemaking Congress has imposed since fiscal year 1996, to permit the Department to once again engage in rulemaking that will set fuel economy standards for the light truck fleet. The Appropriations act passed by the House and Senate does not continue the restrictions on CAFE rulemaking, so that we will soon be free to begin rulemaking to set the light truck standard for model year 2004.

When it became apparent this summer that the restriction on rulemaking would not be perpetuated in fiscal year 2002, Secretary Mineta urged the appropriations committees to consider legislation that would remove the restriction before the end of fiscal year 2001, so that the Department would not need to wait until the enactment of appropriations for fiscal year 2002, but could begin work right away. Unfortunately, the Congress did not act on the Secretary's request.

We now face an immediate need to begin rulemaking for the light truck fleet for model year 2004. Under the CAFE law, we must issue a standard for that model year not later than 18 months before the model year begins. We consider model years to begin on October 1, so we will need to issue the MY 2004 standard by April 1, 2002, 18 months before October 1, 2003, the beginning of MY 2004.

Although we will begin our work immediately, I must caution you that our knowledge of the potential to improve fuel economy is limited. We have not been able to collect data on our own or conduct any analyses that would be needed to support the statutorily required determination that a specific level is the "maximum feasible average fuel economy level." In making this determination, we are directed by the statute to consider "technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy." Due to the freeze on activity related to CAFE, we have not been able to address these issues.

Our rulemaking for MY 2004 will not likely result in a significant change in the CAFE standard. The time available between April 2002 and October 2003 is simply too short for a significant change, since the technologies with the largest potential for increasing fuel efficiency would require much longer to incorporate into vehicles. The CAFE law requires us to consider "economic practicability," which means that we must provide the lead-time necessary to incorporate changes without substantial economic disruption to the vehicle manufacturers. As a result, we do not anticipate adopting a standard that would result in significant changes in the manufacturers' current plans for light truck CAFE for MY 2004. We will immediately begin the process of reviewing fuel economy levels for model years 2005 and beyond. We believe focusing our efforts on the MY 2005 rulemaking will allow us to consider more significant changes in the light truck CAFE standard. Our CAFE rulemaking faces a further challenge, in that the new appropriations act does not give us the resources to conduct the analyses that we need to support our regulatory determinations.

Beyond the context of near-term fuel economy rulemaking, our work will be aided by the July 2001 report on the CAFE program prepared by a committee of the National Academy of Sciences. The report contains a number of findings and recommendations that bear on the future of the CAFE program.

While the report supports a Federal program to ensure fuel economy levels beyond those expected to result from market forces alone, it cautions that selecting fuel economy targets will require "uncertain and difficult tradeoffs among environmental benefits, vehicle safety, cost, oil import dependence, and consumer preferences." The report found 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." This finding was based primarily on research conducted by NHTSA in the mid-1990s, which we are updating in a study that we expect to complete next spring. The National Academy of Sciences' report went on to observe "that the likelihood of similar response to further increases in fuel economy must be taken seriously." I want to assure you that we will consider vehicle safety in any rulemaking that we undertake on CAFE, consistent with our obligations to meet the statutory criteria governing the CAFE program. As an agency whose primary mission is safety, NHTSA is completely committed to the safety of Americans on the nation's highways.

We agree that there will be difficult tradeoffs. At the beginning of this administration, the President directed a review of these issues, which is contained in the President's National Energy Policy report. That report recommends that the standards should be based on sound science, and should consider passenger safety, economic concerns, and the impact on the U.S. versus the foreign fleet of automobiles.

We will consider both the National Academy of Sciences report and the National Energy Policy report as we review the alternatives available to improve fuel economy. These reports also highlighted the opportunities for the use of new technologies and the development of alternative fuel vehicles such as those powered by fuel cells. However, we are not prepared at this time to recommend specific changes to the fuel economy law.

It is clear that there are many points of view about the best means to improve the fuel economy of the light duty vehicle fleet, as illustrated by the continuing debate in the Congress on whether to legislate higher CAFE standards or to require specific reductions in fuel consumption by certain segments of the fleet, such as light trucks. The National Academy of Sciences committee examined a number of alternative measures, some of which are represented in pending legislation. The debates on these measures illustrate the difficult nature of the choices facing us.

To achieve a specified CAFE level, a manufacturer must produce fuel efficient vehicles that the public will buy. If cost-effective measures can be devised to increase

consumer demand for fuel-efficient vehicles without compromising passenger safety, those measures should be examined. The President's National Energy Policy report recommends that the Secretary of Transportation evaluate market-based approaches to increasing new motor vehicle fuel economy. We are moving forward to consider these approaches. The National Academy of Sciences report also notes that we need to consider consumer demand, vehicle attributes, and the impact on passenger safety of fuel economy standards.

We want to assure the Committee that the Department will carry out its responsibilities under the CAFE law to the best of its ability, with the goal of improving fleet fuel economy without sacrificing passenger safety, thereby producing benefits to the economy, our national energy security, and our nation's traveling public.

This concludes my statement. I look forward to working with the committee as we continue to address the issue of fuel economy. I will be glad to answer your questions.

Senator KERRY. Thank you very much. Do either of the other of you have testimony you want to make at this point?

Dr. GRAVATT. Mr. Chairman, I have submitted testimony for the record. I can quickly summarize or wait.

Senator KERRY. I think that would be helpful. I would like to hear that, thank you.

STATEMENT OF DR. CLAUDE C. GRAVATT, JR., DIRECTOR, MANUFACTURING COMPETITIVENESS AND PARTNERSHIP FOR A NEW GENERATION OF VEHICLES, DEPARTMENT OF COMMERCE, TECHNOLOGY ADMINISTRATION

Dr. GRAVATT. I am Claude Gravatt. I work in the Department of Commerce Office of the Under Secretary for Technology, and I also serve as the U.S. Government's Director for the Partnership for a New Generation of Vehicles. That partnership is an industry-government partnership R&D activity started about 8 years ago to try to increase the menu of technologies and components and materials that would be available to the auto industry to use in increasing the mileage of future vehicles.

We give a number of the details of the program in the written testimony. Let me just quickly summarize it. For the first approximately 4 years, we studied a wide variety of technologies, since we truly did not know which might be most effective, either on a cost or a technology or fuel economy basis.

In 1997, we selected from among that rather large number a smaller number to focus on more thoroughly in the 3 years up until the year 2000. At that time, the three industry participants in the program, Daimler/Chrysler, Ford, and General Motors, each revealed and displayed here in Washington a concept vehicle that they had put together that represented their thinking at that point in time as to how they would achieve the one goal of the program, three times fuel efficiency of increase over what was available in 1994, when the program started.

I think the interesting thing about those three concept vehicles was that although they in a sense selected from the same menu of options and there was a lot of commonality in the vehicles, there was a lot of diversity as well. Each company selected what they thought they could do best, would be most appealing to the consumer, and moved in that direction, and I think that diversity is very important in an activity of this sort.

One other interesting aspect of the program, each year we have a review of the program by a panel of the National Academy of En-

gineering, and their seventh report was released about 3 or 4 months ago which we summarized in here as well. They point out that we have made good progress, but we still have some considerable issues to address, one of which is cost, the need to get the cost down for many of these technologies so that they are more acceptable to the consumer.

Second, that there are some emission issues, serious technical ones as well related to one of the engines we were working on at the time and still are; and third, that we probably needed to pay more attention to the fuels and components of the fuel.

The initial declaration of intent of the partnership addressed fuels, but it is only now that we are getting to the point where it is a major issue and we are moving in that direction. Let me conclude at this point, and I will be glad to also answer any questions.

[The prepared statement of Dr. Gravatt follows:]

PREPARED STATEMENT OF DR. CLAUDE C. GRAVATT, JR., DIRECTOR, MANUFACTURING COMPETITIVENESS AND PARTNERSHIP FOR A NEW GENERATION OF VEHICLES (PNGV), DEPARTMENT OF COMMERCE, TECHNOLOGY ADMINISTRATION

Mr. Chairman. I am Dr. Claude C. Gravatt, Jr., Director of Manufacturing Competitiveness and PNGV in the Technology Administration at the Department of Commerce. I wish to thank you for the opportunity to testify before you today. My remarks will be focused solely on the Government and Industry's research investments in improving fuel economy under PNGV, and in no way suggests that the Department or the Administration have taken a position on CAFE or on the PNGV program.

THE ROLE OF THE PNGV PROGRAM IN DEVELOPING TECHNOLOGIES TO IMPROVE FUEL ECONOMY OF LIGHT DUTY VEHICLES

Background

The Partnership for a New Generation of Vehicles (PNGV) is a groundbreaking partnership between the Federal Government and the U.S. Council for Automotive Research (USCAR)—whose members include Daimler/Chrysler, Ford, and General Motors (GM)—to plan and manage research and development activities for a wide range of leading-edge technologies that have the potential to dramatically improve the fuel economy of, while also reducing the emissions from, cars and other light duty vehicles, including vans, SUVs and pick-up trucks.

The U.S. Department of Commerce, Office of the Under Secretary for Technology, leads the Federal Government's participation in the partnership and also serves as the government secretariat. Federal agencies participating in the PNGV Program at the technical level include the Departments of Commerce, Energy, Transportation and Defense; the Environmental Protection Agency; the National Science Foundation; and NASA. More than 20 Federal laboratories from these agencies are involved in the program. In addition to the Federal partners and USCAR, more than 350 automotive suppliers, universities, and small businesses have participated in PNGV.

PNGV is best known for its long term objective: developing the technologies required to enable the production of environmentally friendly cars with up to three times the fuel efficiency of cars in production at the start of the program (1994). This objective specifically would increase the fuel efficiency of mid-size family sedans from 27 mpg to 80 mpg. However, the technologies being developed by the program are not limited to application in just mid-size sedans, but instead are applicable across the entire range of light duty vehicles. This objective is expected to be accomplished without sacrificing affordability, performance, or safety. PNGV's other goals are: (1) to significantly improve national competitiveness in automotive manufacturing across all components, sub-systems and vehicle lines; and (2) to apply commercially viable innovations developed under the PNGV research effort to conventional vehicles as quickly as possible.

The level of effort among the participating agencies varies, based on the specific technical activities under active R&D at any point in time, and based on the missions and current core competences of the agency and its laboratories. In fiscal year 2001, total government support for PNGV-related research is $234 million, of which $162 million is for R&D activities directly focused on PNGV goals and coordinated by the PNGV technical teams. Currently, the U.S. Department of Energy and EPA

provide approximately one-half of direct Federal funding for PNGV, with DoE being the largest, and EPA second. The National Research Council estimated the industry's contribution to PNGV research and development to be $980 million in 1999, which includes major efforts on the part of the industry partners to develop the year 2000 concept cars.

Status

The initial PNGV R&D program consisted of an extremely wide range of technical areas which might be combined at the vehicle level to achieve the program goals. In 1997 the first major program milestone was achieved when these technical areas were reduced to focus on those that appeared to have the highest potential in terms of technical feasibility and affordability. In 2000 the program achieved its second major program milestone with the unveiling of the PNGV Concept cars. Although these cars all were based on the R&D activities of the program, each manufacturer selected from among them in ways which best met their corporate competitive strategy.

• The Daimler/Chrysler concept car, the Dodge ESX3, was a diesel-electric hybrid with an estimated fuel economy of 72 mpg.

• The Ford Prodigy was a diesel-electric hybrid with fuel economy estimated at more than 70 mpg.

• Two versions of the GM Precept were unveiled. The diesel-electric hybrid version of the Precept had a projected fuel economy of 80 mpg. GM estimated the fuel cell version of the Precept might achieve 108 mpg.

Many PNGV technologies—such as thermoplastics, lightweight aluminum, and composite materials—have already been used in production vehicles.

• Migration of PNGV technologies into production vehicles, such as;

—production of a new, lighter, recyclable thermoplastic hardtop for the Jeep Wrangler in 2001,

—use of 412 pounds of lightweight aluminum in the 2000 Lincoln LS, saving 188 pounds,

—a new composite pickup truck box on the 2001 Chevrolet Silverado that is 50 pounds lighter than the traditional steel box aluminum used for door, deck, and hood panels for Cadillac, Oldsmobile, and Chevrolet vehicles

• Development of near-production technologies

—complete demonstration of thin-slab continuous casting of aluminum,

—development of laser welding techniques.

• Progress in manufacturing processes, to include

—standardization, scrap recovery initiatives with the aluminum industry, and recycling and design of hybrid material bodies

—through development of more accurate software to predict springback behavior in large steel and aluminum stampings, die-recuts are reduced by 50 percent and cost of new die sets is reduced by 30 percent.

Examples of significant accomplishments in the area of science and technology are:

• Development of carbon foam with extremely high heat conductivity (2000 R&D 100 Award)

• Near frictionless carbon coating, many times slicker than Teflon (1998 R&D 100 Award)

• Oxygen-rich air supplier for clean diesel technology (1999 R&D 100 Award)

• Development of a compact microchannel fuel vaporizer to convert gasoline to hydrogen for fuel cells (1999 R&D 100 Award)

• Development of aftertreatment devices to remove nitrogen oxides from diesel exhaust with efficiencies greater than 90 percent, when used with diesel fuel containing 3 ppm of sulfur

• Improvement of the overall efficiency and power-to-weight ratios of power electronics to within 25 percent of targets, while reducing cost by 86 percent to $10/kW since 1995

• Reduction in cost of lightweight aluminum, magnesium, and glass-fiber-reinforced polymer components to less than 50 percent the cost of steel

• Reduction in the costs of fuel cells from $10,000/kW in 1994 to $300/kW in 2000

• Substantial weight reduction to within 5 to 10 percent of the vehicle weight reduction goal

Additionally, each of the USCAR partners has announced it will begin volume production of new generation hybrid-electric vehicles in 2003–2004 timeframe. Each of these products is in the light truck/sport utility vehicle segments where hybrid technology provides greater fuel saving opportunities.

Daimler/Chrysler

- 2003 Hybrid Dodge Durango
- 2004 Hybrid Dodge Ram

Ford

- 2003 Hybrid Escape
- 2004 Ford Focus Fuel Cell Vehicle

General Motors

- 2004 Hybrid Chevrolet Silverado/GMC Sierra
- 2004 ParadiGM Propulsion

The National Academies 7th Annual Peer Review Report on the PNGV Research Program, administered by the National Research Council, was released in August 2001. This annual Peer Review process provides independent validation of the program's progress and success and has been very helpful in the past in focusing and streamlining the PNGV research portfolio. This year's review of the PNGV program identified several barriers to volume production of vehicles incorporating the full range of PNGV technologies, including: (1) the remaining high cost of PNGV technologies; (2) the uncertainty of meeting the more stringent Tier 2 emissions regulations issued by the Environmental Protection Agency last year, using advanced diesel engines as were included in the 2000 Concept Cars; and (3) the availability of advanced low-sulfur reformulated fuels. The PNGV participants are continuing to address each of these areas, and are optimistic that solutions will be developed.

Once again, I want to thank the Committee for the invitation to testify. I would be happy to answer any questions you might have.

Senator KERRY. Thank you very much, doctor. I appreciate it. Tell me, how long have you been with the program?

Dr. GRAVATT. I was with the program when it started for approximately 2 years, in its initial formative process and the initial aspects of it. I then went back to in a sense what was my normal job and was working in an industry-government partnership in semiconductor manufacturing, and I came back to it about a year or year-and-a-half ago and have been with it since then, so in a sense I was there the first 2, approximately 2 or 3 years, and I have been back approximately one.

Senator KERRY. You heard the testimony of our colleagues who sat at the table ahead of you, who talked with optimism and confidence about the technological capacity to move forward, certainly to close the SUV loophole, and certainly to strengthen the overall CAFE standard. What have you learned from the PNGV program that would weigh on your acceptance of their arguments, or what measurement would you make of their arguments based upon what you have learned?

Dr. GRAVATT. Well, they made a range of arguments. Let me just touch on several of them. Technological progress has been very good. There is quite a menu of materials, components, systems, and subsystems that can be brought together into a vehicle to increase the fuel efficiency, fuel economy, and reduce the emissions of that vehicle, and some of these are getting into the marketplace at this point in time, and we have a list of them in there, and I am sure that industry speakers who will follow can be more specific in many of those areas.

As the National Academy pointed out, cost is still in advanced technology a serious issue, and the industry is always trading off the concept of cost versus the technical gains that they have there, and so I think cost is one, and second, looking at fuels and looking at the emission issues related to, in the one particular case, the direct injection diesel engine, compression ignition engine, is one that

we still have to address, so I think the menu of options is certainly better than it was when the program started.

Senator KERRY. How tangible are those options?

Dr. GRAVATT. Some of them are very tangible. Some of them need both more technical work and cost reduction, and manufacturing engineering.

Senator KERRY. In your judgment, are they sufficiently tangible to permit the industry to meet the goal of passenger car standards for SUVs?

Dr. GRAVATT. The passenger cars?

Senator KERRY. Could you close the loophole as it is known with respect to SUVs?

Dr. GRAVATT. All of the technologies that we have been working on will certainly apply to SUVs as well as other light duty vehicles, and they are bringing brought out in that component. Certainly, each manufacturer has indicated they could move in that direction. In addition to the technical capability, as I say, there is the cost issue and manufacturer ability, and just the rate of introduction, how quickly you can turn over the fleet, but I think things can move in a positive direction, yes, sir.

Senator KERRY. You cite significant accomplishments in the area of science and technology and the development of carbon foam with high heat conductivity, and near frictionless carbon coating many times slicker than teflon, oxygen-rich air supplier for clean diesel technology, development of a compact micro-channel fuel vaporizer, the conversion of gasoline to hydrogen for fuel cells, improvement of overall efficiency in power-to-weight ratios of power electronics to within 25 percent of targets, reducing cost by 86 percent since 1995, reduction in cost of lightweight aluminum magnesium glass fiber reinforced polymer components, reduction in the cost of fuel cells and so forth.

Have any of those advances been embraced by the industry at this point, incorporated into current production?

Dr. GRAVATT. Well, they have certainly participated in work on all of them.

Senator KERRY. Have they been incorporated into the production of automobiles at this point in time?

Dr. GRAVATT. Some have been incorporated in. Others are in the planning stages. I would prefer that you ask them with regards to exactly what each company is doing. Some of that is very proprietary. Others they might be able to comment on.

Senator KERRY. Usually when we ask them it is sufficiently proprietary that we do not get told what they are doing at all, and so I am not sure how far we will get with that.

What I am trying to get from you is, in your judgment, are there technologies that are real, that are sufficiently within reach or that could be pushed by setting a standard that you believe can be reached within a reasonable period of time, that would assist in meeting a stronger and more enforced CAFE standard?

Dr. GRAVATT. Yes, sir, there are certainly things there that will assist in moving in that direction and providing the possibility of meeting the standard.

Senator KERRY. In your judgment, what are the most promising of those?

Dr. GRAVATT. As I indicated earlier, each company takes a diverse approach. I am not the best one to design the vehicle.

Senator KERRY. I understand that, but what I am trying to do is to get as hard a sense as the Committee can get of the real possibilities here. If it is a menu of possibilities, so be it. I know there is some vision involved here. You have got to look ahead and say, I think these things are real, but that is the judgment we are looking to you for from the experience. That is precisely why this partnership was created, and I am trying to get a judgment from you that we can measure some public policy thoughts on.

Dr. GRAVATT. Well, the hybrid concept, hybrid is a broad term, and it includes many things, but the combination of an electric drive, where significant progress has been made both in the electric motor itself, the regenerative braking and all the rather difficult control systems that go into putting that together, along with internal combustion or diesel engine, are very attractive, and each manufacturer has announced the intent to get these things into production in the next several years. I think that looks very promising.

Senator KERRY. In that context, in terms of hybrid, we will hear later on one of the later panels from the Paice Corporation about the development of a power train system called Hyperdrive. Did you examine that in this context?

Dr. GRAVATT. I met with them just several weeks ago and got an update on some of their activities over and above what I was aware of 3 or 4 years ago, and I think they have some very interesting things to present, and have done some significant work in that area.

Senator KERRY. In your program, in the PNGV concept cars, the Daimler/Chrysler concept car, the Dodge EX–3, had estimated fuel economy of 72 miles per gallon, is that correct?

Dr. GRAVATT. Yes, sir.

Senator KERRY. And the Ford Prodigy was a diesel electric hybrid with fuel economy estimated at more than 70 miles per gallon, and there were two versions of a GM precept unveiled. What was the conclusion you drew with respect to these concept cars and those efforts?

Dr. GRAVATT. Concept cars are put together in onesies and twosies, and many of them do not drive, but these certainly have that capability. They are rolled onto the floor to demonstrate a concept, but these were vehicles that could be driven and have been evaluated, and each company has moved forward from where they were at that point about a year-and-a-half ago.

They proved that there was the capability of bringing these pieces together, the technical pieces, and you could achieve this kind of performance, what they need in vehicles that met other requirements as well, but that much needed to be done in manufacturer ability and cost of components and cost of bringing the whole thing together, and that is where they are, and that is where they are working, but it was shown that there was a way of taking the pieces and addressing them and combining them and getting these kinds of performance characteristics.

Senator KERRY. I gather each of the U.S. car partners have agreed, or announced that they are going to begin volume production of those new generation hybrid electric vehicles in the 2003–

2004 timeframe, in the truck, sport utility vehicle segments. So you have got a Daimler/Chrysler offering; you have got a Ford offering; a General Motors offering, to the best of my knowledge, and those will be coming online.

Should the fact of their production coming online in 2003 and 2004 suggest to the Committee that if that technology is available for production now, in that sector, and if we set some goals and standards, that within a 10-year frame of time one could hope for much broader production in that area and much more rapid gain than we might even imagine today?

Dr. GRAVATT. Well, the introduction of the first products will give them a sense to do a good job of answering that question. The SUV provides an attractive platform to bring some of the hybrid technologies out. You have got space, you can handle the weight, it is really a very attractive platform from a technical point of view as well as a market sector point of view.

As several people previously pointed out, that market sector has just exploded since this program started from near zero to 20-some percent at this point in time, so it has all the attractive features. It is technically a convenient one to put the devices in, and it is a high-volume seller, which is what you are trying to achieve.

Senator KERRY. Dr. Runge, I know you have not been on the job that long, and your background is as a physician handling countless thousands of motor vehicle trauma accidents, etcetera, and that is a different area of experience, but given the responsibilities of NHTSA and where we are trying to head here, can you share with us a sense of what you would anticipate as a schedule for your activities, and what kind of enforcement we might find from you with respect to this particular issue and the other issues that sort of dovetail with it?

Mr. RUNGE. Yes, sir. Thank you. As I indicated in my remarks, for the year 2004 we are required to issue a rule by March 31 or April 1 of 2002. That puts us on a very, very short timeframe to issue a standard. We will have to do the work of 18 months in about less than 4 months in order to get that standard out.

Senator KERRY. The standard with respect to what model year?

Mr. RUNGE. 2004. However, simultaneously we will begin to amass data as soon as the freeze is lifted on 2005 and beyond, hopefully with a multiyear standard. The staff is cocked and ready, and as soon as we are able, we will pull the trigger and have them begin this in earnest.

Senator KERRY. The auto industry obviously hopes your standard will be the only game in town. Do you have a view with respect to how that ought to play out?

Mr. RUNGE. Senator, you all make the laws and we administer them, and we will do that to the best of our ability. We look forward to working with you in the development of that law to the extent that you will allow us to do so.

Senator KERRY. Let me ask you this. Since you are on an accelerated schedule, and we are, too, obviously, would you be prepared to meet with us and share some thinking on this as we go along over the course of the next weeks?

Mr. RUNGE. Absolutely, with the caveat that we have been prohibited from gathering data, and so our data are old. We do have

the NAS report. We have the energy policy. We do have experts who have been actively engaged in thinking about it, on their own time, of course.

[Laughter.]

Mr. RUNGE. And we will be ready to devote whatever time is necessary to do that.

Senator KERRY. They have had about 6 years to think about it.

[Laughter.]

Senator KERRY. We look forward to the results of your 6 years of thinking. It should be very productive. Thank you. While pending that I think it would be beneficial for us to move on to the next panel. We certainly appreciate you being here, Dr. Gravatt, thank you very much, very much.

If we could call the second panel: Mr. Tom Davis; Susan Cischke; Edward Cohen; Ann Mesnikoff; and Alan Reuther.

Welcome to all of you and thank you for being here.

First of all, thank you for your patience. We appreciate very much everybody participating in this. What I would like to do is just run down the table here.

Mr. Davis, if you would lead off. I know you are on the end there, and maybe you could share the mike and just run on down. I appreciate it.

Thank you.

STATEMENT OF THOMAS J. DAVIS, GROUP VICE PRESIDENT, GENERAL MOTORS, NORTH AMERICAN PRODUCT DEVELOPMENT

Mr. DAVIS. Thank you for the opportunity to testify on this important subject. My name is Tom Davis. I am Group Vice President, North American Product Development.

My organization has the responsibility to conceive, style, engineer, and develop vehicles for the North American market. We work to ensure that our vehicles meet a wide spectrum of customer requirements and are the kind of vehicles that Americans will buy and want to drive.

Because the Congress has examined energy policy this year, a number of statements have been made about the continuing need for the U.S. to conserve energy, to increase and diversify energy supplies, and to enhance energy security.

We at GM share these concerns. We expect to meet the growing demand for safe personal transportation with technology over the past century, power train technology has changed dramatically—to the point today where it is a highly refined and very mature technology.

While we continue to aggressively push for technological refinement in those systems, we recognize that the continuing incremental evolution of drive trains based upon the internal combustion engines can eventually be surpassed by shift to a new, more advanced technology.

As a company, we are committed to be the leader in new technologies to meet the energy, environmental and economic challenges of the 21st century. U.S. technology leadership historically has provided the key to efficient transportation, environmental protection and a strong American economy. We see the ultimate vision

for sustainable energy future in vehicles powered by hydrogen fuel cells. Hydrogen fuel made from renewable sources of energy can be used to power fuel cell vehicles that are more than twice as energy efficient as today's vehicles and emit only pure water.

These same fuel celled vehicles could be a clean reserve of electrical power sources for home or work sites. The pacing element to make this vision a reality are the development of a hydrogen fuel infrastructure and the reduction in system costs. Our government and industry together have to take a global leadership role in moving toward a hydrogen future for personal transportation.

In the meantime, we are pressing for incremental gains in fuel economy for the driving public. As a result, we have announced the deployment of displacement on demand engine systems, continuously variable transmissions which are in production today and hybrid systems, but what does all this have to do with CAFE policy? Well, CAFE is actually an obstacle to the realization of this vision. With relatively low gasoline prices, CAFE works against the market, the consumer and the long-term technology development. As the National Academy of Sciences report states: "There is a marked inconsistency between pressing automobile manufacturers for improved fuel economy from new vehicles on the one hand and insisting on low real gasoline prices on the other."

We are investing significant engineering resources to create a completely revolutionary technical capability. A near-term shift in CAFE policy engineering resources back to the incremental advancements in internal combustion engine systems and through reductions in vehicle power, weight, and size.

Today's regulatory process provides for a review of CAFE standards by the Department of Transportation that is intended to consider technical feasibility, highway safety, American employment and the economy, costs to the American consumer, the historical and continuing impacts on domestic automakers, and the American consumers' right to choose vehicles that meet their safety and transportation needs.

Now, these are exceedingly complex and intertwined issues, as indicated by many of the other speakers, but issues of great significance. The regulatory process calls for an in-depth analysis and balancing of these diverse CAFE impacts and that comprehensive process should be used to consider any change to CAFE and any legislative support of such changes.

There have also been discussions about changes to the structure of the CAFE program. Any reform of CAFE would have to address the significant adverse consequences of the current system, including the disparate impact on domestic, foreign automakers; the failure to recognize the lead time required for development and manufacturing of new vehicles; the adverse impact on driver and passenger safety; the opposition to natural market forces; the negative impact on the consumer's choice of vehicle; the encouragement to increase driving by reduced mile per gallon costs.

So changes to CAFE system which have been studied for 20 years and one conclusion is very clear. CAFE cannot be fixed by simply a simple shift in the formula. CAFE is determined primarily by what people choose to buy, and that choice reflects consumer needs.

In addition, there are better ways to conserve petroleum in the transportation sector. With over 200 million passenger vehicles already on the American roads today, reducing their overall fuel consumption would be a great policy to pursue. For example, we see opportunities in incentives to scrap older, less efficient vehicles and to reduce fuel-consuming congestion on American roads.

In addition, large fuel savings are possible through the use of hybrid buses for urban mass transit. Another attractive option would be to find ways to permit the new clean diesel engines that were just discussed and now capture nearly 40 percent of the European passenger car sales. These types of policies would engage the power of market forces and act to reduce fuel consumption by the large number of vehicles already on the road.

Let me summarize by saying we are convinced sound regulatory policy is critical to provide a constructive environment for the pursuit of significant technology advances.

Our challenge is to balance our resources between meeting today's regulatory market demands and responding to the long-term needs of the American driving public and society at large.

We urge that the regulatory process be used to develop recommendations for CAFE policy.

Thank you very much. And I'd be pleased to welcome your questions.

[The prepared statement of Mr. Davis follows:]

PREPARED STATEMENT OF THOMAS J. DAVIS, GROUP VICE PRESIDENT, GENERAL MOTORS, NORTH AMERICAN PRODUCT DEVELOPMENT

Thank you for giving me the opportunity to testify on behalf of General Motors on this important subject. My name is Tom Davis, GM Group Vice President, North American Product Development. My organization has the responsibility to conceive, style, engineer, and develop vehicles for the North American market. We work to ensure that our vehicles meet a wide spectrum of customer requirements and are the kind of vehicles that Americans choose to buy and drive.

As the Congress has examined energy policy this year, a number of statements have been made about the continuing need for the U.S. to conserve energy, to increase and diversify energy supplies, and to enhance energy security. We share these concerns.

We expect to meet the growing demand for safe personal transportation with technology. The internal combustion engine has powered our vehicles for a century. Over that time, powertrain technology has changed dramatically—to the point today where it is a highly refined, mature technology. While we continue to aggressively push for technical refinements in those systems and to explore the benefits of hybrid drivetrain variants, we recognize that the continuing incremental evolution of drivetrains based on internal combustion engines will eventually be surpassed by a shift to new, advanced technologies. And like the shift we have seen to a computer-based information age and the shift to the new world of wireless personal communication, new technologies for transportation must address emerging needs of customers and must be embraced by the market.

Ultimately then, meeting our energy goals, addressing the growing demand for transportation and retaining the functions and performance of the vehicles that our customers demand requires a significant advance in technology. So this is a challenging time for General Motors. As a company, we are committed to being a leader in developing new technologies to meet the energy, environmental and economic challenges of the 21st Century. U.S. technology leadership historically has provided the key to efficient transportation, environmental protection, and a strong American economy. And leadership in developing technology will be key to our future competitiveness.

We see the ultimate vision for a sustainable energy future in vehicles powered by hydrogen fuel cells. Hydrogen fuel made from renewable sources of energy can be used to power fuel cell vehicles that are more than twice as energy efficient as today's vehicles and emit only pure water. These same fuel-cell vehicles could, and

should, be a clean reserve electrical power source for homes and work sites—and may indeed find their easiest commercial applications in clean stationary sources of electricity for residences and businesses.

This technology offers a path to balance environmental stewardship with the growing demand for energy that supports our quality of life and rising populations. The pacing elements to make this vision a reality are the development of a hydrogen fuel infrastructure and the reduction in system costs. Our government and industry together have to take a global leadership role in moving toward a hydrogen-fueled future for personal transportation.

In the meantime, we are pressing for incremental gains in fuel economy for the driving public. As a result we have announced the deployment of displacement-on-demand engine systems, continuously variable transmissions, and hybrid systems. CVT transmissions are in production today.

For those who argue the need for more high fuel economy vehicles, many such vehicles are available today. In fact, over 50 models in the U.S. market offer fuel economy above 35 mpg, but they attract less than 1 percent of sales. Hence, they have an insignificant impact on Corporate Average Fuel Economy, or CAFE. Indeed, as the recent National Academy of Sciences report on CAFE notes, "Consumers have a wide variety of opportunities to exercise their preference for a fuel efficient vehicle if that is an important attribute to them." What does our long-term vision for hydrogen-based, clean, efficient, personal mobility have to do with CAFE policy? Well, CAFE is actually an obstacle to the realization of this vision. With relatively low gasoline prices, CAFE works against the market, the consumer and long-term technology development. As the National Academy of Sciences report states, "There is a marked inconsistency between pressing automobile manufacturers for improved fuel economy from new vehicles on the one hand and insisting on low real gasoline prices on the other."

We are investing significant engineering resources to create a completely revolutionary technical capability. A near-term shift in CAFE pulls engineering resources back to incremental advancements in internal combustion engine systems and to reductions in vehicle power, weight and size. Much has been written on the risks of focusing on vehicle weight reduction as a means to accomplish increase in fuel economy. The CAFE report by the National Academy of Sciences concluded, "the downweighting and downsizing that occurred in the late 1970s and 1980s, some of which was due to CAFE standards, probably resulted in an additional 1300 to 2600 traffic fatalities. . ." annually. Furthermore, reduced power and size degrade the vehicle utility required by American farmers and tradesmen, and chosen for family travel and personal use.

Today's regulatory process provides for a review of CAFE standards by the Department of Transportation. This review is intended to consider technical feasibility, highway safety, American employment and the economy, costs to the American consumer, the historical and continuing impacts on domestic automakers, and the American consumers' right to choose vehicles that meet their safety and transportation needs. These are exceedingly complex and intertwined issues of great significance for our nation.

The regulatory process for review of CAFE standards calls for in-depth analysis and balancing of these diverse CAFE impacts. That comprehensive regulatory process should be used to consider any changes to CAFE and any legislative support such changes would require. We intend to work closely with the Department of Transportation as it resumes full CAFE rulemaking authority.

There have also been discussions about changes to the structure of the CAFE program. A change in the mathematical formulation of the CAFE standards is not likely to significantly affect U.S. petroleum consumption in the face of abundant gasoline. Any reform of CAFE would have to address the significant adverse consequences of the current system:

- disparate impact on domestic automakers
- failure to recognize the lead time required for development and manufacture of new vehicles
- adverse impact on driver and passenger safety associated with reduced vehicle weight
- opposition to natural market forces
- negative impact on the consumer's choice of vehicle
- new vehicle cost that encourages retention of older less-efficient vehicles
- encourages increased driving by reducing per-mile cost

However, changes to the CAFE system have been studied for 20 years and one conclusion is clear—CAFE can't be fixed by a simple shift in the formula. CAFE is determined primarily by what people choose to buy, and that choice reflects consumer needs and the abundance of gasoline.

There are better ways than CAFE to conserve petroleum in the transportation sector. With over 200 million passenger vehicles already on American roads today, reducing their fuel consumption would be the best policy to pursue. For example, we see opportunities in incentives to scrap older, less efficient vehicles and to reduce fuel-consuming congestion on American roads. In addition, fuel savings can be encouraged through incentives to deploy hybrid buses for urban mass transit since the fuel savings of hybrid powertrains are greatest in stop-and-go urban driving and in high-consumption vehicles like buses, and the purchase of hybrid vehicles for government fleets. Another attractive option would be to find ways to permit the new *clean* diesel engines that now capture nearly 40 percent of European passenger car sales. These types of policies would engage the power of market forces and act to reduce fuel consumption by the large number of vehicles already on the road. In that regard, they offer the opportunity for immediate impact. Advances in the energy efficiency of future vehicle production can also contribute, though at a slower pace because new vehicles replace approximately 5 percent of the on-road fleet each year.

In conclusion, let me summarize by saying that we are convinced that sound regulatory policy is critical to provide a constructive environment for the pursuit of significant technology advances. We now see our way to fuel cell technology advances that will fundamentally change personal transportation during this century.

Our challenge is to balance our resources between meeting today's regulatory and market demands and responding to the long-term needs of the American driving public and society at large. Therefore, we urge that the regulatory agencies proceed in that spirit to develop recommendations for CAFE policy.

Thank you. I look forward to responding to your questions.

Senator KERRY. Thank you very much, Mr. Davis.

Ms. Cischke.

STATEMENT OF SUSAN M. CISCHKE, VICE PRESIDENT, ENVIRONMENTAL AND SAFETY ENGINEERING, FORD MOTOR COMPANY

Ms. CISCHKE. Thank you, Mr. Chairman, and Members of the Committee. Thank you for inviting me to address the Committee on this very important issue.

My name is Susan Cischke, and I am Vice President of Environmental and Safety Engineering for Ford Motor Company.

I appreciate the opportunity to share with you our views on these subjects, which are of critical importance to our business, our customers, shareholders and the Nation. We support efforts to create an effective energy policy for the U.S., and believe that industry and government both have a role to play in addressing energy concerns.

Industry should continue to invest in development of energy efficient technologies and government should help bring advanced technologies to market more quickly and cost-effectively through policies that encourage early adoption and are providing incentives to make it more affordable to consumers.

In regard to CAFE, it is been widely recognized that this is a complex issue, because many of the tradeoffs and conflicts involve Congress and the Energy Policy Act authorized, NHTSA to periodically review the standards. We believe that NHTSA has the required expertise and is appropriately positioned to consider existing standards on the maximum feasible truck CAFE levels.

Looking at today's fuel economy data on a model-to-model basis, you will see very little difference in the fuel economy performance across the major manufacturers. Contrary to what you may have heard or believe, on an apples-to-apples basis, the fuel efficiency of domestic manufactured vehicles are comparable to imports.

What is different is the model mix. Simply put, CAFE is the calculated average of all the vehicles a company sells. Some manufacturers, mostly domestic manufacturers like Ford, offer a full product line-up with sales of larger cars and trucks like the best-selling F-Series that can haul and tow while other manufacturers have higher sales and small vehicle segments. This has created what you could call a model mix loophole, where some manufacturers have been able to enter the larger vehicle segments unrestricted by CAFE for the past 10 years. Thus, the difference in CAFE performance is not vehicle-to-vehicle differences, and we have shown in the attached table in our written testimony, but the differences in the segments in which the companies choose to compete.

At the end of the day, any solutions to reduce fuel consumption or correct CAFE structure inadequacies must result in vehicles that customers can afford and that they are willing to and inclined to purchase.

Ford has been in the business of making and selling vehicles for 98 years, and we know that when customers consider purchasing a vehicle, they are concerned with vehicle affordability, quality, reliability, safety, appearance, comfort and utility. From our perspective, no one factor can be ignored in the highly competitive U.S. marketplace.

We have reviewed the National Academy of Sciences report on the Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) standards. While we cannot endorse the cost of technology in the report or the methodology for estimated break-even pricing, the report has many findings and recommendations that were thoughtfully prepared. Among them, the panel recommends that consideration be given to an attribute-based system such as vehicle weight. We believe there is merit to investigating this further.

A few years ago, Ford announced an approach we call cleaner, safer, sooner. This is part of a larger strategic vision to improve safety and fuel economy and reduce emissions. I would like to take a minute to share what we have done and plan to do to improve the fuel economy of our vehicles.

First, we have pledged to improve the SUV fuel economy of our U.S. fleet by 25 percent. I would like to thank everyone for recognizing Ford's pledge to improve SUV fuel economy by 25 percent in 2005. As was mentioned earlier, we are committed and on track to do so.

It is a very challenging task made even more challenging in these present economic conditions, but I would like to clarify that this does not translate into a 25 percent truck CAFE increase, which is based on model mix—in other words, what people will be buying 4 years from now, as well as the other categories that are included in truck CAFE, including light trucks, minivans as well. So you have to remember CAFE is complex and it is not an average.

Second, I would like to mention that Ford is the leader in offering clean running alternative fuel vehicles, and we make and sell 10 vehicle lines capable of running on fuels other than gasoline, including ethanol, natural gas, and propane.

And third, we are leading the world's automakers by providing consumers with the broadest lineup of electric vehicles, including

a new zero emissions brand and we are not stopping here. We continue to research other promising technologies, including hydrogen powered fuel cells. Our objective is simple. Give consumers more of what they want. Performance, driveability, and utility using less fuel, emitting lower emissions, and requiring less maintenance.

In closing, we believe that policies that promote research, development, and deployment of advanced technologies and provide consumer incentives to accelerate demands for these technologies are two key elements of our coordinated strategy to reducing U.S. fuel consumption.

Ford is committed to taking action to address societal concerns when we have the technology, when it can be done cost effectively, and introduced in sufficient volumes to make a difference.

Thank you again for the opportunity to address the Committee.

[The prepared statement of Ms. Cischke follows.]

PREPARED STATEMENT OF SUSAN M. CISCHKE, VICE PRESIDENT, ENVIRONMENTAL AND SAFETY ENGINEERING, FORD MOTOR COMPANY

Mr. Chairman and Members of the Committee: Thank you for inviting me to address the committee on this important issue. My name is Susan Cischke, and I am Vice-President of Environmental and Safety Engineering for Ford Motor Company. Ford Motor Company has 48 manufacturing facilities located in North America employing 163,000 people in the United States.

I appreciate the opportunity to share with you Ford Motor Company's views on motor vehicle fuel efficiency and what role advance technology will play. These issues are of critical importance to our business, customers, shareholders, and the nation.

We are committed to reducing energy consumption through development of fuel-efficient advanced technology and alternative fuel vehicles, and improving plant and facility energy use. To that end, a few years ago Ford announced an approach we call "Cleaner, Safer, Sooner". This theme actually is part of a larger strategic vision of where we are headed with technology as a company to improve safety and fuel economy and reduce emissions. I would like to take a few minutes to share what we have done and plan to do to improve the fuel economy of our vehicles.

- We have pledged to improve the fuel economy of our U.S. SUV fleet. This will be done through a combination of new vehicle introductions, significant powertrain and non-powertrain actions, and additional use of lightweight materials.
- Already, today, Ford is the leader in offering clean-running alternative fuel vehicles. We make and sell ten vehicle lines capable of running on fuels other than gasoline, including ethanol, natural gas, and propane. One of the key hurdles to overcome in commercializing alternative fuel vehicles is the lack of fueling infrastructure. Incentives will help the distributors overcome the costs to establish the alternative fuel outlets and support distributors during initial lower sales volumes as the number of alternative fuel vehicles increases.
- We are leading the world's automakers by providing consumers with the broadest lineup of electric vehicles, including a new zero-emissions brand, TH!NK—dedicated to the development and marketing of alternative fuel powertrains and vehicles.
- Fuel cells are one of the most promising long-term technologies and offer the hope of breakthrough fuel economy improvements, zero emissions, and a shift away from petroleum-based fuels. Ford is working hard on this promising technology and has also recently announced a new direct hydrogen internal combustion engine research vehicle. We introduced our first drivable fuel cell vehicle in 1998 and last year introduced the Ford Focus FCV. However, there are significant obstacles to overcome, including cost, infrastructure, and new technologies that need to be invented.
- We recognize that electronics that integrate electric drive with an internal combustion engine offer improvements in fuel economy. For example, we plan to have the Escape Hybrid Electric Vehicle on the road in 2003 that incorporates electric drive technology.

As we work to improve the fuel economy of our vehicles, we keep several important objectives in mind. We must provide consumers with the vehicles they want to drive that provide the functionality they look for and the safety they demand.

Vehicles that do not meet customer needs, do not sell, and will not improve the country's environmental performance. It is also important to set equitable tasks for all manufacturers and to provide adequate lead-time to accomplish these tasks. We have looked at the CAFE standards from a manufacturers perspective and we believe that as a policy tool, it does not measure up to these principles. The goal of the initial CAFE program was to improve the average fuel economy performance of three companies. This is a different objective than setting up a program that conserves energy for the nation.

Contrary to what you may have heard or believe, on an apples-to-apples basis, the fuel efficiency of vehicles from domestic manufacturers is comparable to those from import companies. Looking at today's fuel economy data, on a model-to-model basis, you will see very little difference in the fuel economy performance across the major manufacturers. What is different is the model mix. Simply put, CAFE is a calculated average of all the vehicles a company sells. Some manufacturers, mostly domestic manufacturers like Ford, offer a full product line-up with sales of larger cars and trucks like the best selling F-Series that can help with the chores on the farm, while other manufacturers have higher sales in small vehicle segments. This has created what you could call a "model mix loophole" where some manufacturers have been able to enter the larger vehicle segments unrestricted by CAFE for the past 10 years. Thus, the difference in CAFE performance is not vehicle-to-vehicle differences, as we show in the attached table, but differences in the segments in which a company chooses to compete.

At the end of the day, any solutions to reduce fuel consumption or correct CAFE structure inadequacies must result in vehicles that customers can afford and that they are *willing to* and *want to* purchase. Ford has been in the business of making and selling vehicles for 98 years and we know that when customers consider purchasing a vehicle, they are concerned with vehicle affordability, quality, reliability, safety, appearance, comfort, and utility. Automakers also must consider all competing regulatory challenges, not just reducing fuel consumption, but improving safety and reducing emissions. From our perspective, no one factor can be ignored in the highly competitive U.S. marketplace.

In regards to CAFE, we agree with the National Academy of Sciences that "understanding the impact of potential changes to CAFE standards is, indeed, a difficult and complex task." Because of the many tradeoffs and conflicts involved, Congress, in the Energy Policy Act, authorized the National Highway Traffic Safety Administration (NHTSA) to periodically review the standards, which requires expert and intensive review of competitive information and analysis of competing priorities. We believe that NHTSA is appropriately positioned to set standards at the "maximum feasible" truck levels as required by law. The regulatory process to do this is already in place and scheduled to begin shortly.

We have reviewed the National Academy of Sciences report on "The Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards." While we cannot endorse the cost of technology in the report or the methodology for estimating breakeven pricing, the report has many findings and recommendations that deserve further comment:

(1) *NAS recommended that the government should be involved in setting fuel economy standards for societal reasons.* We agree that government has an appropriate role to play in establishing national energy objectives and evaluating the tradeoffs between competing national objectives. We support the current regulatory process already in place to have the National Highway Traffic Safety Administration review the fuel economy standards and set responsibly crafted standards at maximum feasible levels that consider among other things the interactions between fuel economy and safety, economic concerns, and U.S. competitiveness. As I mentioned, this review process is already in place and scheduled to begin shortly.

(2) *NAS recommended that consideration should be given to an attribute based system, such as vehicle weight.* We believe that there is merit to investigating this further.

(3) *NAS recommended that the CAFE system, or any alternative system, should include broad trading of "Credits."* We do not envision an inter-manufacturer trading system that would work since it would inevitably lead to a transference of wealth from full line manufacturers—who provide working class vehicles to working Americans—to foreign companies who provide small vehicles unless equitable tasks are developed for all manufacturers.

(4) *NAS recommended that the dual-fuel vehicle credits should be eliminated.* Ford believes this recommendation should have been modified to add a phrase at the end *"or we should add additional incentives to build a fuel infrastructure to support alternative fueled vehicles."* We believe that bio-fuels and renewables will play an important role in energy diversity. We should not be cutting off a fruitful path to get

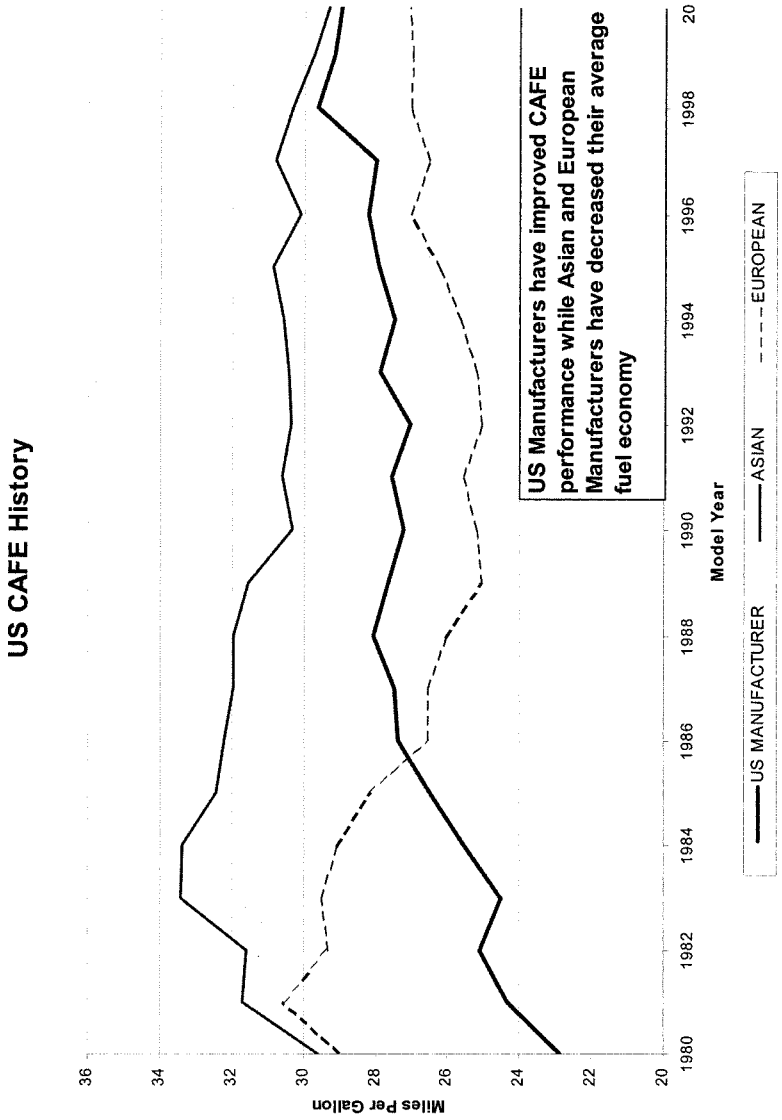
to a renewable market because the fuel infrastructure has not grown as fast as some critics would like. There should be additional incentives to build a fuel infrastructure to support alternative fueled vehicles.

We can not emphasis enough the uncertainties in the NAS report, these "Uncertainties include the cost of implementing existing technologies or developing new ones; the future price of gasoline; the nature of consumer preferences for vehicle types, performance, and other features; and potential safety consequences of altered standards. The higher the target for average fuel economy, the greater the uncertainty about the cost of reaching that target." (ES–7)

In closing, we believe that policies that promote research, development and deployment of advanced technologies and provide consumer incentives to accelerate demand for these technologies are two key elements of a coordinated strategy to address reducing U.S. fuel consumption. Advanced Technology Vehicles hold great promise for increasing fuel efficiency without sacrificing the other vehicle attributes consumers desire. Just as important, the technology is transparent to the customer. Incentives will help consumers overcome the initial higher costs of advanced technology and alternative fuel vehicles during market introduction, bringing more energy efficient vehicles into the marketplace more affordably. Enabling consumers to make more effective fuel-efficient choices makes more sense to achieve the desired outcome.

Ford is committed to taking action to address societal concerns when we have the technology and when it can be cost-effectively introduced in sufficient volume to make a difference.

Thank you again for the opportunity to address the Committee.


US CAFE History
Miles Per Gallon
36
34
32
30
28
26
24
22
20
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
20
Model Year
US Manufacturers have improved CAFE performance while Asian and European Manufacturers have decreased their average fuel economy
US MANUFACTURER
ASIAN
EUROPEAN

1

VEHICLE FUEL ECONOMY COMPARISON

Manufacturer	Carline	Engine Size	Cylinders	Trans	City	Hwy	City/Hwy FE
Cars							
FORD	TAURUS	3.0	6	Auto	20	28	23
DC	CONCOROE	2.7	6	Auto	20	28	23
GM	IMPALA	3.4	6	Auto	21	32	25
HONDA	ACCORD	3.0	6	Auto	20	28	23
TOYOTA	CAMRY	3.0	6	Auto	20	27	22
SUVs							
FORD	ESCAPE 4WD	2.0	4	Manual	22	25	23
TOYOTA	RAV4 4WD	2.0	4	Manual	22	27	24
FORD	EXPLORER 4WD	4.0	6	Auto	16	20	17
DC	GRAND CHEROKEE 4WD	4.0	6	Auto	15	20	17
GM	BLAZER 4WD	4.3	6	Auto	15	20	17
HONDA	PASSPORT 4WD	3.2	6	Auto	16	20	18
TOYOTA	4RUNNER 4WD	3.4	6	Auto	16	19	17
FORD	EXPEDITION 4WD	4.6	8	Auto	14	17	15
GM	K1500 SUBURBAN 4WD	5.3	8	Auto	13	17	15
DC	DURANGO 4WD	4.7	8	Auto	13	18	15
TOYOTA	SEQUOIA 4WD	4.7	8	Auto	14	17	15
TOYOTA	LAND CRUISER WAGON 4WD	4.7	8	Auto	13	16	14
Small Pickups							
FORD	RANGER PICKUP 2WD	2.3	4	Manual	24	28	25
GM	S10 PICKUP 2WD	2.2	4	Manual	22	28	24
TOYOTA	TOYOTA TACOMA 2WD	2.4	4	Manual	22	27	24
FORD	RANGER PICKUP 2WD	4.0	6	Auto	17	22	19
DC	DAKOTA PICKUP 2WD	3.9	6	Auto	18	19	18
GM	S10 PICKUP 2WD	4.3	6	Auto	16	22	18
TOYOTA	TOYOTA TACOMA 2WD	3.4	6	Auto	17	19	18
Full Size Pickups							
FORD	F150 PICKUP 2WD	4.6	8	Auto	16	20	18
DC	RAM 1500 PICKUP 2WD	5.2	8	Auto	14	19	16
TOYOTA	TOYOTA TUNDRA 2WD	4.7	8	Auto	15	18	16
GM	C1500 SILVERADO 2WD	4.8	8	Auto	15	20	17
Minivans							
FORD	WINDSTAR FWD WAGON	3.8	6	Auto	17	23	19
DC	CARAVAN 2WD	3.3	6	Auto	18	24	20
GM	VENTURE FWD	3.4	6	Auto	19	26	22
TOYOTA	SIENNA	3.0	6	Auto	19	24	21
HONDA	ODYSSEY	3.5	6	Auto	18	25	21

* Fuel Economy Label data from 2002MY EPA Website

* Vehicle Weights obtained from Test Car List

Senator KERRY. Thank you very much, Ms. Cischke.
Mr. Cohen.

STATEMENT OF EDWARD B. COHEN, VICE PRESIDENT FOR GOVERNMENT AND INDUSTRY RELATIONS, HONDA NORTH AMERICA

Mr. COHEN. Thank you, Mr. Chairman.

Good morning. My name is Ed Cohen. I am Vice President for Industry and Government Relations, Honda North America. With your permission, Mr. Chairman, I ask that our complete statement be included in the record.

Senator KERRY. Without objection, it is entered.

Mr. COHEN. Thank you, Mr. Chairman. Since its beginning in 1948, Honda has been guided by our philosophy of providing clean, efficient and high performance products of the highest quality, yet at reasonable prices that customers are willing to pay. We believe Honda's products are the purest expression of Honda's commitment to the environment and so we have set out to ensure that Honda's fleet has not only set the standard for cleaner emissions, but also that it is one of the most efficient in our Nation.

Our combined CAFE average for cars and trucks, based on the NHTSA 2001 mid-model year report was 30.3 miles per gallon. And our vehicles are either at the top or close to the top of each segment in which we choose to compete. Also, 100 percent of the cars that we manufacture in 2002 will be low emission vehicles or better. In excess of 40 percent of those vehicles will be ultra low-emission vehicles (ULEV). While fuel efficiency is a high priority for Honda, we also must produce vehicles that our customers will want to buy. The challenge for all of us is finding the critical balance between society's environmental priorities and the needs of our customers.

The report of the National Academy of Sciences provides a good foundation for the Committee's inquiry into the fuel economy issue. While we do not agree with all the findings and recommendations, the National Academy does point out that there are policies other than CAFE that could accomplish the same ends at a lower cost and provide more flexibility to manufacturers. However, you have asked us this morning to focus on CAFE and I will do so now.

We encourage the Committee in focusing on CAFE that close attention be paid to the importance of providing sufficient lead time to design and introduce new technology to meet future standards. The NAS panel focuses on a 10 to 15-year timeframe. While CAFE does create market distortions, they can be mitigated if manufacturers can design in fuel economy attributes during the initial design stages, rather than as a process of retrofits or weight reductions. Certainly, this has been Honda's experience as we incorporate fuel efficiency goals into the base concept of new model development. The NAS endorsed establishing fuel economy targets based on vehicle attributes such as size or weight.

The NAS panel seems to have opted for weight adjustments because of its belief that it is important to eliminate influences toward small cars due to safety considerations.

However, we agree with the view of panel members David Green and Mary Ann Keller, who in dissenting, expressed their belief that

existing safety data is inadequate to reach different conclusions about fuel economy related safety issues. Significant existing studies do not address the safety impact of using lightweight materials without reducing size, especially with vehicles with advanced safety technology.

Mr. Chairman, you have asked us to focus on ways to adjust CAFE or alter CAFE. Let me offer one that you should not use, and that is a proposal that some have mentioned that CAFE increases should be based on a fixed percentage applied against each manufacturer's own CAFE average.

As the NAS pointed out, such an approach would be unfair, shortsighted and unwise. It would impose a higher burden on those manufacturers that have already done the most to help energy consumption. It would reward those who have done the least, or as the NAS puts it, "it conveys a moral lesson that it is better to lag than it is to lead."

It is bad public policy. It creates a strong disincentive for any manufacturer to ever exceed a standard in the future. No good deed will go unpunished for that manufacturer. But most importantly, it harms consumers and it harms American workers. It would reduce competition and keep the most efficient manufacturers out of product classes that they might not yet have entered by locking them into their current market positions.

It also would hurt American workers. Three-quarters of the cars that Honda sells in the United States are made in North America. 94 percent of the steel that goes into those cars are made in U.S. factories. The great proportion of parts, the preponderance of parts that go into those cars, come from suppliers here in the U.S. made by American workers in over 35 States.

Just 2 days ago, I was in Alabama to dedicate the opening of our new Honda Odyssey plant. That plant represents a $580 million investment and employs 1,500 Americans. We will be making 120,000 Odysseys. At the same time we dedicated the plant, we also announced that we were going to expand it. We are going to hire a total of 2,300 Americans. This also will increase production for the U.S. suppliers that supply parts for those vehicles.

Mr. Chairman, we appreciate the opportunity to testify this morning. At Honda, we have always adopted a can-do approach to building cars that exceed our customer's expectations while achieving levels of emission and fuel efficiency that are compatible with the needs of the environment.

We look forward to working with the Committee as it considers the current CAFE program.

[The prepared statement of Mr. Cohen follows:]

PREPARED STATEMENT OF EDWARD B. COHEN, VICE PRESIDENT FOR GOVERNMENT AND INDUSTRY RELATIONS, HONDA NORTH AMERICA

Good morning. My name is Edward B. Cohen. I am Vice President for Government and Industry Relations, Honda North America. We are delighted to once again appear before the Committee. As you will recall, we were pleased to testify on automotive fuel efficiency and technology before the Committee at its hearing on July 10, 2001. The focus of today's hearing and of our testimony is the various issues associated with the regulation of motor vehicle fuel economy. The recent report of the National Academy of Sciences (NAS) entitled "Effectiveness and Impact of Corporate Average Fuel Economy Standards" provides the Committee with a good point

of departure for considering this complex technological, economic and public policy issue.

Since its beginning in 1948, Honda has been guided by its philosophy of providing clean and efficient products of the highest quality at a reasonable price to its customers worldwide. In 1974, the founder of our company, Soichiro Honda, said, "I cannot overstate the importance of continuing to cope with the pollution problem." In this spirit, we believe Honda's products—more than mere words—are the purest expression of Mr. Honda's commitment to the environment. And it is this commitment that has led to the can-do approach that has been the hallmark of Honda's efforts to meet the environmental challenge—while still meeting the needs of our customers.

In this coming year, for example, every vehicle that we sell in the United States will be categorized as a low emission vehicle (LEV) or better, and 40 percent are ultra-low emission vehicles. Every Civic we make is ULEV, the first complete ULEV model line to be sold in all 50 states. The 2000 Accord meets California's Super Ultra Low Emission Vehicle standard, emitting 96 percent less hydrocarbons than a typical car. The 2000 Honda Insight, which achieves an EPA rating of 61 mpg (city) and 68 mpg (highway), was the first gasoline-electric hybrid vehicle introduced in the United States. And this spring, we will introduce the all new Civic Hybrid—the first regular production vehicle that will be available with three different powertrains—conventional gasoline, compressed natural gas and hybrid engines.

In this same light, Honda's fleet has always been one of the most efficient in the nation. Our combined car and light truck CAFE average for 2001, based on NHTSA's mid-model year report, is 30.3 mpg . While fuel efficiency is a high priority for us, we know from our long experience with this issue that we must produce vehicles that our customers will want to buy. The challenge for all of us is finding the critical balance between overall societal needs (reduction of greenhouse gas emissions and reduced reliance on petroleum) with the individual needs and demands of our customers. We look forward to and believe it is time for a constructive discussion about motor vehicle fuel efficiency. The goal must be to develop requirements that are fair and equitable for all manufacturers and that improve energy efficiency and resource conservation.

We commend the NAS on its report on fuel economy. While we do not agree with all the findings and recommendations, the Panel had a formidable task, which it completed on an extremely tight timeframe.

As we will discuss, a number of the recommendations of the NAS on any future increase in CAFE parallel our thinking. The report recognizes the importance of providing adequate lead-time to design and introduce new technology to meet future standards. The report focuses on a 15-year timeframe. Certainly, the more significant the increase in the standard, the longer the lead-time needed. The report also discusses alternatives to the current CAFE program. We concur in the Panel's observation that some of these alternatives have the potential to reduce the nation's fuel consumption without the market distortions created by the CAFE system. We also note the report is not unanimous on its position with regard to safety. We have more to say about this critical issue later, but we concur that more research is warranted.

We believe that any future fuel economy requirements should be stated in terms of performance and be technology neutral. Standards should be set with due consideration of the challenges faced by manufacturers to offer consumers the mix of vehicles and vehicle attributes they desire. For these reasons, we believe that specific CAFE standards should be set by an expert agency, such as the National Highway Traffic Safety Administration, with direction and oversight from Congress.

POLICY CHOICES

The NAS stated that it is appropriate for the Federal Government to set fuel economy levels in order to achieve the twin goals of reducing greenhouse gas emissions and decreasing the level of petroleum imports. However, the NAS also pointed out that fuel economy standards alone are not sufficient to guarantee achievement of these twin goals. Consumer behavior, as reflected in vehicle miles traveled, fuel substitution, incentives and consumer demand for various makes and models also are critical factors. Similarly, the availability and price of gasoline (including the level of gasoline taxation) also directly influence consumers' purchasing decisions. When gasoline prices rose to close to $2.00 per gallon earlier this year, customer demand for our fuel-efficient Insight also increased. The current system of CAFE standards does little, if anything, to influence these consumer-based factors.

Alternatives to CAFE

The structure of any fuel economy requirement has significant impacts on how the program operates and its influence on the marketplace. One critical choice facing policymakers in designing a fuel economy program is whether the fuel economy improvement will be certain or whether the costs of the program will be certain. Costs include not only dollar and cents impacts on the price of vehicles, but also tradeoffs such as vehicle performance and convenience factors. The current CAFE structure fixes the fuel economy improvement, but its costs are very uncertain as it depends on future market choices, fuel prices and the rate of technology development. It cannot be predicted with much accuracy. If the CAFE level is set too high, the costs increase rapidly and may force sales of unwanted vehicles. If the CAFE level is set too low, cost effective technology may not be used, as there is little incentive to do more than the absolute minimum.

The NAS recognized this policy conundrum and observed that there are ". . . policies [other than CAFE that] could accomplish the same end at a lower cost, provide more flexibility to manufacturers, or address inequities arising from the present system." (Finding 10). While the NAS was asked only to examine CAFE policies, alternatives to the current system, that warrant closer scrutiny by Congress, include tradable credits for fuel economy improvements, as well as feebates, higher fuel taxes, and standards based on vehicle attributes.

Attribute-Based Systems

Among the alternatives evaluated by the NAS are fuel economy targets based on vehicle attributes such as size class or weight. This approach would make the vehicle mix each manufacturer offers in the marketplace less significant for the purposes of fuel economy compliance. At the same time, a weight-based system has a significant negative side, as manufacturers would get no credit for substitution of lightweight materials or better packaging efficiency. There simply would be no reward for such changes, and in fact, if not properly structured, there may even be an incentive for *increasing* weight. Significantly, these disincentives would not exist for a system based on size or vehicle class.

The NAS Committee seems to have opted for weight rather than size adjustments because of its belief that—due to safety considerations—it is important to eliminate influences toward small cars. It is significant that these safety considerations are the only issue that produced a dissenting opinion in the report. And Honda concurs with that dissenting opinion expressed by committee members David Greene and Maryann Keller that the data is insufficient to conclude that safety is compromised by smaller cars. The level of uncertainty about fuel economy related safety issues is much higher than stated in the majority report. Significantly, existing studies do not address the safety impact of using lightweight materials without reducing size, especially for vehicles with advanced safety technology.

As the dissenters state, "[t]he relationship between vehicle weight and safety are complex and not measurable with any degree of certainty at present." We believe it is important to understand the differences between size and weight. We have demonstrated through the use of sophisticated engineering and advanced lightweight materials that smaller cars can be made increasingly safer. For example, Honda's 2001 Civic Coupe, with a curb weight of 2502 pounds, was the first compact car to receive a five star safety rating in the NHTSA crash results for the driver and all passenger seating positions in frontal and side crashes. The fuel economy of the Civic HX coupe with a continuously variable automatic transmission (CVT) and a gasoline engine is 40 mpg (highway) and 35 mpg (city). In addition, there are many ways to increase fuel efficiency that do not affect weight including power train technology and the efficient use of space.

Thus, vehicle design and size, and not just vehicle mass, must be considered when studying the relationship between fuel economy and safety. There are accident scenarios where less weight may actually be an advantage in some vehicle accidents. In others, it is a disadvantage. But, there is much we do not know. For example, to what extent can advanced crash avoidance technologies, such as forward collision warning/avoidance, lane keeping and road departure prevention, and lane change collision warning/avoidance systems, be employed to make weight considerations less relevant? To what extent can new, lightweight materials and sophisticated engineering provide a level of crash protection comparable or even superior to vehicles with traditional materials and designs? Honda supports the NAS recommendation that NHTSA undertake additional research to clarify the relationship of weight and size in the context of newly evolving advanced materials and engineering techniques in the array of accident scenarios that are encountered on American roads. There have been too many assumptions made in terms of the factors influencing fuel efficiency and safety. But there simply has not been the detailed analysis of the various

crash dynamics and crash scenarios on vehicles with modern safety designs to draw any definitive conclusions.

The Introduction of Fuel Efficient Technologies and Importance of Leadtime

There is a popular misconception that vehicle manufacturers have not introduced fuel-efficient technologies since the mid 1980s. This is understandable, as the car and light truck CAFE have remained relatively constant for the last 15 years. However, the reason for this flat line is not a lack of technological progress. The combined fleet has gone down due to increasing light truck market penetration—and due to the increasing array of features demanded by customers. There has been a substantial amount of efficiency technology introduced by the industry in that time period. As EPA has reported in its 2000 Fuel Economy Trends Report, penetration of lock-up torque converters increased from just under 30 percent in 1980 to 100 percent in 2000. Similarly, the use of port fuel injection increased from 5 percent in 1980 to 100 percent in 2000. From its introduction in 1985, penetration of 4 valves per cylinder reached 40 percent in 2000. The dilemma facing manufacturers is that consumers may not value using these technologies to improve fuel economy given the relatively low price of gasoline.

These new technologies have been employed more to respond to vehicle attributes demanded by the marketplace than to increase fuel economy. Over the past two decades, consumers have insisted on such features as enhanced performance, luxury, utility, and safety without decreasing fuel economy. Although vehicle weight increased 12 percent from 1987 to 2000, the 0–60 time improved by 22 percent in the same time period. This is because average horsepower increased by 70 percent from 1982 (99 hp) to 2000 (170hp). In addition, the proportion of manual transmissions, which are more fuel-efficient than automatic transmissions, decreased from 32 percent in 1980 to 14 percent in 2000. It is clear that technology has been used for vehicle attributes which consumers have demanded and value more than fuel economy.

If the current car fleet were still at 1981 performance, weight and transmission levels, the passenger car CAFE would be almost 36 mpg instead of the current level of 28.1 mpg. The trend is particularly pronounced since 1987. Based on EPA's data, technology has gone into the fleet from 1987 to 2000 at a rate that could have increased fuel economy by about 1.5 percent per year, if it had not instead focused on other vehicle attributes demanded by the market. There is no reason why this technology trend of improved efficiency (as opposed to fuel economy) should not continue.

This pace of potential improvement is significant in the context of the NAS finding that "[t]echnology changes require very long lead times to be introduced into the manufacturers' product lines." Accelerated mandates that are met through piecemeal modifications to existing vehicle designs rather than through integration of fuel-efficient technologies from the inception of a new vehicle design can have disruptive and undesirable effects. The NAS notes that the downweighting and downsizing that occurred in the late 1970s and early 1980s, may have had negative safety ramifications. But the ability to "design in" fuel economy from the beginning—through the use of aerodynamic styling, enhanced use of lightweight materials, and incorporation of the newest drivetrain technologies—can produce significant fuel savings with little sacrifice of other vehicle attributes that consumers desire. And I can say unequivocally that this has been Honda's experience.

OTHER POLICY OPTIONS FOR MODIFICATION OF THE EXISTING CAFE PROGRAM

Two Fleet Rule

The NAS report raises a number of other critical issues about the current CAFE system that should be reexamined by Congress. For example, the NAS recommends abolition of the import/domestic split or two fleet rule. Honda agrees with this recommendation. Regardless of what the original purpose of the rule may have been, circumstances in the auto industry have markedly changed since the original statute was enacted more than 25 years ago. Significantly, a number of manufacturers have begun production in the United States. Honda, for example, now produces more than 75 percent of its cars for the U.S. market in North America. Just 2 days ago, we dedicated a completely new engine and motor vehicle manufacturing facility in Lincoln, Alabama where we will produce the Honda Odyssey—it is our 8th major plant in America. Depending on the formula used—and there are many—these vehicles contain between 70 and 90 percent domestic content. Over 90 percent of the steel used in these vehicles is domestic. Equally important, over 20,000 Americans are employed directly by Honda to design, develop, assemble, and sell these vehicles

(This employment figure does not include the many tens of thousands employed by our U.S. suppliers and dealer network.)

The NAS believes the two fleet rule may act as a disincentive for manufacturers to increase the domestic content of their U.S.-built vehicles. Depending upon a manufacturers' global production plan, their more efficient vehicles may be made in the U.S. and thus are needed to be averaged with import vehicles to meet their CAFE obligations. Further, under CAFE, Canadian vehicles are treated as domestic, and soon as a result of the North American Free Trade Agreement, Mexican vehicles will be counted as domestic as well. The two fleet distinction already has been eliminated for trucks. It has outlived whatever usefulness it may ever have had.

The Distinction Between Cars and Light Trucks

Another question inherent to the discussion of fuel economy policy is the viability of the current distinction between passenger cars and light duty trucks. When the CAFE statute was originally drafted, minivans were virtually nonexistent and SUVs were bought only by a small group of people who intended to use them off-road or for commercial uses. At that time, a distinction was needed for vehicles used for commercial and consumer purposes. Today, most light duty trucks are used as passenger vehicles and companies are building crossover vehicles that may fall in either a manufacturer's car or truck fleet. Thus, we caution that if cars and trucks are combined into a single fleet with a single standard, or if the same standard is adopted for both cars and light trucks, then there must be sufficient lead-time. Technology will help, but the lead-time must be sufficient. Timeframes reflected in the NAS report appear to be more reasonable. But we know of no technology or imminent breakthroughs that can take CAFE to 39 or 40 miles per gallon as some have proposed in a decade or so without severe marketplace disruptions.

UNIFORM PERCENTAGE INCREASE (UPI)

Before concluding, we wish to highlight another important conclusion of the NAS report. The report unambiguously denounced an approach to CAFE that would require each manufacturer to improve its own CAFE by a specific target percentage. This is known as uniform percentage increases, or UPI. The NAS observes that such an approach would impose a higher burden on those manufacturers that have already done the most to help reduce energy consumption. Among its negative consequences, the NAS noted that UPI is generally the most costly way to meet an environmental standard, it locks manufacturers into their relative positions, thus reducing competition, and rewards those who have met only the minimum requirement. Most significantly, the NAS found that it punishes those who have done the most to help the environment and "seems to convey a moral lesson that it is better to lag than to lead." In short, the NAS found that such a system provides a strong incentive for a manufacturer not to exceed regulatory standards for fear this will lead to tighter regulations. As one company that would be particularly aggrieved by an UPI approach precisely because we have worked proactively and tirelessly to meet or exceed all requirements, Honda strongly endorses the NAS's position in condemning UPI. Similarly, an approach that allocates to each manufacturer total gallons to be saved would have many of the same negative implications as UPI. And, like UPI, it would freeze market share of each manufacturer at current levels. How ironic it would be to effectively exclude from a new market a manufacturer like Honda that sells some of the most fuel-efficient cars in America.

CONCLUSION

There are several basic rules that should apply to any approach to address fuel economy that Congress ultimately adopts:

- Any future fuel economy mandates must be equitable to all manufacturers;
- Those mandates must provide adequate lead time;
- They should reflect a basic understanding that technology is ever evolving;
- They must be applied fairly to all automakers; and
- They must ensure that manufacturers will be able to offer consumers the vehicles with the attributes they demand.

In short, this is a major challenge that will require all of us to work together. But for those of us at Honda, it is a challenge we will embrace with our can-do spirit—for the benefit of our customers and society.

Thank you.

Senator KERRY. Thank you very much, Mr. Cohen. We appreciate it.

Ms. Mesnikoff.

STATEMENT OF ANN R. MESNIKOFF, WASHINGTON REPRESENTATIVE, SIERRA CLUB GLOBAL WARMING AND ENERGY PROGRAM

Ms. MESNIKOFF. Thank you, Mr. Chairman.

My name is Ann Mesnikoff. And I thank you and the Members for the opportunity to testify today on behalf of Sierra Club's more than 700,000 members nationwide on the issue of automobile fuel economy standards. I would similarly request my full written testimony be submitted for the record.

Senator KERRY. Without objection, so ordered. Let me just alert you. I am not sure if we could get the two testimonies in. There is a vote on, and then I could go and vote and come back and engage in the questioning. It would be helpful.

Ms. MESNIKOFF. I will try to be brief. It has been a little more than a year since I last represented Sierra Club before this Committee on solutions to global warming and much has changed since that last testimony in support of raising CAFE. The national debate on energy policy is now focused on energy security and the issue of oil dependence is central to that debate. The tragedy of September 11th heightens the need to act now to raise fuel economy and reduce our dependence on oil.

The biggest single step the U.S. can take to save oil is to raise CAFE standards. New standards will save millions of barrels of oil every day, will keep billions of dollars in our economy that consumers can reinvest rather than sending them overseas. And more importantly, they will also slash carbon dioxide emissions. As this Committee develops new standards to be included in balanced and responsible energy legislation, it has the opportunity to ensure real oil savings for the Nation.

Cars and light trucks guzzle 8 million barrels of oil every single day in this country and emit 20 percent of our CO_2. The Sierra Club urges this Committee to call for a 40-mile-per-gallon CAFE standard to be phased in over the next 10 years for a combined fleet of cars and light trucks. This should include closing the light truck loophole. This will put the Nation on the path to saving nearly 2 million barrels a day by 2012 and nearly 4 million barrels a day by 2020.

When you contrast that to the 8 million barrels of oil we are using a day in cars and light trucks, those are real savings that will have an impact on our oil imports. The U.S., as pointed out by previous testimony, just 3 percent of the world's oil reserves, yet we use 25 percent of the world's oil, so we cannot really drill our way out of this situation.

The new standards will save far more than we import from the Persian Gulf and they will save far more than the 6 months worth of oil expected to come from the National Arctic Wildlife Refuge—oil that won't add to supplies for about 10 years. In contrast, a cumulative savings from raising CAFE standards to 40 miles per gallon over the next 10 years will be nearly 3 billion barrels of oil.

Consumer savings in the billions of dollars a year will be a helpful to our economy. They will generate jobs as consumers invest the dollars they save at the gas pump into this economy rather than sending them overseas to pay for oil. In 1990, this Committee adopted and sent to the floor a bill to update CAFE standards. Had

that bill passed, we would be saving more than a million barrels of oil a day now, well on the way to saving 3 million barrels a day.

I would like to make a few points about the NAS report issued in July.

I think importantly, the report concludes that CAFE standards have worked to save nearly 3 million barrels of oil every day and that auto manufacturers can use technology to significantly improve fuel economy over the next 10 to 15 years to generate greater savings and further pollution reductions.

The key issues to consider in setting new standards are the technologies available and the timeframe for moving forward. The July report provided there is some guidance on these issues, we certainly urge this Committee to look at other reports; for example, one issued by the Union of Concerned Scientists "Drilling in Detroit," as well as reports by the American Council for an Energy Efficient Economy, and by MIT.

All of these studies look at a broader range of technologies beyond the primarily drive-train-related technologies looked at in the NAS report. Better engines, better transmissions, integrated starter generators, better tires, better aerodynamics and appropriate weight reductions all combined can improve fuel economy. And again, I would refer, as Representative Boehlert did, to the *Automotive News* image right up there which lists all of these technologies that can be used over the next 5 years to improve fuel economy, and these technologies are cost-effective.

Consumers will save far more than the cost of these technologies at the gas pump. As for timeframe, we need to ensure that fuel economy standards ramp up over the next 10 years. We cannot wait for another 10 or 15 years to see further backsliding.

I think the NAS report identifies the ranges of fuel economies but does not say what can happen in the short term. And I would refer to Ford's pledge to improve the fuel economy of their SUVs by 25 percent and other auto manufacturers following suit as an example that the auto manufacturers can move forward in the short term with technology. Further, I think history does show that when the industry is given a target, they can meet that target with technology. Eighty-five percent of the fuel economy improvements we saw from the existing CAFE standards came from technology.

We would agree that the CAFE system is not perfect, but before looking at reforming it, again it is important to recognize that the NAS says it worked. The two major reforms the Sierra Club would support are closing the light truck loophole that has been discussed by both Senators Feinstein, Snowe, and Representative Boehlert. And again, we would also support, strongly support, phasing out the dual fuel vehicle program. Each of these programs substantially increases gasoline consumption. I would be happy to discuss those further when time permits.

The Sierra Club strongly agrees with the National Academy of Sciences that we can move forward to improve fuel economy safely using technology and putting technology to work. We would also agree to the point you raised earlier that we need to deal with the testing system now in place that does not accurately reflect what is going on in the real world when it comes to fuel economy. So we would like to see reforms in that program as well.

Last, I would like to make a quick point about global warming. As you pointed out, this is a very serious issue that we need to address. One of the important benefits we can get from raising fuel economy standards is reducing global warming pollution. It is the biggest single step we can take to curb global warming. As I have mentioned, American cars and light trucks spew out 20 percent of our carbon dioxide pollution. That is more than only four other countries in the world emit. The U.S. has failed to act domestically to substantially reduce our emissions and we have abandoned our role in the international process, but that does not mean we should abandon our obligation to reduce our emissions domestically. We have 4 percent of the world's population. We emit 25 percent of the world's CO_2.

In conclusion, the Sierra Club would urge this Committee to raise CAFE standards to 40 miles per gallon over the next 10 years. This new standard would ensure substantial oil savings for the Nation. It will help reduce our dependence on oil. It will slash CO_2 pollution and it will save consumers billions of dollars at the gas pump. National energy legislation must include oil savings and there are no other policy option that will do what new CAFE standards can. Thank you very much.

[The prepared statement of Ms. Mesnikoff follows:]

PREPARED STATEMENT OF ANN R. MESNIKOFF, WASHINGTON REPRESENTATIVE, SIERRA CLUB GLOBAL WARMING AND ENERGY PROGRAM

Introduction

Thank you Mr. Chairman and members of the Committee for the opportunity to testify today on behalf of Sierra Club's more than 700,000 members nationwide on the issue of automobile fuel economy standards.

It has been a little more than one year since I represented the Sierra Club at a hearing on solutions to global warming. Much has changed since this last testimony in support of raising Corporate Average Fuel Economy (CAFE) standards. The national debate on energy policy is now focused on energy security, and the issue of oil dependence is central to that debate. The tragedy of September 11 heightens the need to act now to raise fuel economy standards for cars, SUVs and other light trucks. The biggest single step the U.S. can take to save oil is to raise CAFE standards. Strong new standards will save millions of barrels of oil every day—more than we import from the Persian Gulf—and will keep billions of dollars in the economy as consumers save money at the pump. In addition, they will slash CO_2 emissions that cause global warming.

As this Committee develops new CAFE standards to be included in comprehensive energy legislation, it has the opportunity to ensure real oil savings for the nation. In determining appropriate new standards and possible reforms to the CAFE system, the Sierra Club urges the Senate to review the National Academy of Sciences CAFE Report issued on July 31, 2001. This Report says we can move forward to raise fuel economy and that the technologies already exist to meet new standards safely. In addition, the Committee should consider other studies on the issue, including the Union of Concerned Scientists' (UCS) report, "Drilling in Detroit," that look at a broader range of technologies for improving fuel economy. We can and must have new standards. The Sierra Club urges the Senate to ensure that new standards take full advantage of fuel-saving technologies in an appropriate timeframe.

Energy Security: Raising Cafe Standards to 40 Miles Per Gallon

The Sierra Club believes that raising CAFE standards is an essential part of a balanced and responsible energy plan. Cars and light trucks guzzle 8 million barrels of oil every day—40 percent of the oil used in the U.S. every day—and emit 20 percent of U.S. CO_2 that causes global warming. The U.S. now imports 55 percent of the oil we use, a level projected to rise steeply.

The Sierra Club supports raising CAFE standards to 40 miles per gallon (mpg) over the next 10 years for a unified fleet of cars and light trucks. This new standard is achievable with existing conventional technologies and will lead us toward oil sav-

ings that approach 4 million barrels of oil every day and reduce CO_2 by 600 million tons every year. The Union of Concerned Scientists' "Drilling in Detroit" report provides a blueprint for achieving a 40 mpg standard.

The fuel economy of cars and light trucks peaked in 1987 at 22.1 miles per gallon (mpg) but has dropped to 24 mpg—a 20-year low. Congress set the current 27.5 mpg standard, still in place for cars, in 1975 based on the technology outlook of the 1970s. Automakers met the 27.5 mpg standard in the mid-1980s. The fuel economy standard for light trucks, 20.7 mpg, has stagnated for nearly 20 years. Light trucks, now 50 percent of the new vehicle market (up from 20 percent in 1975), are largely to blame for the decline in overall fuel economy. With the slide in fuel economy comes an increased demand for oil, more global warming pollution, and increased pressure to drill for oil in special places like the Arctic National Wildlife Refuge.

The U.S. has just 3 percent of the world's oil reserves yet consumes 25 percent of the world's oil. We cannot drill our way out of oil dependence, but we can go a long way toward oil independence by making cars and light trucks go further on a gallon of gas. Raising CAFE standards to 40 miles per gallon for cars and light trucks would save far more than the 2.5 million barrels of oil per day we now import from the Persian Gulf. It will also save far more than the estimated 6 months of oil in the Arctic National Wildlife Refuge—oil that would not add to U.S. supplies for 10 years. In contrast, the cumulative oil savings from phasing in a 40 mpg standard over the next 10 years would be nearly 3 billion barrels of oil. By 2012, the daily savings would near 2 million barrels per day, and approach 4 million barrels per day in 2020. If new cars and light trucks averaged 40 miles per gallon, we would save 1,507 gallons of gasoline per second.

Annual consumer savings from a 40 mpg standard would hit $16 billion in 2012 and continue to rise as the efficiency of the fleet continued to improve. The cumulative savings over 10 years would be $45 billion. Each dollar saved at the pump can be invested in the U.S. economy instead of spent on foreign oil. In 2000, Americans spent $186 billion at the gas pump for 121 billion gallons of gasoline. Overall, the U.S. sends $200,000 overseas every minute to pay for oil products. Studies have consistently shown that re-investing the billions of dollars from oil savings will generate jobs economy-wide, including 40,000 new jobs in the auto industry alone.

As outlined in "Drilling Under Detroit," conventional technologies now exist to achieve a 40 mpg standard over 10 years. A combination of better engines, transmissions, aerodynamics, appropriate weight reductions and other technologies can be used to improve the fuel economy of all vehicles, from cars to the largest SUVs.

This is the first time since 1990 that this Committee and the Senate have looked at raising CAFE standards. In 1990 the Senate Commerce Committee adopted and sent to the floor a bill that would have raised the CAFE standard for cars to 40 mpg and for light trucks to 34 by last year. This bill gained the support of 57 Senators. Had these standards passed we would be saving more than a million barrels every day on the way to saving 3 million barrels a day and the cumulative savings over the past past 10 years would have been 1.2 billion barrels.

This Committee and the Senate should act now to raise fuel economy over the next 10 years to 40 mpg—a level that reflects the technologies now available. The country cannot afford another 10 years of backsliding on fuel economy.

The National Academy of Sciences Report on Fuel Economy Standards

On July 31, 2001, the National Academy of Sciences (NAS) released its report, "Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards" [Report]. According to the Report, CAFE standards save nearly 3 million barrels of oil every day and automakers can use technologies to significantly improve fuel economy over the next 10–15 years to generate greater savings.

The 2001 report is the second NAS report on fuel economy in less than 10 years. The 1992 NAS report on CAFE standards, "Automotive Fuel Economy: How Far Should we Go?" focused on identifying achievable levels of fuel economy over the course of the 1990s while meeting existing and pending environmental and safety standards. The 1992 report provided ranges of fuel economy improvements the auto industry could achieve between 1996–2006 from a low range of 30–39 mpg for cars to 26–29 mpg for light trucks and a high range of 33–44 mpg for cars and 29–32 mpg for light trucks. The 1992 Report was closely followed by a 6-year freeze on new fuel economy standards imposed through the Transportation Appropriations bills.

Instead of being well down the road to higher fuel economy for America's cars and light trucks, automakers produced a fleet of new vehicles in 2001 with an average fuel economy of 24 mpg. This is a twenty-year low, according to the Light-Duty Automotive Technology and Fuel Economy Trends Report from 2001.

In light of the debate on national energy security and oil dependence, the 2001 Report must serve as a platform for action on fuel economy.

The 2001 NAS CAFE Report

The NAS Report concludes that CAFE standards save oil. While the auto industry continues to argue that CAFE standards have not worked, the Report finds that the standards save 2.8 million barrels per day, or 43 billion gallons, of oil every year. The Report also identifies the direct connection between oil consumption in cars and light trucks and global warming. The Report's conclusion is clear: reducing both oil consumption and pollution are key reasons to move forward with new standards. The Sierra Club encourages the Committee to consider the NAS study, but also look for guidance from other studies that look at a broader range of strategies and timeframe.

Technologies for Achieving Higher Fuel Economy

The debate about higher CAFE standards has always hinged on quantifying the ability of automakers to redesign their vehicles with improved technology. The question is one of how much improvement can be made in what kind of timeframe. The 2001 NAS Committee's approach to fuel economy was to identify ranges of fuel economy improvements for both cars and trucks while holding acceleration, performance, size, in terms of functional capacity, accessories, amenities, the mix of vehicle types, makes, and models sold constant. The Report focused on a limited set of primarily drive train related technologies. The Report concludes that fuel economy can be safely improved. The Path 2, or mid-range projection in the NAS report is consistent with a 40 mpg standard.

The NAS Report, however, must be viewed in context of other recent studies on the potential for fuel economy improvements that can be made in all classes of vehicles, affordably while improving safety, and retaining utility and performance. In addition to the UCS study, the NAS Report refers to the DeCicco-An-Ross study, prepared for the Energy Foundation and published by American Council for an Energy Efficient Economy, and the Massachusetts Institute of Technology study by Weiss-Haywood-Drake et al. These deserve particular attention for assessing how much car and light truck fuel economy can be improved by looking at a fuller range of technologies. Even *Automotive News* has provided a view of the technologies automakers can employ to improve fuel economy over the next 5 years (Attachment).

Each of these studies comes to nearly identical conclusions on the ability of the auto industry to redesign cars and light trucks using improved conventional technology to achieve a 40 mpg combined standard. For the $1000–$1500 investment—the average cost across all vehicle types—in technology, consumers would save several times that at the gas pump. This level of fuel economy improvement does not include the greater efficiency boost that will come from the use of hybrid gasoline-electric vehicles like the Toyota Prius and Honda Insight now selling in the U.S.

Similar to the NAS Report, the above studies looked at technologies that include: high-efficiency, lightweight, low-friction, precision-controlled gasoline engines; improved transmissions, such as continuous variable timing, depending on vehicle type; integrated starter-generator (ISG) with 42-volt system; and aerodynamic streamlining, reduced tire rolling resistance, and accessory improvements.

These other studies, however, show the fuel economy benefits of mass reduction, particularly from the heavier vehicles in the fleet. Using advanced high-strength lightweight materials and other strategies these vehicles can safely shed weight. Further, improvements in the design of SUVs and other light trucks to make them more compatible with cars will improve overall traffic safety. The NAS Report recognized the benefits of reducing weight, particularly in SUVs, but did not incorporate this strategy in setting fuel economy ranges.

Timeframe for Improving Fuel Economy

New fuel economy standards must be phased in over the next 10 years to ensure progress and begin oil savings in the near-term. While the NAS Report identifies ranges of fuel economy improvements that can be achieved in 10–15 years, it fails to recognize that the automakers can improve fuel economy in the short term. The auto industry itself has pledged to make short-term changes. Ford led the way with its pledge to improve the fuel economy of their SUVs by 25 percent between 2000 and 2005. General Motors and Daimler/Chrysler have also pledged to make fuel economy gains by 2005. While each company's commitment is slightly different, their pledges show that we do not need to wait 10–15 years to see fuel economy rise.

A ramp up in fuel economy standards is essential to steering the auto industry in the direction of incorporating fuel saving technologies into their vehicles. If the automakers are not directed to move forward in the short term, they will continue

to produce gas-guzzlers, locking in high oil demand, and fail to plan ahead for changes.

What is too often lost in this debate is that automakers can and do make changes to their vehicles in short timeframes. For competitive reasons automakers are continuously updating their designs. Every year automakers introduce a host of new products and improvements. An automaker whose market share slips responds with ambitious schedules of redesign and new product announcements. There is no question about the auto industry's capacity and skill to make changes. New fuel economy standards will determine how much of this capacity and skill are applied to reduce oil consumption, save consumers money at the pump, and cut pollution.

Currently, automakers tout changes such as more horsepower, extra seating, and extra comforts. Since CAFE standards for cars have not changed in more than a decade and the light truck standards have stagnated for nearly 20 years, automakers have made substantial changes each year in vehicle attributes other than fuel economy, or eat away possible fuel economy gains with more power. There is no reason why we couldn't see year-to-year improvements to fuel economy under regulatory guidance, as under the original law.

After Congress passed the CAFE law in 1975, new passenger car fuel economy nearly doubled and the combined car plus light truck fleet saw an 82 percent improvement overall. That corresponded to an average 7.5 percent annual rate of increase (from 1974–85). Department of Energy analysis shows that 85 percent of that improvement was technology based. So taking 85 percent of the 7.5 percent annual rate indicates that the industry achieved an average 6.4 percent rate of technical efficiency improvement. During this same period the industry also improved safety through better body structures and other measures and phased in tighter emissions standards as well. Affordability was not compromised and sales started to rebound as the country climbed out of the recession and stagflation that was caused in large measure by the oil shocks.

A new fuel economy goal of 40 mpg over 10 years can be achieved within the industry's normal product upgrade cycles. All that is needed is the guidance to begin applying technology to make steady forward progress. Contrary to industry claims that they cannot make any changes for years to come, minor modifications to existing product plans can be made with the 18 months of lead time required for rules under existing CAFE law. The fuel economy improvements that the industry achieved in the late 1970s when the CAFE law first came into play show that they can act if they are required to do so. New standards will ensure that the industry moves out of the 1980s and into the 21st century.

NAS Recommendations for Reforming the CAFE System

Before the Senate engages in a debate over changing the current CAFE system, it is essential to recognize that CAFE standards have worked. They are the most successful energy savings measure Congress has ever adopted, saving some 3 million barrels of oil every day. And, because CAFE standards save oil they are an essential element in a strategy to reduce U.S. global warming pollution. The current standards keep approximately 600 million tons of carbon dioxide, the primary global warming pollutant, out of the atmosphere.

As the NAS Report confirms, we can effectively raise standards under the current system. According to the Report, the current system yields "much certainty" in the magnitude of fuel economy increases and therefore the oil savings and pollution reductions that follow. The Sierra Club recognizes that the current system, however, is not perfect. The NAS makes several recommendations on reforming CAFE. The Sierra Club would support the following changes to the current system:

Closing the Light Truck Loophole: The Sierra Club strongly supports a reform to the CAFE law that would close the light truck loophole. SUVs, minivans and pickup trucks are all considered light trucks. The NAS Report finds that closing the light truck loophole would provide more certainty of the magnitude of oil savings from the fuel economy increase than even the current system provides. The NAS found that "the car/truck distinction has been stretched well beyond the original purpose." The "poster" vehicle to make this case is the PT Cruiser. For fuel economy purposes this 4-passenger vehicle that cannot tow a trailer is a light truck (EPA considers it a car for emissions purposes). Automakers are producing vehicles that are used as passenger cars, but escape the more stringent car standard. Cars and light trucks should be combined into a single fleet of passenger vehicles.

The fuel economy standard for light trucks, 20.7 mpg, has stagnated for nearly 20 years. The market share of these vehicles, however, has jumped from 20 percent in the 1970s to nearly 50 percent of new vehicle sales in 2000. As a result, these vehicles are driving demand for oil to an all time high, and driving up emissions of global warming pollution. As of last year, the explosive growth in light truck sales

had already brought the average fuel economy of all the nation's new vehicles to its lowest point since 1980, according to EPA's 1999 Fuel Economy Trends Report. Light trucks alone spew more than half a billion tons of CO_2 into the atmosphere each year.

The Sierra Club has documented the importance of addressing the issue of SUV fuel economy in a report entitled "Driving up the Heat: SUVs and Global Warming." (Attachment 2) In this report, we educate the public about how much energy is being wasted by today's SUVs. For example, switching from an average new car to a 13 mpg SUV wastes more energy than leaving a refrigerator door open for 6 years. Further, while a 13-mile-per-gallon SUV emits more than 130 tons of carbon dioxide over its lifetime, the average new car emits 74 tons. A new Honda Insight will emit only 27 tons.

The technology is available to ensure that tomorrow's SUVs are more efficient, and therefore pollute less. According to the Union of Concerned Scientists, the best-selling Ford Explorer, which gets only 19 mpg, could be a 34 mpg vehicle by putting today's technology to work. The cost of the technology is made back by the consumer in just a few years from savings at the gas pump.

The Sierra Club applauds Senators Feinstein and Snowe for taking their leadership in introducing S. 804, The Automobile Fuel Economy Act of 2001. This bill would close the light truck loophole by requiring light trucks to meet the 27.5 mpg current passenger car standard by 2007 and then combine the passenger car and light truck fleets. S. 804 also takes the additional step of bringing the heaviest SUVs, those weighing between 8,500 and 10,000 pounds, into the CAFE program. As the program is now administered, CAFE standards only apply to vehicles up to 8,500 pounds. This weight cutoff has encouraged manufacturers to increase the weight of their largest SUVs in order to remove them from the CAFE system. Some Chevy Suburbans and the Ford Excursion are examples of vehicles sold as passenger cars that are exempt from CAFE standards. S. 804 is a critical first step in moving forward with new fuel economy standards.

Reforming the Gas Guzzler Tax: The Sierra Club agrees with the NAS Report's criticism of the Gas Guzzler Tax that it does not include light trucks. The Sierra Club does not, however, agree with the remedy in the Report of reducing or eliminating the Tax. The Gas Guzzler Tax applies to cars with a fuel economy below 22.5 mpg. The Tax appears on the stickers of new cars and serves to highlight that a vehicle's fuel economy is substantially lower than the 27.5 mpg average. Because the Tax does not apply to light trucks, the Report concludes that this creates an incentive to classify vehicles as light trucks that might otherwise be subject to the tax as cars. To remedy this problem, the Gas Guzzler Tax should be applied to light trucks. A similar structure for light trucks would add a cost to light trucks associated with poor fuel economy and create an incentive for manufacturers to improve light truck fuel economy. The Tax could also be applied to a combined fleet of cars and light trucks.

Ending the Dual Fuel Vehicle Program: The Sierra Club strongly supports ending the dual fuel vehicle program. This program rewards automakers with credits toward meeting CAFE standards for producing vehicles that can, but in fact rarely do, run on alternative fuel. While this program was intended to increase use of alternative fuels by cars and light trucks, the auto industry has turned this program into an enormous loophole, exploiting it to help them meet CAFE standards. Under the existing law, automakers can now use a 1.2 mpg credit toward meeting CAFE standards and the program can be extended at a lower 0.9 mpg level after 2004. The NAS Report recognizes that this program does not generate benefits and should be eliminated.

The NAS points to the Energy Information Administration analysis, which shows that less than 1 percent of the fuel used in these vehicles is ethanol. Out of the 176,000 gas stations across the nation, only 101 offer the alternative fuel. Despite this fact, manufacturers are getting much needed help in meeting the standards. Currently, Ford Motor Company applies a 0.7 mpg credit toward meeting the 20.7 mpg standard for light trucks and Daimler/Chyrsler uses a .95 mpg credit. General Motors now uses the least amount of credits, .35 mpg, but is ramping up production of dual-fuel Yukons, Tahoes and Suburbans—vehicles that will drive up demand for gasoline.

A Department of Transportation (DOT) analysis, as reported in *The New York Times* on June 21, 2001, shows that the dual-fuel vehicle program actually increases gasoline consumption. According to the DOT report, the program increased gasoline consumption by 473 million gallons in 2000 because manufacturers can sell more gas-guzzlers. The Report is currently at DOT awaiting final decision on extending the program. Continuing the program will further increase consumption and pollution. This program should be phased-out.

Feebates: The Sierra Club would support a feebate system implemented as a compliment to the current CAFE system. Structured properly, a feebate system would provide consumers with incentives to buy more efficient vehicles while costing consumers for buying less efficient vehicles. This would be a revenue neutral program.

Truth in Testing: The Report does not recommend reforming the system now in place for testing vehicles to determine each vehicle's fuel economy for CAFE purposes. The Sierra Club would strongly support this step.

Under the current testing program, vehicles are given a fuel economy value that is 15–20 percent above their real world performance. These inflated values are what the Department of Transportation uses to determine the average fuel economy of each manufacturer's fleet and whether that manufacturer is meeting, exceeding or below the 27.5 mpg standard for cars or the 20.7 mpg standard for light trucks. According to the DOT, the average fuel economy of new cars and light trucks sold in 2000 was 24 mpg, but in fact it is about 15–20 percent below that. Testing reform would require manufacturers to actually meet the standards now in place. Even this modest step would yield oil savings and pollution reductions.

The Sierra Club opposes the following changes to the fuel economy system:

Tradable Fuel Economy Credits: The Sierra Club would strongly oppose a system that would allow manufacturers to trade fuel economy credits. Even the NAS Report finds that this system would provide less certainty of fuel economy increases than the current system. The trading program suggested in the Report recommends a "safety valve" if the cost of fuel economy credits were to rise above a pre-determined level. This type of system would ensure manufacturers that the costs of non-compliance would be limited by the availability of credits from the government. This would weaken the system.

The automakers have proven adept at gaming the current credit program under which a manufacturer essentially trades credits with itself to meet the current standards. Automakers can apply credits from future years to meet the standard in any given year, or borrow from a past year if they exceeded the standard. Despite years of not meeting the standards, as reported in both *BusinessWeek* and *The Detroit News* (4), automakers have not been fined under the CAFE law. The credit system has become a smokescreen which the industry successfully exploits and hides behind. Expanding it will provide more opportunities for gaming and deception.

Under a trading regime the benefits of oil savings and pollution reductions afforded by the fuel economy leader (i.e. Honda) would be lost because those credits would be sold to a fuel economy laggard.

The Report's support for a CAFE trading scheme is in part based on the panel's belief that the trading program now in place to reduce sulfur emissions from power plants has been "highly successful." Under the sulfur trading scheme, however, little of the reductions are attributable to trading but rather resulted from falling rail prices to bring low-sulfur coal to power plants. With the technologies now available to all manufacturers to cost-effectively meet higher standards, a trading system would not provide the certainty the current system provides.

Attribute-Based Targets: The Sierra Club would oppose a reform that would base fuel economy standards on vehicle weight or other attributes. The Report describes a system in which vehicles less than a selected weight, such as 4,000 pounds, would be subject to a fuel economy target determined for by weight. Vehicles above that weight would be required to meet a set standard similar to the current program.

Under a weight-based program, manufacturers would be given an incentive to add enough weight to a vehicle to move it into the heavier class where it might meet or exceed the standard set for that weight without having to apply fuel saving technologies.

The Dingell-Tauzin Provision in H.R. 4

The House of Representatives took up the issue of fuel economy as part of their energy bill. The House approach to updating fuel economy standards is severely flawed. The bill the House passed on August 2, 2001, H.R. 4, contains a provision which Representatives Dingell and Tauzin crafted. The Dingell-Tauzin provision directs the Department of Transportation to set new standards for light trucks—SUVs, minivans and pickup trucks—at a level that will save at least 5 billion gallons of gasoline between model years 2004 and 2010. Five billion gallons of oil amounts to a savings of less than one day's worth of oil per year and can be achieved by increasing light truck fuel economy by less than 1 mpg. The *Automotive News* described the Dingell-Tauzin provision as a "smokescreen." The Dingell-Tauzin provision in H.R. 4 also extends the dual-fuel vehicle credit program at the 1.2 mpg level, instead of the 0.9 mpg level that the program could be extended at under existing law. Because of the impact of the extended dual-fuel vehicle program in

H.R. 4 it is questionable whether the House provision would actually yield any oil savings.

The Dingell-Tauzin provision could also be construed to weaken the current CAFE law by focusing on achieving a minimal oil savings rather than meeting the four requirements for new standards contained in the law: technological feasibility, cost effectiveness, other standards, and the need of the Nation to conserve oil.

The Senate should reject the House approach. But, the Senate must factor it into the Senate's approach to updating fuel economy standards. Any Senate action on fuel economy must take into account the weakness of the House provision as well as the fact that a Senate provision will be conferenced with the House and runs the risk of being weakened.

Fuel Economy and Safety

Fuel economy can be increased safely while continuing to provide consumers with a full range of vehicles. The auto industry met existing CAFE requirements while providing consumers with a full range of cars and light trucks. In fact, when Congress passed the CAFE law, America had the industrialized world's least efficient fleet of vehicles. The CAFE law spurred the development of technology and improved the competitiveness of our auto industry. Eighty-five percent of efficiency improvements came from technologies such as more efficient engines and transmissions, and better aerodynamics.

History shows that the rate of traffic fatalities decreased by 50 percent over the same time that fuel economy doubled under the existing standards. Yet, the auto industry has consistently opposed the CAFE law using a flawed size/safety argument. In 1974, Helen Petrauskas, a Ford representative, argued before Congress that CAFE would result in a "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." Of course, this dire prediction proved to be untrue. The NAS report concludes that "CAFE regulations have not impeded the implementation of safety regulations, and safety regulations have not prevented manufacturers from achieving their CAFE requirements." (p. 2–16).

The Sierra Club agrees with the recent NAS Report that we can move forward to safely achieve fuel economy improvements, however, the Sierra Club strongly disagrees with the Report's conclusions about the safety impact of the current standards. The August 2000 Government Accounting Office report, "Automobile Fuel Economy: Potential Effects of Increasing Corporate Average Fuel Economy Standards," came to a similar conclusion about moving forward safely. The Government Accounting Office report notes that safety experts and automakers agree that "as long as there is sufficient lead time to meet higher CAFE standards, auto manufacturers could use fuel-saving technologies (such as continuously variable transmissions or lean burn engines) instead of simply building smaller, lighter cars." David Greene and Maryann Keller's analysis (included as the dissent to the NAS Report) of the safety issue reveals that conclusions regarding the relationship of fuel economy and highway safety looking back over time are flawed.

In the safety debate, it is important to understand that design, not size alone determines safety. Many smaller vehicles outperform many larger cars and SUVs, proving that automakers make safe and unsafe cars of all sizes. Small cars are excelling in crash tests. The 2-door Honda Civic scores five stars on each element of the government's crash tests. The car weighs 2,502 pounds. The Volkswagen Beetle also performed extremely well in government and Insurance Institute of Highway Safety tests. In a standard head-on barrier crash test, the driver of a 1997 Saturn subcompact will fare better than the driver in a 1997 Ford Expedition. In addition, SUVs perform poorly in rollover tests, many scoring only two stars.

The fact that each of the Big 3 has pledged to make fuel economy improvements in the light truck sector between 2000 and 2005, and that GM have pledged to improve SUV fuel economy by 25 percent over 5 years, is evidence that they can move forward safely. These pledges were not simply to downweight their SUVs to achieve fuel economy gains, although in the case of SUVs, lighter vehicles would help to restore some balance to the fleet.

Research by both the Center for Auto Safety on cars, and by the Union of Concerned Scientists on SUVs, demonstrates that higher fuel economy standards can be achieved using existing technologies, while also reducing occupant deaths and injuries without altering the vehicle mix. The Union of Concerned Scientists' "Drilling in Detroit," fully analyzes the fuel economy and safety connection and concludes that the standards have not and do not impinge on safety. Cost-effective technologies such as improved engines and transmissions and new materials are the keys to achieving higher fuel economy in both cars and light trucks. Appropriate weight-reductions, focused on the heaviest light trucks, will further improve vehicle

safety. These technologies will also help the American automotive industry face an increasingly competitive future. Further, roof crush and rollover standards and improving car/truck crash compatibility will improve vehicle safety.

The current system of separate standards for cars and trucks, which has allowed manufacturers to move heavily into SUV production, compromises traffic safety. Light trucks pose safety dangers to their owners and occupants. SUVs are four times more likely to roll over in an accident. Rollovers account for 62 percent of SUV deaths, but only 22 percent in cars. Yet automakers fought new standards protecting occupants in rollover accidents. According to a study by the National Crash Analysis Center, an organization funded by both the government and the auto industry, occupants of an SUV are just as likely as occupants of a car to die once the vehicle is involved in an accident. This is in part because of their higher rollover rates. National Highway Traffic Safety Administration (NHTSA) tests announced in July 1999, as reported in the *New York Times* (July 15, 1999) showed that the rollover issue is a major problem for light trucks:

"Because it is taller, heavier and more rigid, an SUV or a pickup is more than twice as likely as a car to kill the driver of the other vehicle in a collision. Yet partly because these so-called light trucks roll over so often, their occupants have roughly the same chance as car occupants of dying in a crash." Keith Bradsher, *The New York Times*, "Light Trucks Prone to Tip, Safety Tests Find," July 15, 1999.

Light trucks, particularly heavy SUVs and pickups, are fundamentally incompatible with cars on the road. According to the NHTSA, collisions between cars and light trucks account for more than half of all fatalities in crashes between light duty vehicles. Nearly 60 percent of all fatalities in light vehicle side impacts occur when the striking vehicle is a light truck. SUVs are nearly three times as likely to kill drivers of other vehicles during collisions than are cars. Finally, these vehicles pose excessive risks to pedestrians because of their design, weight and historically weaker brake standards. The same technologies that will help to improve light truck fuel economy can help to improve their safety.

Even Ford has identified these problems. In its "Connecting with Society" report, Ford noted that "SUVs can raise safety concerns for drivers and passengers in other vehicles because of the height, weight and design differences between cars and SUVs, as well as the reduced visibility for cars in traffic with trucks of any sort."

The NAS Report recognizes that weight reductions in the heaviest vehicles can improve overall vehicle safety by creating greater compatibility between vehicles on the road. According the K.G. Duleep, who served as a consultant to the NAS Committee, had the NAS incorporated appropriate weight reductions into the ranges of possible fuel economy improvements, these would have been greater by 20 percent than the mostly drivetrain related fuel economy improvements. Further safety improvements such as reducing differences in bumper height, stiffness and weight would save thousands of lives each year. Finally, instead of resisting fuel economy standards, automakers should be implementing safety improvements such as better seat belts, stronger roofs and crash avoidance.

Global Warming

The biggest single step the U.S. could take to curb global warming is to raise fuel economy standards for cars and light trucks. America's cars and light trucks alone spew out 20 percent of U.S. global warming pollution. As the NAS Report points out this amounts to 5 percent of global carbon dioxide pollution. This is true despite the fact the U.S. has less than 4 percent of world population. The impact of cars and light trucks on global warming is enormous. Ford Motor Company alone—production and vehicles—would be the 10th largest emitter in the world. As the world's leading polluter, the need for the U.S. to take action to reduce global warming pollution is pressing. By saving oil as part of national energy goals, a 40 mpg standard would yield significant cuts in CO_2.

The most recent projections of the United Nations-sponsored Intergovernmental Panel on Climate Change (IPCC) are that the Earth's temperature will rise as much as 10.4 degrees F by 2100 and concluded that man-made global warming pollution has "contributed substantially to the observed warming over the last 50 years." By comparison, the Earth is only 5 to 9 degrees Fahrenheit warmer today than it was 10,000 years ago, during the last ice age. Throughout history, major shifts in temperature have occurred at a rate of a few degrees over thousands of years. They were accompanied by radical changes, including the extinction of many species. Human-induced global warming is occurring much faster; faster in fact than at any other time in human history. Unless we slow and ultimately reverse the buildup of greenhouse gases, we will have only decades, not millennia, to confront major changes in weather patterns, sea levels, and serious threats to human health.

The U.S. has failed to act domestically to reduce global warming pollution and abandoned the international process. The Senate should consider raising fuel economy standards for cars and light trucks as a key part of a strategy to reduce U.S. global warming pollution. Taking this step will show the world that the U.S. is taking action and will be a leader in curbing this enormous environmental threat.

Public Support for Raising Fuel Economy Standards

Historically, overwhelming majorities of Americans support raising CAFE standards for automobiles. A recent poll of labor union households showed that 61 percent of these voters endorsed a statement that "increasing fuel efficiency is the single most effective action that could reduce national dependence on foreign oil. A Gallup poll conducted in November had 77 percent of Americans supporting raising vehicle efficiency.

Polling conducted during the spring, at the height of the debate over whether the Nation was experiencing an energy "crisis" showed strong support for CAFE. A CBS/New York Times poll released in June revealed that 81 percent of Americans "Approve of the government requiring car manufacturers to meet higher fuel efficiency standards than they do now?" And 66 percent supported higher standards if it would increase the cost of the car (66 percent GOP and 70 percent Dem). Similarly, an ABC/Washington Post poll also released in June showed that 81 percent of Americans strongly support more fuel efficient vehicles.

An August 1999 World Wildlife Fund poll of light truck owners showed that 73 percent believed light trucks should be cleaner, and two-thirds would pay significantly more for their next truck if it polluted less. Significantly, 70 percent believed automakers will not clean up their trucks if they are not required to do so. Another August 1999 poll, by Zogby International, of predominately Independent and Republican voters in New Hampshire revealed that 75 percent favor increasing fuel economy to address global warming, even at an extra cost of $300.

The results of these polls are consistent with polls dating back to the early 1990s. A 1991 poll conducted for the Union of Concerned Scientists demonstrated overwhelming public support, exceeding 80 percent, for requiring 40 to 45 miles per gallon fuel economy standards.

Conclusion

A 40 mile per gallon fuel economy standard for cars and trucks is a critical component of energy legislation. New standards are the key to delivering the oil savings necessary to reducing our dependence on oil. Given a 10-year timeframe with appropriate interim goals, automakers could achieve a 40 mpg standard with technologies now available. Hybrid gasoline-electric systems, now in use in Toyota's Prius and Honda's Insight, could also be used to move fuel economy forward.

As this Committee crafts an approach to updating fuel economy standards and possible reforms to the current CAFE system, the Sierra Club urges this Committee to consider the fact that CAFE standards have been enormously successful at saving oil and reducing global warming pollution. Further, the current system affords certainty in the amount of oil savings new standards could achieve. The Sierra Club would support appropriate reforms to the CAFE system, such as closing the light truck loophole, ending the dual-fuel vehicle program, and truth-in-testing.

There is no other policy option that will lock in the oil savings that new CAFE standards can. Savings that near 2 million barrels of oil per day in 2012 and ramp up to 4 million barrels will put the U.S. on the road toward oil independence. While the CAFE system could use some reforms, such as closing the light truck loophole and ending the dual-fuel vehicle program and truth-in-testing, new standards would work. The auto industry will strongly oppose new standards. For example, General Motors claims that even a 3 mpg increase in light truck fuel economy could force them to eliminate their larger and most profitable SUVs—assuming the company chose this course of action to meet the higher standard. Yet, GM has announced that its new engine for these vehicles will improve their fuel economy by 2 mpg. The industry has better engines and other technologies, but without new fuel economy goals we will not see progress. No one is asking that the industry make 34 mpg SUVs tomorrow or next week, but we cannot afford to let the auto industry continue to drag fuel economy down. The consequences of oil dependence on our national security, economy and environment are too great.

The Sierra Club urges this Committee to support a 40 mile per gallon CAFE standard as a key part of responsible national energy legislation.

[From Automotive News, Oct. 8, 2001]

EXCERPTS ON NEW TECHNOLOGIES

SUPPLY AND DEMAND: PARTS BUILDERS ONCE SERVED AS ORDER TAKERS.

NOW, CAR COMPANIES ARE SPURRING SUPPLIERS TO CREATE FULL MENUS OF NEW TECHNOLOGY

(By Richard Truett)

• *Drive-by-wire:* The Chevrolet Corvette and Lexus LS 430 are two of a growing number of cars with electronically controlled throttles that rely on sensors and computers, not cables, to change engine speed. Drive-by-wire technology will help enable such advances as cylinder deactivation, variable compression and electronically controlled valves.

• *Steer-by-wire:* Automakers and suppliers have started down the road toward replacing the mechanical connection between the driver and the front wheels. Electronic power steering increases fuel economy by as much as 5 percent.

• *Brake-by-wire:* Today virtually all automobile brakes are hydraulic, using a master cylinder and a series of pipes to deliver hydraulic pressure to each wheel. But a number of technical hurdles have to be overcome before brakes go fully electronic. Engineers must first perfect the 42-volt electric systems that are needed to power the energy-intensive electric brakes. Then they have to design an electromechanical brake caliper that fits into the small area inside the wheel.

In the meantime electrohydraulic brakes, scheduled to appear next spring for the first time on the 2003 Mercedes-Benz SL roadster, use an electronically powered master cylinder that determines the correct braking pressure for each wheel. Fully electronic brakes could be on the road by 2005.

• *Diesel technology:* Big advances have been made in diesel technology in the last 5 years. The diesel is no longer the smelly, smoky, chattering engine most Americans remember from the 1970s, when GM rushed hastily designed versions onto the market in response to a sharp drop in the supply of imported oil.

• *Common-rail injection:* In which diesel fuel is injected into the cylinders under very high pressure, combined with advanced turbocharging and more efficient combustion chamber design has enabled lean-burning diesels to run smoother, quieter and cleaner. Fuel economy on some cars, such as the subcompact Volkswagen Lupo and Audi A2 sold in Europe, deliver highway fuel economy of around 90 mpg.

Another promising technology is direct injection, in which diesel fuel is blasted straight into the cylinders under high pressure and in a target area for more complete combustion.

• *Starter-generators:* The integrated starter-generator, first used on hybrids such as the Honda Insight and Toyota Prius, is a fuel-saving and pollution-cutting device that combines the starter and alternator in one unit.

• *42-volt systems:* It's going to take a lot of juice to power the cornucopia of electronic gizmos, such us integrated starter-generators and by-wire technology, and today's 12-volt systems—in use since the mid-1950s—can't keep up. Starting in the 2004 model year, 42-volt batteries and alternators will provide the power.

• *Cylinder deactivation:* Cadillac had a good idea back in the early 1980s for variable-cylinder operation, but lacked the technology to make it work. The technical problems with Cadillac's V–8–6–4 engine sullied the image of the concept.

• *Continuously variable transmissions:* The no-shift transmission, used by Subaru in the early 1990s, is returning. Honda offers it on the Civic and has added it to the Insight. Audi and Saturn will use the gearbox on the A4 sedan and Vue sport-utility. The chief advantage of a continuously variable transmission is that it enables the engine to run at peak efficiency during acceleration, which results in fuel economy gains of between 5 percent and 10 percent. The limitation is the transmissions are unreliable when engine torque is greater than 200 pounds-feet, which makes it ideal for small- and medium-sized cars, but not light trucks.

• *Clutchless manual transmissions:* Instead of the driver engaging the clutch, it's done either electronically or hydraulically while the driver changes gears by pressing a button or moving a shift lever.

• *Fuel cells:* This technology has the potential to change everything. If engineers and scientists can adapt the clean energy-creating system to the automobile, the internal combustion engine will be history in most vehicles; automotive pollution will be practically nonexistent; and the country's dependence of imported oil will be diminished.

• *Active suspension:* By continually adjusting the firmness of the shock absorbers, through a process called variable damping, drivers can better manage a car as it

rounds a corner or curve. This is accomplished in a number of ways. A less complex system debuting on the 2002 Cadillac Seville STS uses shocks filled with silicon fluid that contains minute metal filings. When a magnetic field is applied to the shock, the fluid becomes much thicker, which increases the firmness of the shock.

• *Tire pressure monitoring devices:* A 2000 law, passed in response to the massive Ford-Firestone tire controversy, requires that all 2004 model-year vehicles must have systems to monitor tire pressure. General Motors will introduce rear-wheel steering on its full-sized pickups in 2002. The system, created by Delphi, reduces the turning radius from the current 44 feet to about 37 feet—about the same as that of a mid-sized sedan.

Chevrolet's Duramax V–8 diesel is the first U.S. truck engine that uses common-rail direct fuel injection, which makes it run smoother and quieter than previous diesels.

Electric power steering from Delphi eliminates the power steering pump and all hydraulic lines. It's the first step toward steer-by-wire.

Continuously variable transmissions keep engines running at peak efficiency and improve fuel economy 5 percent to 10 percent.

Electronically controlled valve lifters, shown at left detached from the valve cover, turn off unneeded cylinders to save fuel in Delphi's cylinder deactivation system.

Lord Corp.'s electronic shock absorbers, part of an active suspension system, will make vehicles handle more predictably on curves and rough roads.

GM Plugs Into Electric Steering

(By Richard Truett)

DETROIT.—General Motors is set to begin high-volume production later this year of vehicles equipped with electric power steering systems, the largest commitment so far to a new technology that eventually will become commonplace.

GM plans to install the new 12-volt steering system in several high-volume vehicle lines in the next few years, starting this fall with the 2002 Saturn Vue sport-utility. Electric power steering also is slated for the replacements for the Chevrolet Malibu and Pontiac Grand Am, due in the 2004 model year.

The Latest Cool Thing: Carbon Dioxide

(By Amy Wilson)

Carbon dioxide, long considered a culprit in the global warming debate, is being touted as a remedy for the ozone-depleting flaws of current auto air conditioning systems.

A decade ago, automakers and suppliers redesigned air conditioning systems to switch from chlorofluorocarbon-laded R12 refrigerant, which damaged the ozone layer, to the more environmentally friendly R134a refrigerant.

But while the new refrigerant did not do as much damage as R12, commonly known by the trade name Freon, it, too, could damage the atmosphere if released. This forced auto suppliers to redesign air conditioning sytems with new hoses and couplings to reduce leakage. Now suppliers are promoting a refrigerant that drastically lowers greenhouse gas emissions, improves system performance and could boost fuel economy.

What promises to deliver such benefits? Ironically, a substance closely associated with global warming and the greenhouse gas effect: carbon dioxide.

Compressing the naturally occurring gas into a refrigerant to replace today's R134a will not put additional CO_2 back into the atmosphere, backers of the new technology say. But suppliers still have to prove its cooling power and affordability to customers.

Additive May Clean Diesel; Group Studies Whether Ammonia Cuts Emissions; Distribution Could Prove Problematic

(By Richard Truett)

ONTARIO, Calif.—The Big 3 and diesel engine makers Caterpillar, Detroit Diesel and Cummins have formed a team to explore the use of urea, an ammonia-water solution, to reduce diesel engine emissions.

The technology, if made production-ready, would give automakers another fuel-efficient powertrain option for the U.S. market. Strict limits on particulates and oxides of nitrogen, or NOx, set by California for 2007 are cited by automakers as one

of the primary obstacles to using diesels in cars and light trucks. Diesels can improve fuel economy by up to 30 percent compared with gasoline engines. They also offer a quicker and less expensive alternative to gasoline-electric hybrids.

[March 26, 2001]

CHEAPER CATALYST DEBUTS WITH HONDA VAN

(By Richard Truett)

A new technology for catalytic converters enables automakers to save up to $200 per converter and helps insulate them from the volatile price swings of precious metals such as platinum.

Honda Motor Co. Ltd. will be the first to use the less-expensive catalytic converter, on a small Japan-market van named the StepWGN, in April.

Delphi Automotive Systems Corp., the world's largest auto supplier, says it will produce a similar converter in 2002 for a U.S. vehicle. The catalytic converter is one of the most expensive parts of a vehicle. The high-temperature device cleans the exhaust of carbon monoxide and other gases through chemical reactions.

At the heart of catalytic converters are expensive platinum group metals—platinum, palladium or rhodium. The metals are expensive because supplies are found in remote areas of the world or in politically unstable countries, such as Russia, which makes it hard to guarantee a steady supply.

Honda worked with Catalytic Solutions Inc., a small company in Oxnard, Calif., to develop an internal coating for the converter that cuts the use of precious metals by as much as 70 percent. Honda owns 10 percent of Catalytic Solutions.

[March 12, 2001]

SAE GIZMO GURUS SHOW OFF SMART PARTS

(By Richard Truett)

The exposition at the SAE World Congress is a cornucopia of automotive engineering. Products run the gamut from plastic connectors and grommets to integrated starter alternators.

The annual trade show, held last week in Detroit, also is a place for companies to entice auto engineers with technologies and devices that push the envelope in performance or convenience. Here are things that caught our eye this year while prowling the exposition:

1. Built-in beverage heating and cooling systems should be optional on some domestic and imported sport-utilities starting in 2002, said Charles Cauchy, president of Tellurex Corp. of Traverse City, Mich. The company uses a thermoelectric semiconductor to generate temperatures ranging from 38 degrees to 120 degrees. The low-voltage semiconductor is mounted underneath the vehicle's console and conducts heat or cold by transfer to a metal plate or by a small electric fan. A center console for a Lincoln Navigator, for instance, could hold a six-pack of soda and keep it as cold as a refrigerator. The price to consumers is expected to be between $120 and $150.

2. NGK aims to outdistance its competitors with a line of Iridium IX spark plugs. The gold-colored spark plug, which retails for $15, is designed to reduce emissions, increase fuel economy and last longer than 100,000-mile platinum-tipped spark plugs. NGK officials say iridium is harder than platinum and provides a better spark for more thorough fuel burning in the combustion chamber.

3. The SmartBar from American Axle and Manufacturing Holdings Inc. enhances the handling performance of sport-utilities and off-road trucks by electronically sliding a metal collar that breaks the connection between the left and right sides of the sway bar. The system can be used on both front and rear sway bars. Uncoupling the sway bar lets each wheel move over bumps independently without causing a rocking motion in the vehicle body. The SmartBar debuts on the Hummer H2, which will be built on General Motors' full-sized truck platform. It is expected in late 2002.

4. Even the least expensive Hyundai and Kia models have highly polished and classy looking taillight lenses. They are not so much for safety purposes as for styling. The designs molded into the plastic are called reflexes. They not only reflect light but also make a design statement. Starting with the 2002 Ford Explorer, reflexes will get larger and more ornate, said Michael Beale of DBM Reflex in Tecumseh, Ontario.

5. If diesel engines find their way back into light vehicles in the United States, they likely will need to be equipped with a particulate matter filter, such as the Metalit from German catalyst supplier Emitec. The Metalit uses layers of perforated metal to trap the soot in the exhaust created by the combustion of diesel fuel. A supply of nitrogen dioxide from an earlier catalyst sets up a chemical reaction in the Metalit that heats it up, burning away the trapped soot. But for the Metalit system to meet durability requirements, the sulfur content of the diesel fuel must be below 10 parts per million.

DRIVING UP THE HEAT: SUVS AND GLOBAL WARMING

Switching from driving an average car to a 13mpg SUV for one year would waste more energy than if you . . .

Left your refrigerator door open for 6 years
Left your bathroom light burning for 30 years or
Left your color television turned on for 28 years

Background

When it comes to wasting energy, SUVs are unrivaled. Built with outdated, gas-guzzling technology, many SUVs get just 13 miles per gallon. And the higher gas prices are, the more money they waste.

Auto-industry advertising portrays SUVs as the ticket to freedom and the great outdoors. Commercials depict them climbing massive snow-capped mountains or tearing through desert sand dunes, taking their owners into the wild. In reality, the only off-road action many of these vehicles see is accidentally driving through a flower bed next to the driveway.

Missing from these ads are other contributions from SUVs—the brown haze of air pollution hanging over many of our national parks, images of weather disasters linked to global warming or the oil derricks and tankers needed to feed gas-guzzling SUVs. In contrast to Detroit's carefully crafted image, SUVs have a dark side. They spew out 43 percent more global-warming pollution and 47 percent more air pollution than an average car. SUVs are four times more likely than cars to roll over in an accident and three times more likely to kill the occupants in a rollover. They also cost the owner thousands more on gasoline.

WORSENING THE THREAT OF GLOBAL WARMING

Because the government classifies SUVs as "light trucks" rather than cars, SUVs have a license to guzzle more gas and pollute more than cars. In 1975, when fuel-economy standards were first adopted, "light truck" referred to a vehicle used to haul hay on the farm or gravel at a construction site. At that time, light trucks comprised only 20 percent of the vehicle market. Today, SUVs, mini-vans and other light trucks make up nearly half of new vehicles sold. They are far more likely to haul lattes home from Starbucks than lumber from the yard. Even though Detroit has technology that could make them both cleaner and safer, SUVs and other light trucks are still held to low environmental standards, roll over more than cars and pose greater danger to other vehicles than cars do.

The world's leading climate scientists have warned that there is now 30 percent more carbon dioxide—the primary global-warming gas—in the atmosphere than a century ago. The burning of fossil fuels is the primary source of this CO_2 pollution. Over the same period of time, the average surface temperature of the earth has risen more than 1 degree Fahrenheit.

Due to these changes, we are already seeing signs of global warming. The 1990s was the hottest decade on record and the 11 hottest years on record have all occurred in the past 13 years.

Extreme drought conditions and changing rainfall patterns have occurred across the country, setting the stage for wildfires, which decimated areas from Florida to California. Record heat waves have killed hundreds in Chicago and infectious-disease outbreaks linked to global warming have sickened or killed hundreds from Texas to New York, shut down Disney World and re-introduced Americans to dengue fever, malaria and encephalitis. Sea levels have risen between four and 10 inches and glacial ice is rapidly retreating on five continents.

The world's leading scientists warn that over the 21st century, CO_2 levels are expected to double, raising sea levels two feet or more, worsening smog and leaving our children to cope with a more hostile climate.

America's cars and light trucks alone produce nearly 20 percent of U.S. CO_2 pollution. That's more than all but four countries worldwide! And transportation is the

fastest-growing sector of global-warming pollution in the nation. Popular light trucks pump out 237 million tons of global-warming pollution into our atmosphere each year. That's because every gallon of gas burned emits 28 pounds of CO_2 into the atmosphere.

SUVs EMIT MORE AIR POLLUTION THAN CARS

Nearly 117 million Americans live in areas where the air is unhealthy to breathe, according to the American Lung Association. Light trucks, which can spew up to three times more smog-forming pollution than cars, magnify this growing health threat. The increased air pollution can lead to more asthma, bronchitis and other health problems.

U.S. autos emit more CO_2 than all but four countries.

Top 5 Global-Warming Polluters:

1. U.S.
2. China
3. Russia
4. Japan
5. U.S. autos

Air pollution is not exclusively an urban problem. National parks from Maine's Acadia to Virginia's Shenandoah and North Carolina's Great Smokey Mountains all have severe air-pollution problems that match major metropolitan areas. Pollution monitors are now installed at some trailheads in Mt. Rainier National Park to warn hikers when smog reaches unsafe levels.

The U.S. Environmental Protection Agency adopted new "Tier 2" tailpipe pollution standards in 1999 to cut smog (but not CO_2) from cars and SUVs. However, these rules will not go into effect until 2004 and the auto industry has until 2009 to clean up its largest SUVs.

THE MORE YOU GUZZLE, THE MORE YOU POLLUTE

Represented below is the total tonnage of CO_2 produced by SUVs and other vehicles over a 124,000-mile lifetime.

Ford Excursion (13 mpg)
Jeep Grand Cherokee (18 mpg)
Ford Taurus (23 mpg)
Honda Civic HX (36 mpg)
Honda Insight (65 mpg)

SUVs INCREASE OUR OIL ADDICTION, THREATEN OUR WILDERNESS AND COASTS

A hidden cost of SUVs is the price we pay with our natural resources. To keep these gas guzzlers running, oil companies seek to drill in new areas—including some of our nation's most sensitive wilderness habitats. As the number of gas guzzlers on the road grows, so does the pressure to drill in Alaska's Arctic National Wildlife Refuge—one of the last remaining pristine ecosystems. Fragile coastlines in California and Florida, and lands surrounding Yellowstone National Park are also targets for drilling.

The Exxon Valdez disaster serves as a powerful reminder that transporting oil also threatens our environment. Smaller spills and leaks occur daily, putting waterways and wildlife at risk.

Worsening Our Energy Security

Every day America consumes 18 million barrels of oil. We import nearly half of this oil (the same amount guzzled by cars and light trucks) from politically volatile regions. Our oil imports add $50 billion to the U.S. trade deficit annually. Due to the increasing number of gas-guzzling vehicles, America is more dependent on foreign oil now than we were at the height of the 1973 energy crisis.

Congress passed the Corporate Average Fuel Economy (CAFE) standards in 1975 to reduce our dangerous oil dependence. This doubled the fuel economy of America's vehicle fleet, saving 3 million barrels of oil per day. However, the oil savings from CAFE standards are being eroded by people driving farther and the rising proportion of inefficient SUVs and other light trucks. In fact, the average fuel economy of new vehicles has sunk to the lowest level since 1980. Raising the CAFE standard for light trucks to equal that of cars (27.5 mpg) would save 1 million barrels of oil

per day. We can do even better. Raising the average for cars to 45 mpg and light trucks to 34 mpg would save 3 million barrels of oil per day.

Lowest Fleet Fuel Economy Average Since 1980

The fuel economy average for both cars and trucks is at its lowest pint since 1980. (U.S. EPA Light-Duty Automotive Tecnology and Fuel Economy Trends Through 1999, Spet. 1999)

Available technology and higher mileage standards could make the popular Ford Explorer a 34.1 mpg vehicle, rather than a 19.3 mpg guzzler, without compromising performance or safety. This "improved" Explorer could emit 43 percent less global-warming pollution and 76 percent less smog-forming pollution and cost only $935 more. Consumers would save several times this at the gas pump over the life of the vehicle.

Industry Foot-Dragging and Excuses

History shows that automakers won't improve the environmental performance of their products unless they are required to put technology to work. Raising CAFE standards is the key to cleaning up SUVs and other light trucks.

In 1974, a Ford official testified before Congress that CAFE standards would "result in 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." Today, automakers use similar arguments against improving CAFE standards for SUVs. The claim wasn't true then; it isn't true today. Eighty-six percent of the fuel-economy improvements for cars have resulted from improved technologies such as more efficient engines and transmissions and better aerodynamics.

In July 2000, Ford promised to use technology that will improve its SUVs' fuel economy by 25 percent over five years. General Motors pledged to exceed Ford's light-truck fuel economy. Keeping these promises will begin the process of cleaning up SUVs.

But Detroit continues to fight higher CAFE standards for light trucks and cars, which would guarantee these and other improvements. The auto industry has taken its fight to Congress, getting its friends to fight legislation that would increase fuel economy. Beginning in 1995, Congress froze CAFE standards at levels set decades ago.

AMERICANS DESERVE VEHICLES THAT ARE BOTH SAFE AND CLEAN

Detroit opposes CAFE standards, claiming that they cannot make a safe, clean SUV. Contrary to the auto industry's arguments, CAFE standards don't dictate automobile size or safety. Design, not weight, is the key to both safety and fuel economy. Engineering and safety features like airbags and crush-resistant roofs can ensure that vehicles absorb crash forces so occupants don't. Crash-test results show that automakers are making safe and unsafe cars of all sizes. In a standard head-on crash test into a wall, occupants of a 1997 Ford Expedition faced greater risk of injury or death than occupants of a 1997 Saturn subcompact. This is because the Saturn has crashworthiness designed into it and the Expedition does not.

"Ford Motor Company, which depends on sport utility vehicles for much of its profit . . . sad that the vehicles contribute more than cars to global warming, emitted more smog-causing pollution and endangered other motorists."—New York Times, May 12, 2000.

The same industry claimed the original CAFE law was a threat to highway safety, battled automotive safety improvements from seatbelts to airbags and continues to fight a rollover standard. The fact is that since 1975 CAFE standards doubled fuel economy and the rate of highway fatalities fell by 50 percent.

The SUV Safety Story: Rollovers and Dangers to Others on the Road

Here's what the *New York Times* said about SUV safety (July 15, 1999): "Because it is taller, heavier and more rigid, an SUV or a pickup is more than twice as likely as a car to kill the driver of the other vehicle in a collision. Yet partly because these so-called light trucks roll over so often, their occupants have roughly the same chance as car occupants of dying in a crash."

SUVs give a false impression of safety. With their height and comparatively narrow tire-track width, SUVs handle and maneuver much less effectively than cars. Emergency swerves to avoid a crash can themselves lead to rollover accidents in SUVs, which are four times more likely to roll over in an accident. Rollovers account for 62 percent of SUV deaths but only 22 percent in cars. Yet automakers continue to fight new standards that would protect occupants in rollover accidents.

Because SUVs are built on high, stiff frames, their bumpers ride above the occupant-protecting frame of cars. When an SUV and a car collide, this height difference, combined with the stiff battering-ram frame and greater mass, create a lethal weapon.

According to a government study, in 1996 "at least 2,000 car occupants would not have been killed, had their cars collided with other cars instead of trucks of the same weight." And SUVs are also more deadly to pedestrians, bicyclists and motorcyclists than cars, in part because existing braking standards for SUVs are weaker than for cars.

TAKE ACTION! THE BIGGEST SINGLE STEP TO CURB GLOBAL WARMING

Beginning in 1995, friends of the auto industry in Congress attacked CAFE standards with an anti-environmental "rider" in the Department of Transportation's funding bill. The rider forbids the administration from setting new CAFE standards. While technology exists to safely improve fuel economy and protect our environment, the CAFE-freeze rider allows the auto industry to remain stuck in reverse.

It is time for action. Please urge your public officials to support cleaning up our cars and light trucks. Ask them to help take the first step of closing the loophole that allows SUVs and other light trucks to guzzle more gas than cars. Tell them our children have a right to a safe and healthy environment. It's time to take the biggest single step to curb global warming. See the Sierra Club Take Action page.

For more information please contact: Sierra Club, 408 C Street, N.E. Washington, DC 20002 (202) 547–1141; 5 Second St., 2nd Floor, San Francisco, CA 94105 (415) 977–5500.

Senator KERRY. Thank you very much.

You know, because we are on the back end of the vote here, Mr. Reuther, I do not want to shortchange your testimony. I think it would be best to recess at this point in time and then we will pick up with your testimony. So we will stand in recess.

[Recess.]

Senator KERRY. The hearing will come back to order, please. Thank you all very much for bearing with us. I think we will be able to proceed without further interruption, if we can get everybody quieted down.

Mr. Reuther, thank you for waiting and we look forward to your testimony.

STATEMENT OF ALAN REUTHER, LEGISLATIVE DIRECTOR, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA (UAW)

Mr. REUTHER. Thank you, Mr. Chairman. My name is Alan Reuther. I am Legislative Director for the UAW. The UAW welcomes the opportunity to testify before this Committee on the subject of reforming the CAFE program. The UAW is obviously very concerned about the impact of any changes in the CAFE program on the jobs of our members. To avoid any adverse impact, we believe increases in CAFE standards must be technologically and economically feasible for the auto companies. This means that the magnitude of any increases must not be excessive and there must be sufficient lead time for the companies to make the necessary investments and changes in product plans.

Equally importantly, the UAW believes the structure of any CAFE increases is crucial. In particular, any changes in the CAFE standards must not place full-line domestic manufacturers at a competitive disadvantage relative to the companies that historically have specialized more in the production and sale of small vehicles.

At the same time, we believe any changes in CAFE must not enable the full-line domestic manufacturers to shift production of small cars to other countries. To achieve these structural objectives, the UAW strongly believes that any mandated increases in CAFE standards should take the form of a uniform percentage improvement in average fuel economy for each company and for each fleet, domestic and imports. Under this approach, all companies must improve their fuel economy regardless of their current status. That should reduce any CAFE-related competitive disadvantage that may exist for full-line producers. Companies that have been able to exceed the standard based on vehicle mix alone would now be forced to adopt widely used technologies.

Moreover, companies would risk falling short of the new standard if they move increasingly into high-performance niches. Opponents of the uniform percentage increase approach as has occurred today have incorrectly argued that this would unfairly penalize technology leaders. The truth is the current differences in average fuel economy of the fleets sold by the domestic full line manufacturers and some foreign companies are due mostly to the product mix, not due to differences in technology. The addition of ceilings and floors to the uniform percentage increase approach would ensure that all companies fairly contribute to improvements in fuel economy.

A number of alternative proposals for reforming CAFE standards have been offered. We are deeply concerned that these alternative proposals could cause substantial dislocation in the automotive industry. Alternatives such as the Feinstein-Snowe bill or the Markey-Boehlert amendment propose that the standard for light trucks be harmonized upwards to the substantially higher level established for passenger cars.

In our judgment, the implementation of such proposals would impose severely disparate impacts on domestic full-line manufacturers with serious adverse effects on the jobs of our members. Domestic full-line manufacturers have responded to strong consumer preferences for light trucks by dramatically shifting their U.S. capacity to meet that demand. As a result, today the U.S. production and sales of domestic full-line automakers are much more oriented to light trucks, compared to foreign companies that have historically focused on the passenger car segments of the market. Upward harmonization of the light truck CAFE standard to meet the car standard would thus place domestic full-line manufacturers at a strong competitive disadvantage relative to foreign companies. This would put at risk the jobs of our members who work in light truck assembly plants and associated supplier operations.

Another alternative that has been advanced would simply apply a flat MPG increase to the current standards. This approach also has a discriminatory impact on domestic full-line producers due to the nature of their product mix. This disparate impact would be exacerbated if the flat MPG increase approach were combined with the upward harmonization approach for light trucks.

A third alternative that has been advanced would allow the CAFE structure to be changed to an unspecified weight-based structure through rulemaking. UAW's concern is that such open-ended authority would permit a shift from the fleetwide average

approach that the auto industry has used for a quarter of a century, an alternative that could further jeopardize U.S. small car production and possibly have a disparate impact on full-line producers.

In conclusion, the UAW appreciates the opportunity to present our views on the subject of reforming the CAFE standards. We look forward to working with you, Mr. Chairman, and the other Members of this Committee on this important issue. Thank you.

[The prepared statement of Mr. Reuther follows:]

PREPARED STATEMENT OF ALAN REUTHER, LEGISLATIVE DIRECTOR, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA (UAW)

Mr. Chairman, my name is Alan Reuther. I am the Legislative Director for the International Union, UAW. The UAW welcomes the opportunity to testify before the Commerce Committee to provide our union's views on reforming the Corporate Average Fuel Economy (CAFE) program.

The UAW represents more than 1.3 million active and retired workers in several major U.S. manufacturing industries, as well as in technical, office and professional sectors. The largest portion of UAW membership is involved in the manufacture of transportation equipment. This includes motor vehicles that cover the complete range of vehicle types and uses from passenger cars to light, medium and heavy-duty trucks, as well as motor vehicle parts covering all vehicle component systems. UAW members therefore have a strong interest in the CAFE program.

Of course, the UAW is particularly concerned about the impact of any changes in the CAFE program on the jobs of our members. Sales in the U.S. automotive industry are down this year, and are forecasted to drop again next year. The recession in the overall economy is likely to have a continuing negative impact on automotive sales and production. We have already seen substantial layoffs in the automotive industry, and are concerned about additional dislocation in the coming year. Against this backdrop, the UAW strongly believes that any changes in the CAFE program must not aggravate the difficult economic circumstances of the auto companies and their suppliers and result in additional job loss for American workers.

The UAW supported the fuel efficiency measure enacted into law as part of the Environmental Policy and Conservation Act of 1975 because we viewed it as wise public policy. CAFE standards have helped to make our nation's light vehicle fleet more fuel-efficient, thereby generating real benefits to the nation. As a trade union we are concerned about our members' jobs; but a clean environment and energy conservation are also workers' concerns. In the past, we have supported policies that achieved environmental goals without undue dislocation. Today, I want to share with you our views on reforming CAFE in ways that offer environmental benefits to society without jeopardizing the jobs of our members, disrupting communities or causing unnecessary dislocation in the domestic automotive industry—an industry vital to our nation's economic health.

The UAW has supported the principle of mandatory fuel economy standards for motor vehicles to help achieve the goals of energy conservation and reduced dependence on imported oil. We continue to support that principle today. The CAFE program has provided environmental benefits to society, without causing excessive dislocation in the domestic auto industry or reductions in the array of domestically built vehicles. We are committed to the U.S. remaining the production site for all types and sizes of vehicles for this market. The requirement for separate averaging of domestic and foreign fleets contributes to maintaining such full-line domestic production and is an important part of the current structure of the program. If increases in CAFE standards are technically feasible and economically practicable, and applied as a uniform percentage increase to each fleet average, we believe further progress on fuel economy could be achieved without job dislocation or disparate impacts on manufacturers.

We also know that vehicle fuel economy standards alone cannot satisfy the nation's energy conservation and environmental protection needs. Measures to improve energy conservation, provide clean fuels and reduce emissions are required throughout the U.S. economy. The Federal Government's continued commitment to fund R&D on advanced vehicle technologies is also needed, as are tax credits for advanced, highly fuel-saving vehicles. The Nation needs a comprehensive and balanced strategy to achieve energy conservation, environmental and public health protection, and economic growth.

U.S. energy conservation needs are even more critical now than they were in 1975. Scientists have concluded that gasses emitted when fossil fuels are burned accumulate in the stratosphere creating a greenhouse effect, which causes a long-term, gradual global warming trend. While there is no consensus about the timing and degree of the warming trend, there is little disagreement that it will occur. As an imperative for fuel conservation, we now add the problem of global warming to the problems of finite fossil fuel reserves and growing dependence on foreign oil. We also recognize the nation's interest in improving the fuel economy of vehicles sold and operated in the U.S. without sacrificing other important objectives, such as high levels of employment, safety and environmental standards, the financial viability of the automotive industry and the affordability of vehicles for consumers.

FLEETWIDE AVERAGES

The UAW has supported the approach that requires the fuel economy of each company to be averaged across the entire fleet and to be at or above a minimum standard. This approach guarantees that progress in fuel economy will be made, but allows manufacturers sufficient flexibility to meet standards efficiently and without dislocation. Since it is not always possible to raise the fuel efficiency of all models simultaneously, continued use of a fleetwide average for calculating compliance provides manufacturers the flexibility they need to introduce fuel-saving technologies for a specific range of vehicles at any given time.

Our view is that a fleetwide average allows companies to build an adequate range of vehicles to satisfy consumer tastes and the needs of the market. As long as vehicles in most size classes are making steady progress toward improved fuel economy, the requirement of energy conservation can be met. At the same time, manufacturers require the flexibility to focus technological improvements and redesign efforts on a limited range of vehicles at any given time in each design cycle rather than instituting sweeping changes across the entire fleet. The fleet average approach thus tends to be less costly for American consumers who have to absorb the cost of new technology in higher vehicle prices—a cost recouped over time in lower fuel costs per mile.

We believe that fleetwide averaging offers an incentive to manufacturers to focus production, engineering and sales efforts on small vehicles, which can be used to offset the lower fuel economy of more profitable, larger vehicles. In our judgment, it is important that domestic manufacturers be encouraged to continue putting effort into the design and development of domestically produced smaller vehicles in order to be competitive with manufacturers focused more on the low end of the market. It is our hope that maintaining the fleetwide averaging in the CAFE program can slow or reverse the loss of jobs in small car production and provide an incentive to shift the sales mix toward more fuel-efficient vehicles.

Finally, we note that in the past decade, as the inflation-adjusted price of gasoline fell, demand for higher performance vehicles increased. Companies already having difficulty meeting fuel economy standards because of the number of large vehicles in their sales mix could not meet the increased demand for high performance models as readily as manufacturers exceeding the standards due to their historical focus on small vehicles. Thus, the UAW believes it is particularly important that any future changes in the CAFE standards should ensure that full-line manufacturers are not placed at a competitive disadvantage relative to companies that historically have specialized more in the production and sale of small vehicles.

SEPARATE DOMESTIC AND IMPORT FLEET AVERAGES

In 1975, we supported the approach to CAFE standards that required the fuel economy of each company to be averaged across separate domestic and foreign fleets. We endorsed this provision because we were concerned that domestic manufacturers, comparatively inexperienced in small vehicle production, would try to meet the fuel economy standards by importing small vehicles. Since U.S. firms would need small vehicles in their domestic CAFE fleet to offset the low fuel economy of larger vehicles, we viewed separate averaging as discouraging the sourcing of small vehicles abroad and encouraging production of such models in this country.

The UAW is aware that the positive impact of separate fleet averaging has narrowed over time. The two-fleet requirement has applied only to passenger cars since model year 1996, after the Department of Transportation eliminated the requirement for light trucks, a change the UAW opposed. Even with the growing popularity of trucks, passenger cars still account for half of total U.S. light vehicle sales. In addition, NAFTA has expanded the definition of "domestic content" to include Mexican value-added. This makes it easier for a company to concentrate more small car production in Mexico, while retaining such models in the calculation of its domestic

fleet average to offset larger U.S.-built car models. Finally, companies have been able to game the two-fleet requirement by shifting car models from their domestic to import fleets by adjusting domestic content.

Nevertheless, the UAW opposes elimination of the requirement that each firm comply with the fuel economy standards separately for its domestic and foreign sales. The UAW is very strongly committed to the U.S. remaining the production site for all types and sizes of vehicles for this market. The two-fleet requirement contributes to maintaining this full-line production. We would welcome proposals to strengthen its role if they ensure enhanced domestic production and jobs, maintenance of full-line U.S. manufacturing and an increased amount of U.S. content. On the other hand, the UAW will oppose attempts to weaken the impact of the two-fleet requirement.

The UAW continues to be deeply concerned about the outsourcing of small car production. While our main concern is the thousands of jobs this trend has cost our country, small car outsourcing is more than a jobs issue. It also threatens our automotive base in the long run. U.S. firms have taken a shortsighted approach to the challenge of foreign competition in the subcompact market, and we fear they will take a similar shortsighted approach in the compact market. If the compact market goes as the subcompact market has gone, before too long there will be no U.S. designed and built subcompact or compact vehicles. If the trend toward fuel conservation and self-reliance continues, as it should, small cars may again be the vehicle of choice for many consumers. Unless we retain domestic sourcing of small car production, consumers would be forced to purchase foreign-made vehicles.

Some foreign companies have claimed the two-fleet requirement constrains their ability to increase the domestic content of their vehicles, thereby restricting job growth in the U.S. The UAW has long observed the relatively lower domestic content of vehicles that foreign companies have sold in the U.S., which is the result of structural trade-related imbalances, not the two-fleet requirement. The UAW continues to urge the U.S. Government to effectively address our nation's structural trade problems. We also have long urged foreign companies to increase domestic sourcing of automotive components from long established, high-quality U.S. suppliers. Such actions would lower the excessive U.S. auto parts trade deficit, create jobs in the domestic industry and increase the U.S. content of both imports and those vehicles produced in the U.S. plants of foreign companies.

TECHNOLOGICAL FEASIBILITY AND ECONOMIC PRACTICABILITY

The UAW does not oppose an increase in the fuel economy requirements for motor vehicles, but we do oppose increases that would place the jobs of our members and other workers in serious jeopardy. We believe the manufacturers will be making fuel economy improvements in the future. But it is essential that any increases that may be required by Federal law be technologically feasible. Increases that are not technologically feasible would force significant changes in the kinds of automobiles and light trucks the manufacturers produce. If, for example, the product mix had to change in a way that would cause production of family sized, larger and less fuel-efficient vehicles to be phased out, plant closings and permanent job loss for workers in those plants and in related industries would inevitably result.

Motor vehicles produced in this country and those imported into this country should be more fuel-efficient. We need improvement—especially now, given our need to develop more effective energy conservation programs, our need to confront the uncertainties of future energy supplies, our need to become more energy-independent and our need to address environmental concerns. At the same time, Federal mandates in the areas of safety and emissions must be given full weight in setting fuel economy standards. These areas of public policy are no less important than fuel conservation, and advances must be made together, recognizing how each impacts the others.

How fuel-saving technologies are implemented is an important element in determining what is technologically feasible. It is important to recognize that the rate of market penetration of different technologies varies. There may be technical, financial, regulatory, organizational, and marketing limitations to deploying them. Moreover, the existence of new technologies does not mean that their full potential to raise fuel economy will necessarily be realized. The setting of standards cannot, therefore, assume full implementation of all technologies capable of being commercialized without qualifications. Lead-times needed to design, engineer, test and build new models in the automotive industry are often underestimated. It is important that lead times and other practical limitations on deployment of technologies be taken into consideration when setting standards.

Economic practicability is another factor that needs careful consideration in determining feasible standards. We strongly believe that the potential impact of fuel economy standards on industry employment must be considered. The Nation would be poorly served if fuel economy gains were achieved at the cost of the loss of thousands of high productivity, high wage jobs that cannot be replaced. The current U.S. recession has contributed to sizable losses in the domestic automotive industry, thereby lessening the near-term ability of the corporations to undertake the necessary investments to raise fuel economy. The financial condition of the auto companies must be taken into account in the standard-setting process. Economic practicability must also include consideration of the cost effectiveness of the various means available to raise fuel economy. Achieving mandated higher fuel economy standards for new vehicles relies on consumers buying the new vehicles. If the cost of the vehicles is beyond the means of consumers, or puts new cars at a disadvantage relative to used cars, little will have been accomplished. The standards must also not assume the implementation of technologies that have excessive payback periods.

Finally, we also believe it is important to retain the existing administrative discretion to relax or strengthen standards. It is impossible to anticipate all events in the short- and long-term that may prevent manufacturers acting in good faith from complying with the law.

UNIFORM PERCENTAGE INCREASE APPROACH

The UAW strongly believes that any future mandated increase in standards should take the form of a uniform percentage improvement in average fuel economy, for each company and for each fleet, domestic and import, from a designated base period. This reform of the CAFE program directly addresses some of the problems in the existing standards.

First, if compliance is measured by a percentage improvement in fuel economy averages, all companies must improve their fuel economy regardless of their current status. That should reduce any CAFE-related competitive disadvantage that may exist for full line producers. Companies that have been able to exceed the standard based on vehicle mix alone would now be forced to adopt widely used technologies. Moreover, companies would risk falling short of the standard if they move into high performance niches. It is our hope that if all firms face a common risk in moving upscale that all will be reluctant to do so. At the very least, it will be more difficult for the Department of Transportation to accept the argument that the standard should be relaxed because it puts some firms at a competitive disadvantage. In contrast to the current statute, we are more likely to see fleetwide improvements in fuel economy since all companies would be discouraged from moving into higher performance vehicles.

Second, in contrast to the current approach, the percentage improvement requirements would make it difficult to raise the fuel economy average of the domestic fleet by shifting low fuel economy vehicles into the import fleet, since the company would be required to achieve improvements in both fleets. Because the principle of fleetwide averaging is preserved, the companies would still have the flexibility to develop new technologies for a limited range of vehicles at any one time.

For these reasons, the UAW believes that requiring separate import and domestic fleetwide average uniform percentage increases in fuel economy would be an effective improvement over the existing standards.

Opponents of the uniform percentage increase approach have incorrectly argued that it would unfairly penalize "technology leaders." But the truth is the current differences in the average fuel economy of the fleets sold by the domestic full-line manufacturers and some foreign companies are due mostly to differences in their product mix, not to differences in technology. The addition of ceilings and floors to the uniform percentage increase approach would ensure that all companies fairly contribute to improvements in fuel economy.

FAIR AND BALANCED ENERGY AND ENVIRONMENTAL POLICIES

We recognize that automotive fuel economy standards alone are not an adequate solution to the need for energy conservation and environmental protection, and that more needs to be done. Promising technologies with the potential to improve fuel economy and reduce auto emissions require ultra-clean fuels. The UAW strongly supports national controls that would reduce sulfur content in gasoline and diesel fuels to nearly zero. Clean fuels will not only increase the effectiveness of current vehicle technologies, but also enable advanced vehicle technologies under development that offer significant future environmental benefits. Gasoline direct injection (GDI) engines and fuel cell propulsion systems, for example, promise such benefits, but both are highly sensitive to sulfur. For the American automotive industry to

stay technologically competitive, and for our country to gain the environmental and economic benefits associated with new technologies, it is vitally important that they be developed, manufactured and sold in the United States.

The Federal Government has played a crucial role in funding research and development of advanced vehicle technologies for more than 25 years. The UAW supports a continuation and strengthening of this Federal commitment. To achieve such goals and thereby gain broad benefits, a sustained, well-funded and coordinated Federal involvement is necessary, including collaborative efforts with domestic auto manufacturers and suppliers. Such efforts not only will help promote the development of advanced conventional technologies that offer improved fuel savings of vehicles powered by today's internal combustion engines. In addition, sustained federally funded R&D efforts centered on leapfrog technologies, such as fuel cell and electric-powered vehicles, present opportunities to make dramatic improvements in the environmental performance of future automobiles. Whether for advanced conventional or leapfrog technologies, such development efforts are needed to keep the domestic auto industry at the forefront of global vehicle manufacturing.

If the United States takes the lead in developing energy-efficient products and new energy-saving technologies that are domestically produced and used here and around the world, we will create more jobs for American workers, while bettering public health and environmental protections. To accelerate the introduction and penetration of advanced vehicles into the U.S. light vehicle market, the UAW supports Federal tax credits for the sale of fuel-efficient, advanced vehicles. These include electric, fuel cell and qualified hybrid vehicles. Our view is that the sale of vehicles qualifying for Federal tax credits should not only possess specified advanced vehicle technologies, but that such vehicles should also provide environmental benefits through substantial fuel economy improvements.

Another enhancement of domestic employment opportunities would flow from expanded investment in our nation's transportation infrastructure to reduce congestion and improve efficiency. A broad national transportation plan should embrace creative, community-based approaches. This avenue recognizes the important role of affordable public transit systems and other energy-saving alternatives to private motorized modes of transportation.

The UAW also has advocated the establishment of a Federal agency to coordinate research on fuel economy and emissions technology and we have called for a comprehensive energy and transportation policy to promote other approaches to fuel conservation. To ensure that workers adversely affected by fuel-economy related actions do not suffer unduly from these policies, we also support a full range of job retraining, job search and income support programs for any dislocated workers. Unfortunately, these proposals were not included in the law enacted in 1975 and have not been added since.

STANDARD HARMONIZATION, FLAT MPG APPROACH, WEIGHT-BASED STRUCTURE AND CREDIT TRADING

Several alternative proposals on reforming or changing CAFE standards have been offered. These include an upward harmonization of the light truck standard to that for passenger cars; applying a flat mpg increase to the current standards; a shift from fleetwide averaging to an unspecified weight-based structure; and a system of credit trading. The UAW is deeply concerned that these proposals could cause substantial dislocation in the domestic automotive industry and result in the loss of thousands of jobs for American workers.

One approach to reforming CAFE (such as the Feinstein-Snowe bill or the Markey-Boehlert amendment) proposes that the standard for light trucks be harmonized upward to the substantially higher level established for passenger cars. The implementation of such proposals would impose severely disparate impacts on domestic full-line manufacturers with serious adverse effects on the jobs of our members. The UAW therefore strongly opposes such proposals. Domestic full-line manufacturers have responded to strong consumer preferences for light trucks by dramatically shifting their U.S. capacity to meet that demand. As a result, today the U.S. production and sales mix of domestic full-line automakers are much more oriented to light trucks compared to foreign companies that have historically focused on the passenger car segments of the market. Upward harmonization of the light truck CAFE standard to meet the car standard would thus place domestic full-line manufacturers at a strong competitive disadvantage relative to foreign companies that are more specialized in cars. This would put at risk the jobs of our members who work in light truck assembly plants and at associated supplier operations.

Another approach to changing CAFE would be to simply apply a flat mpg increase to the current standards. This approach also has a discriminatory impact on domes-

tic full-line producers due the nature of their product mix relative to the other producers that have historically focused on smaller automobiles. This disparate impact would be exacerbated if the flat mpg increase approach were combined with the upward harmonization approach for light trucks. The UAW strongly opposes such proposals because they could cause serious dislocation among our members.

A third approach to reforming CAFE would allow the CAFE structure to be changed to an unspecified weight-based structure through rulemaking. The UAW is concerned that this approach would give regulatory authorities excessive latitude over how the fuel economy standards would be structured in the future. Such open-ended authority would permit a shift from the fleetwide average approach that the auto industry has used for a quarter century—an approach that balances effectiveness and flexibility, and helps ensure continued domestic full-line production—to an unknown alternative that could further jeopardize U.S. small car production and possibly have a disparate impact on full line producers. The UAW therefore opposes open-ended regulatory authority to change CAFE to an unspecified weight-based structure.

Finally, proposals have also been advanced that would allow companies to trade credits earned by exceeding the fuel economy standards between classes of vehicles and between firms. We cannot be certain how this trading would work, as there has been no similar experience to demonstrate its effect. We can easily foresee circumstances, however, in which domestic full-line producers would end their U.S. production of small cars, fail to reach the fuel economy standards for their domestic fleet and purchase credits from their own foreign fleet or from other producers to achieve compliance. In this case, the U.S. industry would lose much of its small car production capability, with potentially serious consequences for domestic output and employment, and with no overall improvement in fuel economy. As previously indicated, the UAW is deeply concerned about the long term threat this would pose to our automotive base.

In conclusion, the UAW appreciates the opportunity to present our views on the subject of reform the CAFE program. We look forward to working with you, Mr. Chairman, and the other Members of this Committee on this important issue. Thank you.

Senator KERRY. Thank you very much, Mr. Reuther. Thank you. I was looking for your prepared testimony, and I appreciate the in-depth detailed discussion of a number of different issues. Let me try to deal for a moment, if I can quickly, while it is fresh, with this question of the uniformity.

And Mr. Cohen, let me get you involved in this, obviously.

In principle, I would agree with your comment that you do not want to penalize people for having taken positive steps, and if they are industry leaders in a particular sector, you would be rewarding lag. You would be encouraging people in the future not to do something. But what Mr. Reuther is suggesting is that if you look at, say, SUVs across the panoply of those offerings in each industry—not each industry, excuse me, in each manufacturer, you will find a really close approximation between them in terms of size, engine and fuel efficiency. There is not that great a sort of technological gain by one or the other. But in effect, the overall CAFE advantage that one manufacturer may have over another, particularly say, you, versus one of the Big Three here, is that you have a different whole product mix, and since the CAFE standard reflects the overall product mix, you sort of could claim a pass, if you will, on what is required with respect to your SUV, while one of the domestic manufacturers would have to make advances that could disadvantage them economically. Now, what do you say to that?

Mr. COHEN. Well, I think there are several points. First of all, I have not seen the data that show manufacturers being so close in the technology they employ. I would note that we are the leader, or close to the leader in almost every class of vehicle in which we compete. This data does not make sense to me because the sum of

the parts should equal the whole. So I would be surprised—if you were to compare our cars on a segment-by-segment basis, I think you would find ours have higher fuel economy, and that is because we have already integrated into a lot of those vehicles advanced technology such as variable valve timing; lightweight materials, and the like. The point is that with a UPI approach, we would have to go out and invent new technology, because a lot of today's advanced technology already is in our vehicles.

I think as far as the point that Mr. Reuther makes, however, there is one way to ameliorate the bad effect, if you think that effect is there, and that is by having an attribute-based standard. In other words, you would have different standards based either upon size or weight. We prefer size over weight. For example, there would be a separate standard for the very large cars, a different standard for the next size down, and so forth. That way, manufacturers would be competing directly against each other within the attribute class, be it size or weight.

With UPI, if a company like Honda, which currently is not in the large SUV market, wanted to enter that market, it probably could not do so. With an attribute-based approach, however, we could enter into that segment as long as we met the target for that segment.

Senator KERRY. What do you say to that, Mr. Reuther?

Mr. REUTHER. Well, I think there was an important admission there, that they do not compete in all segments. So the fact that they may be at or near the top in the segments where they do compete, that does not mean that they have superior technology. The bottom line is if you compare apples to apples, the same size, weight class of cars——

Senator KERRY. Let me just interrupt you for a minute. I think this is a component of the Ford testimony and I am not sure that it is complete. But within the context that we have here in the SUV categories, in the manual transmissions, you have the Ford and Toyota. I am not sure that that is all-inclusive, so I do not know why others were left out. But let us come down to, you have the Ford Explorer, the Jeep Grand Cherokee, the GM Blazer, the Honda Passport, the Toyota Forerunner and they are all at 15 and 16 in the city. They are all at 20 and 19 on the highway. With the combined, 17, one of them is at 18, and they are all at about the same engine size. Actually, the Honda and Toyota, no surprise, are slightly smaller, but no 6-cylinders.

So if we were to wind up creating a size-based category standard, how does that fit? How does that work out in the context of what Mr. Reuther has been saying?

They do seem fairly similar. The point being made here is that the gain you are talking about, the advantage, really comes from the overall smaller cars. This raises another issue. I am not going to let this issue slide by, but it does suggest that you cannot necessarily approach it that way because there is not an evenness in measuring what is to be gained in either fleet.

Mr. COHEN. Well, if the goal here is fuel economy, again, I question the data. That data did not, for example, talk about our Honda CR–V small SUV, and I am not sure which class you are reading, but our CR–V——

Senator KERRY. It is incomplete. I have acknowledged that, and I have asked my staff to put together a complete list of everything in the marketplace.

Mr. COHEN. And our Acura MDX, which is a mid-size SUV. We do make a SUV, we make a mid-size SUV, it is a VLAV on emissions and it is best in class for its fuel economy. So I go back to the question about whether we are all at the same place. The point is we are already putting a lot of this technology in cars.

If Honda already meets a future standard, then I think that achieves Congress' purpose. We should not be penalized for doing that early. But to go back to the issue, if this disparity is one that is of great concern to the Committee, an attribute-based system will negate that.

Senator KERRY. Let me ask the other side of that question, Mr. Reuther. Most of the American cars do tend to be bigger, with bigger engines, more muscle-oriented, more amenities, etcetera in different ways that do appeal to Americans. I am not going to suggest to you the market does not ask for it. The question is whether or not, following up on what Senator Bingaman and Senator Snowe talked about, whether we have a responsibility to try to set as a matter of policy, the framework within which your competition is going to take place.

In other words, we are not going to tell you what kind of car to make specifically, but we are going to create a framework as a matter of public policy about emissions and about fuel usage that then forces you to respond before the market demands it, in effect. Particularly given the price issues that Senator Ensign and Senator Breaux raised, if fuel prices continue to go down. Although that is questionable, since some geologists predict that world production is going to go down by about 2004, and if demand increases, we do not know what will happen to price, but that all depends on the rate at which you really begin to supplant your current dependency.

Mr. REUTHER. We believe the uniform percentage increase approach directly addresses that point. It would require the Big Three to improve the fuel economy of their entire fleets, the truck fleet as well as the car fleet. If they try to keep moving more and more upscale, it would be very difficult for them to meet the higher percentage increase standards. So there is an incentive, if you have fleet wide averaging, but you have a uniform percentage increase approach, there is an incentive not to keep going upscale.

In contrast, if you went to the weight-based system that Honda has suggested, then it would be wide open to gaming the system, and keep saying "oh, you are really are in a higher classification," and you would wind up with no improvement in fuel economy.

Mr. COHEN. Mr. Chairman, if I may, I think there are ways to structure attribute-based systems, whether it is weight or size, to structure those attribute-based systems so that there is not an incentive to game the system.

Senator KERRY. That might well be. I am not particularly excited about weight, but I think there might well be.

Mr. COHEN. Those are obviously very sophisticated and——

Senator KERRY. What about the concept of the floor and ceiling that we had discussed?

Mr. REUTHER. If people are concerned that a uniform percentage increase approach would produce too great extremes at either end, we could support establishing a minimum floor. In other words, you would say everyone has to increase by a certain percentage, but in no event less than a certain MPG and in no event more than a certain MPG. That would cushion the extremes on either end, but it would require all the companies to start using the technology that is available. It would put the same pressure on all the companies not to keep moving continually upward into more high performance, bigger vehicles.

Senator KERRY. What is your reaction to that, Mr. Cohen?

Mr. COHEN. I think it has all the negatives of UPI, only slightly reduced, depending upon the devil in the details. It still punishes the leaders. It still sends a terrible regulatory message from the Congress to companies, that you exceed standards at your peril.

Senator KERRY. Mr. Reuther, what if you accept the National Academy of Sciences judgments? Do you?

Mr. REUTHER. Not all of their judgments.

Senator KERRY. Do you accept their judgment when they find that: "Technologies exist to significantly reduce fuel consumption of passenger cars and light duty trucks within 15 years without affecting vehicle weight?"

Mr. REUTHER. We definitely accept the judgment that the technologies can be brought in to increase fuel economy substantially.

Senator KERRY. So if we were to look at something different from the current Feinstein-Snowe proposal in its timeframe, which some may find difficult to meet, and created a system in which you have the SUV component tied to the overall average, and we sort of work through what kind of average structure we are going to strike, maybe with some targeting in the way that has just been discussed, is it then more important to have a timeframe that is realistic?

I think in your testimony, Mr. Cohen, you talk about that; you say very specifically that the timeframe is critical. If you are looking at 15 years, is that a more reasonable framework within which we could work and perhaps demand a little more?

Mr. REUTHER. Certainly, the longer the lead time, the easier it is for the companies to make the changes, and we support longer lead times. We still have concerns about an approach that simply says well, let us bring the trucks up to the car level because we think that disproportionately has an impact on the Big Three auto companies. We think there should be improvements in the light truck segment. We think there should be improvements in the car segment, but a simple harmonization or "close the SUV loophole" approach we think has a discriminatory impact. Our concern is that our light truck plants will be forced to close or curtail production, whereas the Japanese, because of their current position, will be able to continue to move upscale.

Senator KERRY. What is different? That is a very important consideration. What is different in the current Japanese position as you describe it, versus what Detroit and the Big Three are marketing?

Mr. REUTHER. Because of the product mix, it is easier for them to move upscale.

Senator KERRY. OK. But when you say to move upscale, approximately 50 percent of the vehicles being sold in Detroit today are SUVs. Correct?

Mr. DAVIS. No. It is not correct.

Senator KERRY. What is the correct——

Mr. DAVIS. Light trucks would be that category.

Senator KERRY. Light trucks. And SUVs proportion is what?

Mr. DAVIS. Slightly less than half.

Senator KERRY. Slightly less than half of that. OK. So, but 50 percent fit into the light truck category?

Mr. DAVIS. Right.

Senator KERRY. Within which category SUVs also fall. So light trucks were always meant to be what they are, light trucks. SUVs—and Congress in its wisdom created a lesser standard there, understanding the impact on farmers, certain kinds of businesses, etcetera. We used to make station wagons. We do not make them; we make SUVs. By and large: we still have a few, but they are all mid-size, I understand.

The question is, is there a way for Detroit to remain competitive, and rethink both size of engine and perhaps some of the offerings that have been made to create that market, if you will, in response to the fact that it has been available as a loophole. Is there a way to do that?

Mr. REUTHER. We think you can have improvements in the fuel economy of the light truck segment, and we support a uniform percentage increase for that segment so they will be forced to bring in the technologies to make the light trucks more efficient. But if you simply say light trucks have to meet the same flat MPG as cars, or a higher flat MPG, that is not treating all the companies the same, that is hitting the Big Three much harder.

Senator KERRY. I understand that. I understand that. Let me come back then to a couple of the manufacturers here if I can.

If we were to embrace—and I am not sure how to do this yet, and I am partly thinking out loud. First of all, let me ask this threshold question. How do you view the technology that was talked about earlier, the hybrid, particularly something like Paice Corporation's Hyperdrive? Or some other. I know Ford particularly is moving down its own road.

Ms. CISCHKE. Well, Ford is going to be introducing the hybrid Escape in 2003. And this will be the first hybrid SUV, and we believe that the market acceptance of that will also depend upon how many we will be able to sell, because obviously there is a lot of componentry involved in differentiating a hybrid SUV from the conventional gas engine, and we are exploring whenever that technology would make sense.

There were comments earlier and references to the chart here, and this happens to be a Ford Explorer, and one of the comments here was an integrated starter generator, which is a mild hybrid, another form of hybrid. We recently decided to drop the ISG on Explorer. It indicates here there was a fuel economy gain of 15 to 25 percent, when we found in our whole development process it was significantly less than that, and at a pretty expensive cost between $300 and $1,000 a vehicle.

So while we believe there is an area of market opportunity for hybrids, you have to apply it to the right vehicle size, and we believe the Escape was probably much more effective, and we will continue to look at ways of adding new technology. That is what our SUV commitment is all about, is adding new technologies as well as reducing weights and changing our model mix, too.

Senator KERRY. Well, I know that obviously corporations, particularly when they are innovative, in the innovation business and are trying to gain a foothold, that sometimes there can be some exaggeration to what is offered. And I am not suggesting that these are. I am just saying I know that sometimes that can occur.

On the other hand, here you have Paice, a company that has former auto industry executives and others involved, saying we cannot dictate customer choice, nor should we try to, and so, they are going to try to produce a vehicle that does everything that the customer really wants. It gives consumers the power. It gives them the comfort. It gives them the same safety, but does so with a hybrid power train.

Now, according to the indications that I have read about, Paice has the ability, on a standard SUV, to gain fuel efficiency improvements of roughly 50 percent, depending upon the size of the vehicle. The smaller, I suppose, the better. In their modeling of various vehicles, they come up with a compact car exhibiting an increase of 31 to 45 miles per gallon, which is a 45 percent improvement; a full size car, an increase from 27 to 39 miles per gallon, which is a 44 percent improvement; and the large SUV exhibits an increase from 16 to 26 miles per gallon, which is the 62 percent improvement.

Now, why is that power train not exciting the industry? Or is it not something that you all find similar modeling capacity?

Mr. DAVIS. Well, let me try and address this, Senator.

We have had some interaction with the company that you are talking about over time, and we continue to talk to them, and will continue to talk to them. We have not substantiated those numbers with the work we have done.

Candidly, we have not done any work for a couple of years on that subject. But we have had a number of applications that we are making that do apply the hybrid technology; in fact, we have announced we are putting the hybrid technology in production in our full size trucks in 2003, with every intention of getting that done on time and in a significant volume.

Senator KERRY. But if this hybrid goes into production, and you do well at the hybrid and the marketing of the hybrid is adequate, why should we not believe, building upon what Senator Feinstein was saying, that it would be reasonable for us within 10 years to 15 years to establish a standard? Where we already know that if you did the hybrid now, you would be achieving what that standard sets out to do?

Mr. DAVIS. Well, as we said in our testimony, there is a number of things that we are applying that provide particular benefits. In fact, it is not just a future application of technology. If you look at our mid-sized utilities we brought out this year, variable valve timing, line six engine, hundreds of millions of dollars in investment to bring our mid-size SUV up and improve the fuel efficiency asso-

ciated with that. As I said, variable valve timing, aluminum line six. Hundreds of millions of dollars of investment. The same thing with the hybrid on the full size pickups targeted at improving. Now, when you look at the hybrid on a full size pickup, we will be subsidizing that particular application of technology by the thousands of dollars per vehicle in terms of getting that done, and we are prepared to go ahead and do that.

In addition, consistent with some of the comments made by the National Academy of Sciences, we are taking the predominant volume of our full size engines, our V–8s and our V–6s and switching to displacement on demand which, in fact, considerably improves the pumping efficiency of the engine.

We are doing that; we have said we will do that; we are announcing it; we are moving forward on it. But in no way from a mix standpoint does it drive the kind of numbers that we are talking about here from a CAFE standpoint.

We are more than willing to look at the work that has been done by Paice and others and have continued to do that over time, but have not seen cost-effective solutions that drive those kind of numbers.

Senator KERRY. Why would you not have looked at it for 2 years?

Mr. DAVIS. I have not been contacted, nor am I aware of people at our company. I am not saying we have not been, but I am not aware of a contact that has taken place within the last 2 years.

Senator KERRY. Let me ask you, and I do not mean to do this, I do not do this pejoratively at all. But I want to try to understand. When we sit here, we policymakers, and try to wade through this, we obviously have to look at the science. We make some judgments; we look at the public policy issues, we make some judgments; we look at the track record and make some judgments.

And one of the difficulties is that back in the original go-around in 1975 when we did this, the auto industry came to us and said, quote, and this was the original proposal: "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-subcompact to perhaps a Maverick." At the same time General Motors was saying: "This legislation would have the effect of placing restrictions on the availability of 5 and 6 passenger cars, regardless of consumer needs or intended use of vehicles. It is not only an unjustified interference with individual freedom, but an extreme and unusual way for a free society to achieve its goals."

Yet obviously, neither Ford nor GM eliminated either of those lines. We are doing wonderfully. We are producing significantly different vehicles. How do we sit here and listen to the Sierra Club come in, and scientists come in, and the National Academy of Sciences say, this technology is available in 10 to 15 years; that we know if we create a framework where we push the technology curve, we always accelerate in this country?

We heard the same arguments on sulfur dioxide and the Clean Air Act. The industry said "This is going to cost us $8 billion. Do not do it." The government sources said: "It is going to cost $4 billion and we can do it." And it wound up costing $2 billion because nobody factored in the impact of the push of technology and the rapidity with which, once you had to do something, technology met

the curve faster than we thought. How do we weigh all of that against what you are saying today and against the other testimony we are hearing?

Mr. DAVIS. Two points I would make. In our testimony we are very clear on the technologies that we not only think should be brought on near-term, but we are bringing on near-term. And those include variable ratio transmissions, they include hybrids and they include displacement on demand, which basically makes a gasoline engine act more like a diesel. We think there are a number of alternatives that improve from a consumption standpoint where we want to be.

Certainly, when we look at what we are doing with urban buses, you know, if you look at urban buses, 13,000 hybrid urban buses is the equivalent of 500,000 hybrid small cars, 13,000; and most of those are subsidized by the U.S. Government. We mentioned the fleet that is currently in place in the marketplace today, and that has to be addressed as well. But the overriding issue that we think is important is that we believe fuel cell technology is the technology that is going to take us where we want to go, and it does not make sense to orchestrate or legislate marginal improvement. It makes much more sense to put our resources in bringing that fuel technology on quicker.

Senator KERRY. Well, what if we set a pretty strict goal and gave you some fairly generous incentives for developing the hydrogen fuel cell technology? That would make it easier to do that.

Mr. DAVIS. I think that would be a well-focused and well-thought-out viewpoint.

Senator KERRY. But I am saying set a fairly strict goal simultaneously.

Mr. DAVIS. We have to have more discussion on what is a fairly strict goal, certainly. But I think the marginal, what we are talking about——

Senator KERRY. So you will take the candy but you will give back the rest of the meal, right?

Mr. DAVIS. Well, you know, the progress that has been made in fuel cells in the last 5 years, I think has changed the position of many in the industry, based upon the technology improvements we have made. And I also think that we can bring that on at a very measured and intelligent way, for instance, stationary devices in terms of developing the capability of the system makes sense before mobile devices. But clearly, we would welcome engagement in that kind of discussion.

Senator KERRY. Let me ask you this. Is there a way to embrace clean diesel technology and meet the standards? Could you bring in some of the advances that have been made in Europe with respect to that diesel and perhaps move more rapidly?

Mr. DAVIS. Well, both ourselves and other people in the industry are very familiar with that because we do it on a day-to-day basis and our colleagues in Europe are in continuous discussion with them. We would have to address the same issues that they address in Europe on fuel standards, and on emission control systems in order to bring on clean diesels. But certainly, clean diesels offer us another alternative to talk about and an alternative that most of the rest of the world is using to address CO_2.

Senator KERRY. Ms. Mesnikoff, you make the statement in your testimony quite declaratively: "As outlined in *Drilling Under Detroit*, conventional technologies now exist to achieve a 40 mile per gallon standard over 10 years. A combination of better engines, transmissions, aerodynamics, appropriate weight reductions and other technologies can be used to improve the fuel economy of all vehicles and cars and the largest SUVs." You have heard these folks sort of contest that. They do not think they can do that in 10 years. What gives you the certainty of the declaration in that statement?

Ms. MESNIKOFF. Well, you certainly read one of my favorite lines or several lines from the 1970s. The manufacturers will say they do not have the technology. If you set the goal, they will put the technologies that I have identified, and that my colleague David Friedman from the Union of Concerned Scientists can discuss further. They will put those technologies to work in the near term to get us moving in the right direction.

I think in terms of testimony about fuel cells or otherwise, I think the manufacturers have had a free ride on fuel economy standards. For light trucks the standard has stagnated for essentially 20 years, and the standard for cars in place now was set in 1975 based upon a technology outlook then. And they have not done better when it comes to fuel economy.

So I think that if we sit around and wait for some great technologies to come forward, and fuel cells may come in the next 10 years or so, but in the near term, let us put the technologies identified there, that they have talked about, but let us make sure we are seeing fuel economy gains when they put those technologies to work.

You know, I hate to point it out, but I understand in the Toyota testimony, they essentially make the point that there is a big difference between fuel efficiency and fuel economy. You can put technologies to work and not necessarily improve the fuel economy of that vehicle. What we need to do is see these technologies actually improve the fuel economy of the vehicles sold to consumers so that we can save oil. If we do not put the new standards out there, we may not see the fuel economy gains that we actually need to see to reduce our dependence on oil and to reduce the emissions of CO_2.

Senator KERRY. Is there something in your production structure that makes it harder to achieve what Ms. Mesnikoff just said, in the sense that there will be, there is something in the American manufacturing process that adds cost to the consumer that makes it an undesirable choice for you in terms of the marketplace?

Ms. CISCHKE. No, I would just like to comment that we have improved the fuel efficiency of all of our vehicles over the last 20 years or so, and we have done that in light of ever-increasing safety improvements, as well as emissions improvements, so it is not a one-horse race here. There are a couple of different things that we are trying to balance, and I think technology has been the enabler to do that and certainly tax incentives to encourage advanced technology would help even more. But as far as anything different, we have the technologies that the other manufacturers are offering. It comes to a matter of choice in terms of cost issues and that if you have a hybrid engine, for instance, you have two power trains

versus one power train so you have got to figure out if volume can eventually reduce those costs, the same as the fuel cells.

But there is nothing in our structure that inherently drives the cost up.

Mr. DAVIS. There is still an overriding issue, too, that we have talked about a lot, but I think we need to come back to on this. And that is that there are 50 offerings in the market today that have a fuel economy number of over 35 miles per gallon and they account for 1 percent of the sales of vehicles in the United States. Nine of those happen to be GM vehicles, but the market speaks very clearly on the issue.

Senator KERRY. I understand, but the market is distorted to some degree. I have talked to countless parents and countless people, just trying to get the person on the street opinion about this. And a lot of people have been bullied into a position of feeling that they are just not safe if they are not driving an equally combative, large vehicle on the road. That is the way they feel. Now, a lot of families also want to be able to get the dog and the three kids and do the car pool and put people in it and I understand that. That is a very legitimate need. The question is, do they need a vehicle that does 140 miles an hour to do it? And do they have to be sold the upper level of things that are not really offered in some other places, in other markets?

And so we have conditioned our own market to a degree, you have conditioned our own market, and now to a degree you are a victim of the market. It is not unlike the 1960s and 1970s when Volkswagen came along and introduced the Beetle and everybody in Detroit laughed at them. And we wound up learning that there could indeed be a market for a different kind of vehicle. Now we have manufacturers sort of appealing to both. But there are a lot of ingredients in the marketplace right now which are dictating consumer behavior, some of which I think need to be changed, and you all are not going to take the lead in changing them in a way that adversely impacts you, and I understand that. I completely understand that.

At Ford you are doing a good job of trying to bring in this hybrid piece. You are going to kind of sneak in under the wire there. But you are going to sell the others for as long as people are going to buy them, and take the cushion that comes with that. What we have to make a decision about is whether we want to affect that marketplace over all, and affect all of you simultaneously, so that there are a different set of choices available to consumers that gas prices are not creating in and of themselves.

This goes back to what other Senators have said about what moves the market in the interest of public policy. Now, I am for as much choice as possible. I am for the freedom of the marketplace. I am for competition. I do not want to adopt something that runs against the grain in those things, but we have got a couple of big things looming at us here. The biggest of all is global warming, the impact on the environment, the quality of the air that we are breathing and the combination of oil use, oil dependency and where it is going to come from in the long haul. It is in our interest from the public policy point of view to push the curve on the development of hydrogen, of hybrid, of alternatives that significantly

alter this marketplace. And of course, and I say this to Mr. Reuther and others, we do not want to do it in a way that puts people out of work. Obviously we do not.

So we have a difficult needle to thread here and we are trying to find a way to do it that is reasonable.

Mr. COHEN. Mr. Chairman, I think you make very good points. It is important, as you deliberate, to keep in mind what the NAS said about lead time and about cost. Honda, too, is in the hybrid business. In fact, we brought the first hybrid to the United States, and in just 6 months we will be offering the Civic as a hybrid. We will have three types of motors in the Civic. Come April we will have a compressed natural gas, an internal combustion engine and a hybrid.

The key point to remember, however, is that hybrid technology is expensive, and I do not know exactly how we are going to price it, but hypothetically, say in the $3- to $4,000-dollar range price differential. It is expensive technology. When gasoline is 95 cents a gallon, consumers are going to look at the gasoline Civic and they are going to look at the hybrid Civic and they are going to ask can they make up that differential in price over the life of their car?

So in addition to lead time, the price of these technologies is very important in terms of achieving consumer acceptance.

Senator KERRY. That is why Senator Rockefeller and I and others have a bill that tries to mitigate against that differential by creating an incentive for people to buy it with a tax credit.

Mr. COHEN. And we are an original and enthusiastic supporter of the CLEAR Act.

Senator KERRY. I hope that those policies can also be a part of the mix, in how we try to deal with this transition with the least negative impact, and I emphasize that. We want the least negative impact we can create. But the mix of cars remains, and means this is not going to be resolved by CAFE standards, but it is an interesting discussion to talk about, America's mix of offerings versus other people's mix of offerings. And it needs to be noted, it needs to be part of the overall fabric.

It is one of the reasons why I think there is such a reliance among our domestic manufacturers, particularly of SUVs, on not changing the current dynamic because uncertainty is always scary in the marketplace, and nobody quite knows how they come out with respect to that competition. And right now there is a very nice niche there for these larger, more consumer-appealing, vehicles that do things that nobody needs to do, in some respects. I mean, people are driving around cities with cars that are advertised for climbing over mountain chasms. And to the best of my knowledge, most of the people never take them off-road. There is a mindlessness in what's going on. I know it is great marketing. But we have to measure how we begin to address some of that in the long term, and we have to find a thoughtful way to do it.

Let me ask a couple of other things with respect to that. In the National Academy of Sciences report, I ask this of you, Mr. Davis and Ms. Cischke, they point out as of a few months ago. That it is their judgment that fuel economy can be improved by 8 to 11 miles per gallon, just using existing technologies at a net savings

to consumers over the life of the vehicle. Do you accept that finding?

Mr. DAVIS. Not that particular finding. No. And the issue there from our perspective is that although——

Senator KERRY. That is without taking into account hybrid.

Mr. DAVIS. Right. What they talked about there was a lot of different technologies that potentially can improve the fuel economy and will improve the fuel economy. Where we take issue with is having all of those to be additive. Now, I do think there are some issues that they talk about in there.

Senator KERRY. What are they missing there? Why do they come up with 8 to 11 and you say no? What are the scientists missing? What is their misjudgment?

Mr. DAVIS. Incrementally, in our position, incrementally as they went through and did the work associated with the incremental improvements, we would support their conclusions. The issue comes up to when you add all those together, what is the additive? And we have been continuing to dialog with NAS on that particular issue. The vast majority of the NAS report we clearly agree with and we think it makes a lot of sense and are moving forward in a number of those areas. And when they talk about pumping losses, we fully support the displacement on demand as I mentioned, and investigating the issue of clean diesels as well, so there is a lot of excellent work in the report. That particular area we are concerned about.

Senator KERRY. Do you agree with that, Ms. Cischke?

Ms. CISCHKE. Yes. I think it is difficult, just like this board shows here, and not all these things can be added together. And there are ranges in terms of the overall fuel economy improvement. And so it is easy to—it is a very complex set of calculations, and we met with the NAS panel and shared our concerns in certain issues.

Senator KERRY. And what did they say? Did they accept your dissent or did they say we disagree with you?

Ms. CISCHKE. I think that there has been an agreement to disagree, that there is not maybe the same view, that there certainly are different ways to look at it, but we have not reached consensus on that.

Senator KERRY. Is there a level of fuel economy increase the industry would support?

Ms. CISCHKE. Certainly, we are looking at ways to reduce fuel consumption and looking at all these new technologies, and because the system we have today has so many problems, CAFE had so many problems and it is so complex, that we really believe it is NHTSA that should take a look at that with help from industry and others, to really come up with something that could be effective.

Senator KERRY. Do I interpret that to mean no, there is no figure?

Ms. CISCHKE. There is no figure that I could——

Senator KERRY. There is no figure you would accept? Well, I mean, are you operating under the notion that the CAFE standard is going to be abolished?

Ms. CISCHKE. No. I know that we need to improve fuel efficiency.

Senator KERRY. So you are accepting the notion that even NHTSA is probably going to come up with some increase?

Ms. CISCHKE. Well, NHTSA will either come up with an increase or an alternative method as we talked about, maybe an attribute-based system. The devil really is in the detail of all of that, and so we need to really explore what it means. The overall goal is to reduce fuel usage and we need to make sure that whatever we do does that.

Senator KERRY. I assume you are not going to sit here and tell this Committee that the industry cannot, that the industry believes that zero increase is the number that CAFE ought to be imposed. Is that, am I——

Ms. CISCHKE. We have indicated that we believe that there would be an appropriate increase in CAFE. Just what that number is, is what is going to be difficult to come to.

Senator KERRY. And you are not prepared as an industry to suggest in the next weeks a level that you think would be reasonable and acceptable?

Ms. CISCHKE. I think it will take a lot of work to make that happen.

Senator KERRY. Well, we are going to do that work. Do you want to do it with us?

Ms. CISCHKE. We certainly do.

Mr. COHEN. Mr. Chairman, our company, Honda, is not a member of the Alliance, and our perspective is that as we said, the NAS report is in the ballpark. I do agree with the testimony from Ford that the devil is in the details. Some of the reticence you probably are seeing comes from not knowing the details. What is the timeframe? Are we talking about an attribute-based system? What is the test methodology? We have heard some discussion about that.

From Honda's perspective, the key elements are the standards should be equal for all manufacturers and the lead time should be reasonable.

Senator KERRY. Honda wouldn't be driven by any notions that that might advantage them competitively with any of the other industry, would it?

Mr. COHEN. Mr. Chairman, it is a very tough industry. We intend to compete in every sector. We do it reasonably well.

Senator KERRY. Including at the witness table.

[Laughter.]

Mr. COHEN. I try.

Senator KERRY. I accept that. Good try.

Each of the Big Three has already made a pledge to improve fuel economy by 2005, particularly in the SUV fleet. You have already discussed, Ms. Cischke, what you are doing. And Mr. Davis, I think you did, too. What is the prime motivation for moving voluntarily to do that, or spontaneously within the market? Is it because you think the market is demanding it or you see us coming down the road?

Mr. DAVIS. Well, as you are very well aware, when we make these decisions, we make these decisions on large amounts of money and capital. And so for instance, I will use a number of examples that are already in production rather than talk about the future. I mentioned the mid-sized SUV in which we completely

changed over our engine technology to a line six with variable valve timing. That is in production in high volume.

We are in production today with CVT transmissions in SUVs in high volume, or will be in high volume within the next year. And in my testimony, there is a number of things that are coming. I think as was indicated by Honda, this is a very competitive industry and we vote with our capital and we vote—all of us vote to have the most competitive product. Those decisions and others were driven by those types of considerations and we will continue to do that as time goes by.

Ms. CISCHKE. I would just like to comment, too, that it is customer-desired. We decided to focus on SUVs because they had indicated that was an area there that they would like to see improvement. And for instance, the SUV Escape will get 40 miles per gallon. That is a pretty significant improvement for that type of vehicle.

Senator KERRY. I must say to you that I think if you can—I am not in the business, but if I were, boy, I would be moving as fast as I could to an SUV that compromised a little bit. In certain places.

I think the compromises are fairly obvious, but still providing people with space and ability to get from here to there and do so with much better mileage. I drove—well, it does not have to be named, but I drove one of them until recently, and I loved it. It is a terrific car. But the mileage was just horrendous, and I gave it up because I just could not excuse driving a car with that low a mileage.

And I think if you could provide any option—I wanted to buy a hybrid. I would have bought a hybrid, if it had been manufactured in that car, because of the comfort and the basic design of the car. But there is no hybrid. So I think you are missing something. I really do. I think the faster people move into that market, boy, the American consumer would love to save that money and put it into other things. Disposable income is cherished these days. And so I encourage you to do it and I hope we can come up with a reasonable way to help encourage you without doing more harm than good.

Does anybody feel compelled to add anything before we liberate this panel?

Ms. MESNIKOFF. I would actually like to make a quick point. The attribute-base system has come up numerous times. The Sierra Club feels very strongly against that kind of a proposal, because it could potentially encourage manufacturers, or would encourage manufacturers to essentially focus their attention on perhaps the heaviest SUVs. And as long as they improved the fuel economy of those vehicles, they could perhaps dump production of much more efficient cars or other vehicles in their lines, so that the goal of achieving overall oil savings or over pollution reductions would not be achieved because of the amount of gaming that could go on.

Manufacturers could, you know, again improve the fuel economy of a Suburban or an Expedition by 2 or 3 miles per gallon, whatever the new standard was—we think it should be higher. But unless you keep an overall average and ensure forward progress, you could see a migration toward those vehicles, achieve some incre-

mental improvement there, but not get the overall gains we need to see.

And again, one more point on consumer choice. The manufacturers point to the 30 or so models that might be over 30 miles per gallon, but again, as you have pointed out, when you go to the marketplace and the consumers have decided that they are going to buy an SUV, for whatever needs that they have, their choice is very limited. The EPA trends report points out that the majority of light trucks, and I do not remember the exact percentage, are all within 4 miles per gallon of the average. Similarly for cars, 50 percent or more of cars are all within 4 miles per gallon of each other.

And so the actual choice is not in the marketplace. And in fact, yesterday a marketing representative from a national company called me and said "we are trying to come up with the sustainability program for our company to address environmental issues, and one of the big issues is vehicles that we drive to bring our products to trade fairs, et cetera. Where we have a big load, we are using minivans right now, but we are overloading them, and we have done all this research, but there is no choice for us. If we need an SUV, there is no fuel economy that actually achieves our environmental goals. What is your advice?"

And there was not much I could give, because the manufacturers really are not giving consumers choice within vehicle categories. And I think that is what we really need to see. New standards phased in over the next 10 years will give consumers that choice.

Senator KERRY. Well, that is a very good point. Half, that is 50 percent of the new trucks built since 1999, are all within 4 miles per gallon of each other. So that is not an enormous selection, obviously.

Well, this has been helpful. I think it certainly has helped outline some of the parameters of what we need to slog through. And we are going to try to do it. We have another panel coming up to test some of what has been said here. I really thank you very, very much. I look forward to working with all of you within the next weeks.

Thank you very much.

Could we bring the next panel up if we could right away? Thank you. We expect brilliance because of what has gone before. You can just tear it all apart and add it and build it back up.

Mr. Ditlow, we are going to begin with you and we will run down the table if we can from there. If you are ready to roll, thank you for being with us.

STATEMENT OF CLARENCE M. DITLOW, DIRECTOR, CENTER FOR AUTO SAFETY

Mr. DITLOW. Thank you, Mr. Chairman. I will summarize my testimony and ask the full testimony be included in the record.

Senator KERRY. It will be, without objection.

Mr. DITLOW. The Center for Auto Safety's position on safety and fuel economy has been consistent over time. Technology exists to improve both safety and fuel economy.

When CAFE standards were enacted in 1975, the vehicle fleet had dismal safety and fuel economy. Government regulations

changed all that. Overall, the inherent safety of passenger cars built to meet the 27½-mile-per-gallon CAFE standard is twice that of the older, heavier more gas guzzling cars of the 1970s.

The government regulations forced the auto companies to redesign their fleet and the public benefited in both increased safety and fuel economy. There were a large number of small unsafe vehicles on the road in 1975. They are gone. Replaced by larger, safer and more fuel efficient vehicles.

Prior to CAFE, there were many models that weighed less than 2,000 pounds. The 1,800 pound Honda Civic of the mid-1970s now weighs 2,600 pounds and gets 40 miles per gallon versus 32. That Civic went from failing NHTSA's crash test to passing with flying colors and in both front and side crash tests at 35 and 38 miles per hour, the chance of serious injury in the Civic is less than 10 percent, but the disparity of weights and vehicles is much more important to occupant safety than the average weight of all vehicles sharing the road.

Specific design features that affect the inherent safety of individual vehicles and their compatibility when they collide can play a more important role than the weights of the individual vehicles. By that I mean things like the stiffness and the height of the vehicle.

Since adoption of CAFE, small passenger cars got heavier while large passenger cars got lighter with the biggest growth in new car fleet coming in the middle with 3,500-pound cars going from 12 percent to 15 percent. Cars with inertia weights less than 2,500 pounds made up 11 percent of the 1975 fleet, but only 2.6 percent of the 2000 fleet. In contrast, passenger cars over 4,500 pounds made up 50 percent of the fleet, and now they are only 1 percent.

What has happened is we have homogenized the fleet and the fleet has gotten safer. As the General Accounting Office pointed out in 1991, every car in the fleet got safer, even the biggest cars that got downgraded by 1,400 pounds. That car, the down-weighted car, was safer than its gas guzzling predecessor.

It is simply a myth to suggest that the vehicle fleet itself got less safe because of CAFE standards. Even more aggressive SUVs have been introduced. Passenger car safety and fatalities continue to improve. For example, in 1979 to 1999, when passenger cars increased by 24 percent to 124 million vehicles on the road, their fatalities went down by 7,600, while at the same time, the number of light trucks and vans on the road including SUVs had a threefold increase. So if this disparity had a tremendous effect on safety, we would have seen it. Instead, we have fewer fatalities.

The major increase in light trucks and vans, though, used to substitute for passenger cars in the vehicle fleet has kept the number of light vehicle occupant fatalities from falling as much as other crash statistics. We have 2,000 additional fatalities each year due to rollovers of light trucks and vans.

What we need to do when we look at the vehicle fleet today is do the same thing in the truck fleet that we did in the passenger car fleet. We dropped the weight of the heaviest vehicle. We need to drop the weight of the heaviest SUV. Today, an SUV, the average SUV weighs, large SUV weighs 5,400 pounds. In 1975, the average large car weighed about 5,200 pounds. It lost 1,400 pounds.

The SUV could lose weight and maintain its size and its horsepower and by the example of a Suburban which went down 500 pounds in weight. An example of the Suburban that went down in engine size went up in transmission efficiency and got about a 4-mile-per-gallon increase in fuel economy.

We can use technology to improve both vehicle safety and fuel economy and the other aspect, though, is the introduction of SUVs because they are stiff, heavy and high, has increased the adverse effect on lighter cars. In a collision, we have about 1,000 additional lives lost each year that we could save if these vehicles were made lighter, lower and softer.

The answer to the SUV is not to take the SUV to take the SUV away from anyone, it is to make it a better SUV that is safer for its own occupants because it's lower, less rollover prone and because it will, in fact, be more crashworthy and absorb energy in a crash with a fixed object.

Now, given the extent that the auto companies have concerns over auto safety, there are a number of real simple measures we could adopt in the future that would save 10- to 18,000 lives per year. They are stronger roofs for rollover protection, improved safety belt design, advanced crash avoidance technology, reduced aggressivity of light trucks and vans and more effective seatbelt use in distance.

If we do this, we can do exactly the same thing in the future that we did in 1975. We can use technology to make the cars safer and more fuel efficient and that is the challenge for the auto industry and the government and absent government regulation, if we do not see cars of tomorrow being safer and more fuel efficient in the light truck market, which is where we need the improvements.

Thank you.

[The prepared statement of Mr. Ditlow follows:]

PREPARED STATEMENT OF CLARENCE M. DITLOW, DIRECTOR, CENTER FOR AUTO SAFETY

Mr. Chairman and members of the Committee, thank you for the opportunity to testify on the safety aspects of Corporate Average Fuel Economy (CAFE) standards for passenger cars and light trucks. The Center for Auto Safety (CAS) is a consumer group founded in 1970 that works to improve motor vehicle safety, fuel economy and quality.

CAS has supported and testified in favor of stringent motor vehicle fuel economy standards since the first hearings held by Congress in 1974 on what became the Energy Policy and Conservation Act (EPCA). Our position on safety and fuel economy has been constant over time: the technology exists to improve both the safety and fuel economy of motor vehicles.

In 1971, CAS criticized the original VW Beetle as one of the most unsafe vehicles ever built and pointed out that it didn't have to be that way. It no longer is. The 2001 new Beetle is about 25 percent more fuel efficient than the old Beetle and is dramatically safer in both NHTSA frontal and IIHS offset crash tests.

The Beetle is not alone. Prior to CAFE, there were many models that weighed less than 2,000 pounds. The only vehicle under 2,000 pounds today is the Suzuki Vitara, which is an SUV. The 1,800 pound Civic of the mid-1970s now weighs 2,600 pounds and gets 40-mpg versus 32-mpg. The Civic went from failing NHTSA 35-mph crash tests to getting 5 stars. The Pinto got replaced by the Escort; the Chevette by the Nova. All get better fuel economy and all are safer.

Overall, except for rollover performance, the inherent safety of passenger cars built to meet the 27.5 mpg CAFE standard is twice that of the older, heavier, more

guzzling cars of the 1970s.[1] Yet, despite the talk about the possibility that fuel economy might compromise safety, neither the auto industry nor the government has made safety a real priority then or now. We were not pushing the safety technology envelope in the mid-1970s and we are not pushing it now.

When one considers road transportation generally, the disparity in the weights of vehicles is much more important to occupant safety than the average weight of all vehicles sharing the road. Furthermore, specific design features that affect the inherent safety of individual vehicles and their compatibility when they collide, often play a more important role than the weights of the individual vehicles. In the passenger car fleet, the disparity in vehicle weight has decreased dramatically.

Cars with inertia weights less than 2,500 pounds made up 10.8 percent of the 1975 new car fleet but only 2.6 percent of the model year 2000 cars. In contrast, passenger cars over in the 4,500 pound weight class and above made up 50 percent of the 1975 new car fleet but only 0.9 percent of the 2000 model new cars.

The decline in full-size car weight is not due to introduction of SUV's since the market share of 4,500 pound and heavier passenger cars had dropped below 1 percent by 1985. Since adoption of CAFE, small passenger cars got heavier while large passenger cars got lighter with the biggest growth in the new car fleet coming in the middle with 3,500 pound cars going from 12.5 percent of the new car fleet in 1975 to 51.9 percent in 2000. The net effect has been a safer passenger car fleet, particularly when one considers improved safety technology built into passenger cars.

Advances in fuel economy technology have lead to a gain in overall fleet from 1980–2000 from 22.5 to 24.0 even though the average weight of the fleet went up from 3,227 pounds to 3,868 pounds during that timeframe. Improvements since 1980 are particularly significant since the easy technology gains of going from carburetors to fuel injection, from engine modifications to catalysts for emissions control, from 3-speed to 4-speed transmissions, and the down weighting of the large cars had already occurred. Attached to my testimony are examples of particular vehicles since 1980 that have used more technology to improve fuel economy or maintain fuel economy while upsizing. For example, the Toyota Corolla had a 25 percent improvement despite a 10 percent gain in weight despite going from 5,000 to 5,500 pounds, the GMC Suburban increased its CAFE by 27 percent from 14.3 to 18.1 mpg through modest drivetrain improvements including going from a 3-speed automatic to a 4-speed lockup. Despite going from a 5.7L to a 5.3L engine, the Suburban's horsepower went from 165 to 265.

Over the last two decades, highway fatalities have gone down nearly 20 percent while travel has increased by more than 40 percent. This is a reduction of more than 50 percent in fatalities per mile traveled over 20 years. During the same period, pedestrian fatalities went down by one-third, and motorcycle fatalities went down by half. There were no particular safety innovations or design changes that would have affected these fatalities, but motorcycle registrations decreased from 5.4 million in 1979 to 3.8 million in 1999. Increased helmet use accounts for some of the reduction in motorcycle fatalities. Passenger car and LTV occupant fatalities were down about 10 percent. That reduction was mostly in single-vehicle, non-rollover crashes and in crashes between two passenger cars. The following Table shows some basic motor vehicle fleet and crash statistics.

Table—A Comparison of Selected U.S. Motor Vehicle Statistics Over the Last 20 Years

Some Basic U.S. Motor Vehicle Statistics	1979	1999
Registered Motor Vehicles	144M	212M
(Percent Passenger Cars/Percent LTVs)	(72%/20%)	(59%/35%)
(No. Passenger Cars/No. LTVs)	104M/28M	125M/74M
Vehicle Miles Traveled	1.5B	2.7B
People Killed as Passenger Car Occupants	27,788	21,164
People Killed as Light Truck and Van Occupants	7,119	10,647
Pedestrians and Pedalcyclists Killed	9,021	5,981
Heavy Truck (> 10,000 lbs.) Occupants Killed	1,087	936
Motorcycle Riders Killed	4,679	2,284

[1] The fatality rate of passenger cars in crashes with other cars or in single vehicle, non-rollover crashes in 1999, per registered vehicle, is half that of passenger cars in 1979. Rollover safety is a function of a vehicle's handling and stability, its roof strength, and its restraint performance, not its weight.

The reduction in light vehicle occupant fatalities is a result of a number of factors including a substantial increase in safety belt use, the almost universal installation of airbags in recent model light motor vehicles, and the implementation of the dynamic side impact standard. Rollover fatalities have decreased modestly in passenger cars. Rollover fatalities have increased dramatically in pickup trucks and SUVs, consistent with the comparative growth in the number of these vehicles in the fleet. Overall, fatalities in rollovers of pickups and SUVs have more than doubled.

These data suggest several conclusions that will help in considering the potential impact of future changes in vehicle fuel economy on safety. The major increase in LTVs used as substitutes for passenger cars in the vehicle fleet has kept the number of light vehicle occupant fatalities from falling as much as other crash statistics. The increased use of LTVs as substitutes for private passenger vehicles has produced at least 2,000 additional rollover fatalities annually.

The greater number of LTVs in the U.S. fleet has increased passenger car occupant fatalities in crashes with LTVs by more than 50 percent while passenger car occupant fatalities in crashes with other passenger cars decreased by nearly 50 percent. The consequence is that light vehicle occupant fatalities in two-vehicle crashes went down only about 10 percent while fatalities in single-vehicle crashes went down more than 25 percent from 1979 to 1999. This reduction was driven by a 45 percent reduction in passenger car single-vehicle crash fatalities. Two-vehicle crashes would have killed nearly 1,000 fewer people without the major increase in LTVs as passenger car substitutes.

More even-handed regulation of LTVs used as passenger vehicles, in relation to passenger cars, should slow or even reverse these trends in increased occupant fatalities.

If the disparity in weights between passenger cars and light trucks becomes wider, either because of the design and marketing practices of the auto makers or because of continuing regulatory policies that differentially affect cars and light trucks, fatalities in these types of two-vehicle crashes will continue to increase relative to other types of automotive casualties. Reducing this weight disparity will have a salutary impact on casualties in two-vehicle crashes.

No more than one out of four light vehicle occupant fatalities would be influenced by changes in vehicle weight to improve fuel economy. Furthermore, the effect on weight disparity on these fatalities is marginal—almost certainly less than the effect on fatalities of the major increase in LTVs in the fleet. Had light vehicle occupant fatalities in two-vehicle crashes decreased to the same degree as single vehicle crash occupant fatalities (other than from rollovers), the effect would have been roughly 2,000 fewer fatalities (less than 5 percent of the total in 1999).

Some crash losses are fundamentally dependent on the weights of the vehicles involved while others are not. Clearly, in two-vehicle crashes, occupants of the lighter vehicle are at a disadvantage. This effect has been seriously exacerbated with the introduction of large numbers of LTVs into the U.S. vehicle fleet, not only because of the LTVs' greater average weight, but because of their stiffer structure that is higher off the ground than passenger car structures. Just like large cars posed more of a hazard to small cars until they were down sized, so do large SUV's pose a hazard to small SUV's and pickups as well as small cars. In the 2000 model year, large SUV's weighing an average 5,439 pounds comprised 5.5 percent of the new passenger vehicle (cars, trucks and vans) while small SUV's were nearly 1,800 pounds lighter at 3,670 pounds with 2.3 percent of the new passenger vehicle fleet. Just as large cars lost nearly 1,400 pounds in weight from 5,142 pounds to 3,792 pounds between 1975 and 2000, large SUVs should go on a diet to lose a similar amount of weight with a net resultant gain in fleet safety.

Light trucks, vans and SUVs pose a significant safety hazard to their own occupants, to passenger car occupants and to pedestrians.

• In crashes between cars and all types of LTVs, the fatality rate for car occupants is four times higher than for LTV occupants.

• On the other hand, LTVs have up to a four times higher rate of involvement in fatal rollover crashes.

• The stiffness of LTVs results in more intrusion into their occupant compartment in crashes into fixed objects as shown by IIHS offset crash tests.

• For vehicles of the same weight, LTVs have a higher fatality rate than passenger cars.

• Because of their height and broad front ends, LTVs are more likely to kill or seriously injure pedestrians than are passenger cars.

• NHTSA has not even begun to seriously address the two primary safety consequences of using LTVs as passenger vehicles: their propensity to rollover and their

aggressivity in collisions with cars and people. A few crash tests and some colored stickers are not in any way adequate responses.

• Introduction of LTVs has degraded safety overall because of their excess weight, stiffness and height that makes them very aggressive in collisions and because of their propensity to rollover and seriously injure their own occupants. Making LTVs "lighter, lower and softer" would increase the safety of their own occupants while making them safer for others on the road.

• LTVs will pose an increase threat to passenger cars as they get older and are passed on to younger and more accident prone drivers.

Given the extent auto makers profess concern about auto safety in the debate over CAFE, they should take safety more seriously independent of fuel economy requirements. Until they do, arguments about the nexus between safety and fuel economy have a hollow ring. A number of simple, inexpensive designs and technologies that could have a major impact on safety, independent of fuel economy, remain to be broadly implemented. These include:

• *Effective safety belt use inducements.* Currently, 18,000 people die who were not wearing safety belts: 6,000 to 10,000 could be saved by effective belt use inducements.

• *Stronger roofs for rollover protection.* Although a majority of casualties of rollovers are still unbelted and ejected, 2,000 belted occupants die annually, mostly because of roof crush. With increased belt use, the number of casualties from roof collapse and buckling will increase. SUVs that have a GVWR over 6,000 pounds need not even meet the inadequate roof strength standard for passenger cars. A GMC Suburban will not support its own weight if gently lowered onto it's a-pillar without its windshield.

• *Improved safety belt design and performance.* This includes belt pre-tensioners that trigger on rollover as well as on frontal and side crashes. An additional 3,000 to 5,000 could be saved by an effective rollover protection system: a strong roof, belt pre-tensioners that trigger on rollover, the interior padding required by a new Federal standard, and window curtain airbags.

• *Advanced crash avoidance technologies.* This includes smart cruise controls, yaw control systems, non-pulsing anti-lock brakes, and drowsy driver warnings. New computer and communications technologies should provide major opportunities to reduce the probability of crashes.

• *Reduced aggressivity of light trucks and vans.* More energy absorbing and less rigid front ends, lower heights and reduced weight would save 2,000 lives per year.

• *Reduced rollover propensity.* Light trucks and vans can be made safer by lowering their center of gravity, increasing track width and using yaw control systems.

The numbers of actual lives that could be saved by auto manufacturers adopting these technologies and counter measures range from 10,000 to 18,000 per year or far in excess in the number of hypothetical lives lost through adoption of stronger CAFE standards.

Policy makers must recognize that the desirability of increased fuel economy—lower vehicle operating costs, reduced pressure for oil imports and drilling in inappropriate places, and a lesser global warming threat—should not be considered as antithetical to safety. The automobile companies have the capability, if not the will to improve both as they did with automobiles after the first gas crisis. Just as Congress changed the auto industry in 1975 from a can't do industry to a can do industry with the fuel economy standards of the Energy Policy and Conservation Act, Congressional action is once again needed to force fuel economy improvements from an industry that has reverted to can't do. A 40 mpg fleet corporate average fuel economy standard for all passenger vehicles under 10,000 pounds will save fuel and lives by forcing the auto companies to put new technology for safety and fuel efficiency into the vehicles of tomorrow.

U.S. EPA unadjusted fuel economy for selected nameplates

TYPE	NAMEPLATE	YEAR	CTY	HWY	COMB	TRANS	# CYL	SIZE	CID	HP	WEIGHT	INT.VOL.	Accel 0-60	Sales Frac.
Minicompact	Porsche 911 Carrera	1980	15.8	26.5	19.3	M5	6	3.0L	183	180	3000	50.0		
		1990	17.0	28.0	20.0	M5	6	3.6L	220	247	3500	59.9		
		2000	18.9	32.1	23.2	M6	6	3.4L	207	296	3500	75.0		
Subcompact	Honda Civic	1980	35.8	49.2	40.8	M5	4	1.5L	91	67	2000	82.7		
		1990	35.0	44.0	38.0	M5	4	1.5L	91	92	2500	98.6		
		2000	35.1	46.9	39.6	M5	4	1.6L	97	106	2750	98.4		
Compact	Toyota Corolla	1980	27.2	40.8	32.0	M5	4	1.8L	110	75	2500	87.7		
		1990	31.0	42.0	35.0	M5	4	1.6L	97	102	2500	89.6		
		2000	34.4	48.6	39.6	M5	4	1.8L	110	125	2750	91.6		
Compact	Volkswagen Golf/Rabbit	1980	24.8	40.1	29.9	M5	4	1.6L	97	76	2250	88.2		
		1990	27.0	41.0	32.0	M5	4	1.8L	109	100	2750	104.7		
		2000	26.7	39.2	31.2	M5	4	2.0L	122	115	3000	105.8		
Large Sedan	Ford/Lincoln Continental	1980	14.9	24.8	18.2	A4	8	5.7L	350	149	4500	136.2		
		1990	20.0	32.0	24.0	L4	6	3.8L	231	140	4000	122.7		
		2000	19.1	32.2	23.4	L4	8	4.6L	281	260	4000	103.3		
Large Pickup	Ford/Dodge F-150 2WD	1980	15.7	24.6	18.7	M4	8	5.0L	302	142	4000	---		
		1990	16.0	24.0	19.0	M5	8	5.0L	302	145	4000	---		
		2000	16.3	26.1	19.6	M5	8	4.6L	281	220	4500	---		
Midsize Van	Chrysler Voyager 2WD	1980	10.7	14.6	12.2	A3	8	5.9L	360	175	5000	---		
		1990	21.0	31.0	25.0	L4	6	3.0L	181	141	4000	---		
		2000	20.0	31.8	24.0	L4	6	3.0L	181	150	4000	---		
Midsize Utility	Chrysler Cherokee 4WD	1980	15.2	19.9	17.0	M4	6	4.2L	258	93	4000	---		
		1990	18.0	28.0	22.0	M5	6	4.0L	242	177	3500	---		
		2000	19.1	28.0	22.3	M5	6	4.0L	242	190	3500	---		
Large Utility	GM C-1500 Suburban 2WD	1980	12.5	17.2	14.3	A3	8	5.7L	350	165	5000	---		
		1990	14.0	23.0	17.0	L4	8	5.7L	350	210	5500	---		
		2000	15.6	22.6	18.1	L4	8	5.3L	325	265	5500	---		
LIGHT DUTY FLEET	CARS	1980	20.3	29.0	23.5					100	3101		14.3	0.835
		1990	23.4	36.0	27.8					129	3175		12.1	0.698
		2000	23.3	37.4	28.1					170	3386		10.3	0.539
	TRUCKS	1980	16.5	21.9	18.6					121	3868		14.5	0.165
		1990	17.8	25.9	20.7					151	4005		12.6	0.302
		2000	17.5	26.0	20.5					200	4432		11.0	0.461
	CARS+TRUCKS	1980	19.6	27.5	22.5					104	3227		14.3	1.000
		1990	21.4	32.2	25.2					135	3426		12.2	1.000
		2000	20.2	31.1	24.0					183	3868		10.6	1.000

Notes:
1. To the extent possible, selections represent a cross-section of car/truck classes. Many classes are not listed here due to nameplate changes, lack of sales in certain years, or discontinuation of particular lines.
2. Vehicles are matched by transmission, # cyl., and CID when possible. Discrepancies exist when engines with previous characteristics were not available in a particular year. For example, there were no 8-cylinder Ford Continentals available in 1990.
3. All data based on public EPA Fuel Economy Guide data except for HP and weight which come from Trends Report data base. This chart does not contain any confidential business information.
4. Size is in Liters, CID=cubic inches displacement, inertia weight in pounds, Int.Volume in cubic feet.
5. Interior volume available for cars only.
6. Acceleration data is not provided here; accels are measured by EPA using regression calculations for large numbers of vehicle models which would not represent accurate acceleration for a single, specific model.
7. Chart updated 9-7-2001

Senator KERRY. Thank you very much.
Mr. Olson.

STATEMENT OF JAMES OLSON, SENIOR VICE PRESIDENT, TOYOTA MOTOR NORTH AMERICA, INC.

Mr. OLSON. Good afternoon. One of Toyota's founding principles was the avoidance or elimination of waste, a principle that still permeates our products. In the 1980s, Toyota began to use engines with 4 valves per cylinder, overhead cam shafts and multiport fuel injection.

Today all of our engines incorporate these fuel saving technologies and most also now have lightweight aluminum blocks and heads, variable valve timing—62 percent have variable valve timing—and increased compression ratios.

As a result, in 2001, the EPA rated 6 Toyota vehicles—more than any other brand—as most fuel-efficient. They range from small to large and from SUV to passenger car to pickup.

Our new models usually are more fuel efficient than their predecessors. For instance, the 1990 Corolla achieved 28.6 miles per gallon, while the 2000 Corolla improved to 32.6. The world's first hybrid electric gasoline vehicle, the Toyota Prius, is even more fuel-efficient, boasting EPA fuel economy ratings of 52 city, 45 highway and 48 combined. Furthermore, it is certified to California's super ultra low emissions standard. Toyota will continue to increase fuel efficiency while striving to give customers the performance and utility they demand. Fuel cells, for example, show great promise but we do not expect this technology to be available in any significant quantity for at least a decade.

All of our sales and marketing data indicate that fuel economy ranks low with most American vehicle buyers. This is no surprise. Despite this, because of our corporate culture, we always have exceeded the car and truck CAFE standards. And we have done so without using credits accumulated under the existing CAFE program and while becoming a full-line manufacturer. For example, 45 percent of our sales year to date fall into the light duty truck category.

Camry is a good example of our philosophy. 75 percent of Camrys sold have fuel-efficient 4-cylinder engines that provide performance matching competitor's 6-cylinder engines and Camry is America's best-selling car. Its combination of high volume sales and fuel efficiency is the gold standard of how to improve fuel economy.

Although automakers improve product-by-product fuel efficiency, consumers determine the aggregate fuel economy of the 16 million new vehicles sold here each year by what they choose to buy. Therefore, in shaping future energy policy, the challenge of addressing fuel economy should not be placed solely on manufacturers. We have a very large role to play, but Congress can help by passing legislation to send consumers a signal that buying a fuel-efficient vehicle is the right thing to do.

For example, if Americans are rapidly to embrace fuel efficient but expensive hybrid technology in high volume, incentives such as tax credits and single occupancy access to HOV lanes will be required. Fortunately, the CLEAR Act already incorporated an H.R. 4 would provide consumer tax credits.

Toyota looks forward to working with this Committee, the Administration and others to develop a sound approach in this process. I emphasize the need for fairness, effectiveness and engineering lead time. The NAS report says that "any changes to the current CAFE system should not," and I quote, and this also was noted by Honda's Ed Cohen, "impose higher burdens on those manufacturers who had already done the most to reduce energy consumption."

Specifically, NAS said that to require each manufacturer to improve its own CAFE by a defined percentage, the so-called uniform percentage increase approach, quote, "punishes those who have done the most." In my presence, at our meeting with them one NAS panel member even called UPI unwarranted punishment of innovation.

More importantly, the discrimination inherent in UPI would frustrate effective energy conservation and environmental gains by causing higher fuel economy vehicles to be replaced by lower mileage vehicles from producers with lower fuel economy targets. This would create an environmental loophole that would dwarf the so-called SUV loophole by allowing some manufacturers to meet a lower standard with their entire product line.

If you support the progress clearly delivered over the last 20 years by competition, you must be against UPI.

In addition to fairness and effectiveness, any future program must recognize the many years required to develop new technology and incorporate it into vehicles and bring them to market. A process cannot be turned on a dime without severe consequences from both consumers and industry.

Thank you for the opportunity to testify. We at Toyota look forward to working constructively toward even more fuel-efficient vehicles.

[The prepared statement of Mr. Olson follows:]

PREPARED STATEMENT OF JAMES OLSON, SENIOR VICE PRESIDENT, TOYOTA MOTOR NORTH AMERICA, INC.

Toyota appreciates the opportunity to submit its views on Corporate Average Fuel Economy.

One of Toyota's founding principles was the elimination of waste. This principle still permeates our corporate philosophy and is, therefore, quite evident in our processes and products.

Toyota always has recognized and pursued our responsibility to improve the fuel efficiency of our products. Most importantly, we believe that achieving real environmental gains and fuel use reductions requires wide consumer acceptance of our vehicles. For this to happen, vehicles must offer expected performance, be convenient, affordable and use a readily available fuel so that their utility is not hobbled by insufficient infrastructure. Toyota believes the next core powertrain technology that meets these criteria is the hybrid electric, addressed in greater detail below.

This testimony will first address Toyota's North American operations and then will focus on the technology Toyota has used and will use to improve the fuel efficiency of our vehicles. Finally, it will describe some of the challenges associated with increasing fuel efficiency while meeting the demands of a market, which—unfortunately—does not value it highly.

TOYOTA'S NORTH AMERICAN OPERATIONS

With total North American investment of $12 billion and sales last year of more than 1.7 million new vehicles, Toyota is the fourth largest motor vehicle manufacturer in North America. We directly employ over 31,000 associates. We produce more than one million cars and trucks a year at our plants in Kentucky, Indiana, California and Ontario, Canada. We manufacture 4- and 6-cylinder engines in both

West Virginia and Kentucky. The West Virginia facility also produces automatic transmissions.

In addition, Toyota has parts manufacturing facilities in Missouri, California and British Columbia and has begun construction of a $220-million V–8 engine plant in Huntsville, Alabama, to supply our Indiana truck plant.

These and other Toyota facilities in the U.S., Canada and Japan purchased nearly $15 billion in U.S. parts and materials last year. Toyota's U.S. retail sales force is comprised of more than 1400 Toyota and Lexus dealers, who employ 95,000 Americans and have a total U.S. investment of nearly $9 billion dollars.

TOYOTA'S USE OF ADVANCED TECHNOLOGY TO IMPROVE FUEL EFFICIENCY

Toyota will continue to be a leader in automotive technology. In the 1980s and early 1990s, Toyota began widespread use of engines with 4 valves per cylinder, overhead cam and multi-port fuel injection to improve fuel efficiency. Today, 100 percent of our fleet is equipped with multi-port fuel injection and 4 valves per cylinder. In addition, much of our engine line-up has been reengineered since 1990 in our efforts to improve fuel efficiency and reduce emissions. Most of our engines also now have lightweight aluminum blocks and heads, variable valve timing and increased compression ratios.

Likewise, Toyota has developed and is now introducing a new generation of lightweight, compact and highly efficient automatic transmissions. In the future, Toyota also plans to offer energy-saving technologies such as electric power steering.

All these technologies boost fuel efficiency while simultaneously providing our customers the performance and utility they demand.

As a result of our investment in this technology, in 2001, EPA rated six Toyota vehicles as "most fuel-efficient" in their class—the Prius, ECHO, Avalon, RAV4, Tacoma and Sienna. This is more than any other automotive brand. These vehicles range from small to large, from SUV to passenger car to pickup to minivan. They all incorporate most of the best available fuel economy technology.

Even Toyota's Lexus division, which competes in the high-end performance market—and in 2000 was the luxury market's sales leader—has never produced a car subject to the gas-guzzler tax. In large part, this is because of our aggressive application of fuel-efficient technology, even in a market segment where it ranks very low as a purchase reason.

Consistent with Toyota's philosophy of continuous improvement, each new generation of vehicle generally is more fuel-efficient than its predecessor. In 1990, for instance, the fuel economy of our Corolla was 28.6 mpg. In 2000, with the application of variable valve timing, sequential fuel injection, weight reduction and other technologies, Corolla's fuel economy improved to 32.6 mpg. But make no mistake, squeezing ever-greater fuel efficiency out of each succeeding generation of vehicle is extremely difficult, when married with the marketplace demands for performance, utility, safety and affordability.

Some of the most promising engine technologies from a fuel efficiency perspective are lean-burn gasoline and diesel engines. Toyota currently offers these engines in Japan and Europe. However, Federal Tier II and California LEV II emission standards make their future use in the U.S. questionable.

For example, Toyota has developed a lean-burn catalyst system for gasoline vehicles and a diesel particulate and NOx reduction system to control emissions from these engines. Although we are continuing to work on them, they will need to be further improved before they can be certified for use in the United States. The availability of low-sulfur gasoline and diesel fuel will be critical to any possible U.S. future for these technologies.

In 1997, Toyota introduced the world's first mass-market hybrid gasoline-electric vehicle—the Prius—in Japan. The second-generation Prius introduced in the United States and Europe in 2000 incorporates a number of improvements in an effort to accommodate customer demands—including improved performance, fuel efficiency and reduced emissions. The U.S. version, for example, has an EPA fuel economy rating of 52 mpg city, 45 mpg highway and 48 mpg combined. In addition, Prius is certified to California's Super Ultra Low Emission Vehicle (SULEV) standard.

The improvements made to the second-generation Prius also have enabled it to have greater driving distance on electricity, and a much smaller battery pack, which reduces weight and increases cargo capacity.

Looking to the future, Toyota will continue to develop and apply technology that increases fuel efficiency while giving customers the performance and utility they demand.

New conventional technologies like those previously mentioned will be developed, refined and utilized. We also will continue to improve the Toyota Hybrid System

(THS) and incorporate it into a wider range of vehicles as rapidly as possible. For example, Toyota just introduced a limited-volume four-wheel-drive hybrid minivan in Japan called the Estima. Initial sales have met expectations and we are hopeful they will continue at an acceptable rate.

Finally, Toyota has recently introduced two fuel cell concept vehicles—the FCHV4 and FCHV5. The base body for both vehicles is the mid-sized Highlander SUV we sell here in the U.S. The FCHV4 runs on pure hydrogen, while the FCHV5 runs on a clean hydrocarbon fuel reformed on-board into hydrogen. Both vehicles are called fuel cell hybrid vehicles because they use a fuel cell in place of a conventional engine in conjunction with the Toyota Hybrid System. But we do not expect fuel-cell hybrids to be available in any significant quantity before 2010 at the earliest.

INCREASING FUEL ECONOMY WHILE MEETING CONSUMER DEMAND

As the Committee can see, Toyota has aggressively developed and applied technologies that increase fuel efficiency while providing the types of vehicles consumers demand. The element of consumer demand is critical to the marketplace success, in fact, the existence, of any manufacturer. All of us must meet demand or suffer the consequences.

Through the application of technology, we believe we have been able to successfully balance these two competing demands. The key question is whether, even with our planned technology, we can continue to meet this challenge in the future without losing some of our customers because of high prices.

Although it varies by segment, all our sales and marketing data indicate that fuel economy is low on the shopping list of the typical American vehicle purchaser. Despite this, because of our corporate culture, over the years Toyota has always exceeded the car and truck CAFE standards. We have done so without using any of the credits we have accumulated under the existing CAFE program and while becoming a full-line manufacturer.

Looking to future energy policy, Toyota believes that any program designed to improve vehicle fleet fuel economy cannot focus solely on the vehicle manufacturer. The demand side of the equation also must be addressed—as it is in countries such as Japan—if policymakers are going to send consumers the proper signal that fuel economy is an important attribute to consider when purchasing a vehicle.

There is a crucial distinction among fuel efficiency, fuel economy, and fuel usage. The automaker is the primary driver of product-by-product fuel efficiency. In this effort, automakers face a complex combination of product tradeoffs including vehicle size, cargo and/or towing capacity, the technical challenges inherent in new technology, desired price-positioning, the often conflicting demands of safety, emissions and fuel regulations, and the how-much/how-soon calculation imposed on us by the limited capacity of our product-development workforce.

In contrast, the aggregate fuel economy of the approximately 16 million new vehicles sold each year in the United States is determined by the mix of vehicles consumers choose to buy.

And finally, the total amount of fuel usage each year is determined by the first two factors plus how much and in what way customers choose to use their vehicles.

In our efforts to continue to improve fuel efficiency, Toyota is looking to a new generation of advanced technologies, such as gasoline/electric hybrids and fuel cells. Looking at the customers purchasing our Prius and Honda's Insight, tells us that it will be a big challenge to move these advanced technologies from niche to mass market.

The primary difficulty in moving from conventional to hybrid powertrain technology is increased cost. The Toyota Hybrid System has the highest degree of hybridization and benefit of any system now available or proposed. If we are to spread this fuelefficient technology to other body styles and reach high-volume segments as rapidly as possible, some form of incentives will be required to reduce its price premium.

Ongoing development may further improve the benefits of the Toyota Hybrid System and reduce its cost. And we can expect some level of savings if higher levels of mass production can be achieved. However, incentives will be necessary to get us past the early years and lower volumes. In Japan, for example, Prius buyers are eligible for both national and local incentives, which can total over $2,800. Yet, there is no such incentive at the Federal level in the U.S.

The CLEAR Act, presently pending before the Senate Finance Committee and which also has been amended and passed by the House as part of H.R. 4, provides consumer tax credits for advanced technology vehicles in an effort to narrow their price premium. Indirect incentives, such as the provision in the House-passed bill, which clarifies that states are allowed to grant single occupant hybrids the use of

HOV lanes, are another way to help enhance the attraction of these new-technology vehicles to consumers.

Given the success of the Prius, the Committee may ask why incentives are necessary. The answer is that the typical Prius buyer is very different from the typical compact buyer. Prius purchasers are older, wealthier, more educated and more interested in technology than typical compact buyers. Therefore, to reach the typical buyer of a vehicle in the compact or any other high-volume market segment, something must be provided to encourage buyers to purchase an advancedtechnology vehicle or the most fuel-efficient vehicle in that segment. In shaping future energy policy, the challenge of addressing fuel economy should not be placed solely on manufacturers. Clearly, and inescapably, we have a large role to play and Toyota will do its part. But Congress can help by passing incentive legislation to bring the consumer into the fuel-economy equation. A one-sided program is likely to lead to less than optimum energy savings.

Toyota appreciates the opportunity to work with this Committee as well as others and with the Administration to help develop a sound approach to fuel economy. We believe this process should begin with a thorough examination of the NAS Report by the agency with the greatest expertise on this issue, NHTSA, as it begins its rulemaking to set future fuel-economy standards.

The NAS Report demonstrates the complex set of issues that must be addressed in establishing a fuel economy program for the future. Product cycles, safety tradeoffs, the time needed for technological advances, and issues related to the structure of any program (e.g. credit trading across cars and trucks and among manufacturers, attribute or weight-based programs) make the task of developing the appropriate policy difficult.

With respect to the current CAFE system, the NAS Report and its predecessor Report in 1992 make it clear that the existing import/domestic fleet distinction for passenger cars is counter-productive in today's industry and should be eliminated. The NAS could find no analysis or research to justify the fleet distinction, but did find that the requirement was increasing costs to consumers and perversely providing an incentive for manufacturers to use less domestic content in their vehicles. Toyota supports the NAS findings.

The NAS panel also makes clear that any change in the structure of the existing program should not "impose higher burdens on those manufacturers who had already done the most to help reduce energy consumption." Specifically, NAS said that to require each manufacturer to improve its own CAFE average by a defined percentage "punishes those who have done the most to improve the environment," increases the cost of environmental compliance, reduces competition and "seems to convey a moral lesson that it is better to lag than to lead." Commonly referred to as the Uniform Percentage Increase (UPI) approach, such a policy would be a huge disincentive for future technological innovation and development and would provide a strong incentive for manufacturers not to exceed regulatory standards. Some industry experts have summed up the UPI concept by saying that it stands for Unwarranted Punishment of Innovation.

Most importantly, to the extent that the discrimination inherent in the UPI approach causes higher fuel economy vehicles to be replaced by lower mileage vehicles from producers with lower fuel economy targets, energy conservation and environmental goals would suffer as improvements in overall fleet fuel economy and CO_2 reduction goals would not be met.

UPI or UPI-like approaches which seek to impose higher standards on one company compared with another based on an arbitrary base year or vehicle attribute fail on both policy and environmental grounds. The UPI approach has been highly discredited in the past and the NAS again heavily criticized and strongly cautioned against such an approach. Toyota strongly agrees.

Another point that is crystal clear in the NAS Report is the need for adequate lead time. It took years to develop many of the advanced technologies previously mentioned. These technologies then had to be applied in conjunction with new product and capital investment cycles. The new Toyota Camry recently introduced will be sold for several years, yet work on its replacement already has begun. The product cycle typically is longer for trucks and even longer for powertrains. Thus, any future program involving manufacturers must take into account the time required to develop new technology, incorporate it into vehicles, and bring them to market at a competitive price. This process cannot be turned on a dime without severe consequences.

Toyota again thanks the Committee for the opportunity to submit this testimony for the hearing record.

Senator KERRY. Thank you, Mr. Olson.

Mr. Robertson.

STATEMENT OF BERNARD ROBERTSON, SENIOR VICE PRESIDENT, ENGINEERING TECHNOLOGIES AND REGULATORY AFFAIRS, DAIMLER/CHRYSLER CORPORATION

Mr. ROBERTSON. Good afternoon, thank you, Mr. Chairman.

I am Bernard Robertson, Senior Vice President of the Daimler/Chrysler Corporation with responsibility for technology and regulatory affairs. I also appreciate the opportunity to provide comments to the Committee about improving fuel economy of light duty vehicles, CAFE and the recent study of the program by the National Academy, but I will be as brief as I can. I have deleted a number of comments.

Daimler/Chrysler manufactures a full line of vehicles, including passenger cars, minivans, sports utility vehicles and pickup trucks. We also made Senator Nelson's Jeep Grand Cherokee and Senator Dorgan's 25-year-old Dodge and the big black Mercedes that he ran into.

[Laughter.]

Mr. ROBERTSON. We are leaders in developing new fuel economy technology such as internal combustion engines, hybrid drive trains and fuel cells and we are ready to do our part in helping the Nation achieve its energy goals. At the risk of sounding like an echo, let me begin by saying that a government-mandated fuel conservation program, whether it is the current CAFE program or a substitute for CAFE will be most effective when the preference of customers is considered along with the availability of new fuel efficiency technology.

If customers are convinced of the value of high fuel economy, then they will choose to purchase new vehicles that deliver high fuel economy. In today's market, however, customers base their purchase decisions largely on other vehicle attributes as you have heard from many other witnesses. Consequently, while we and other manufacturers currently offer products with a wide range of fuel economy, it's ultimately the consumers, through their actions in a free market, not the automaker, that determine which of these vehicles will be purchased.

The NAS report correctly concludes that the application of advanced technology can lead to improvements in fuel efficiency and I want to stress that point. I don't think anyone argues that technology either is there or is coming. Indeed, some of the technologies described in the report such as cylinder deactivation, or displacement on demand as Tom Davis was calling it, and advanced automatic lockup torque converters are already in our production vehicles today, while others are ongoing development work to establish their performance, reliability, cost and consumer acceptance.

We plan to introduce them as rapidly as the development status and business case permit, and I would add that our plans to introduce hybrid electric vehicles in 2003 and 2004 and our initial fuel cell vehicles in 2004 are very well documented. They remain in place. I would note that we would be subsidizing those vehicles very heavily.

We will make another fuel cell announcement next week at the environmental vehicle conference. We are the largest producer

today of electric vehicles. By next spring, we will have built over a million alternate fuel vehicles of one form of another, electric, ethanol, methanol, or compressed natural gas. And I might add there, every one of those vehicles except the CNG vehicles were subsidized in the marketplace.

The NAS report recognized the need for providing adequate lead time to develop and bring new fuel savings technology to market. The report also acknowledges the adverse financial, employment, competitive, and safety effects if the lead time was not adequate and there have been a number of comments here about lead time so I will skip my other comments on lead time.

With regard to the Committee's request to address possible alternative means to reduce petroleum consumption, I would note that the CAFE program is only partially successful in accomplishing that. As an earlier NAS study, the 1992 study makes clear, the CAFE program has, and I quote, "Defects that warrant careful examination and chief among these is the fact that the CAFE system has been increasingly at odds with market signals and thus manufacturers are required to sell vehicles with higher fuel economy regardless of consumer interest in purchasing such vehicles."

The NAS report correctly described the many, often conflicting, factors that need to be addressed in determining a responsible energy conservation policy. Not only fuel consumption, but also occupant safety, emissions, consumer acceptance and demand, industry employment and the health of the auto industry are all potentially affected by CAFE standards. While we do have concerns over the effectiveness of the current program, it is nevertheless a program that the industry understands and we at Daimler/Chrysler have made long-term product decisions that comply with the program's requirements.

While we and others have examined alternatives to CAFE, they all tend to be either politically unacceptable or as the NAS said about a weight based approach, require additional analysis, which we are very happy to participate in, I might add.

To best accomplish reductions in light duty automotive consumption, we believe the best venue is to review and act on these complex issues within the regulatory structure of NHTSA. The process has already been established in Congress through the Energy Policy and Conservation Act which set up CAFE in the first place to do that.

We expect NHTSA to soon propose new light truck CAFE standards as Dr. Runge indicated this morning, and we pledge to both provide the agency with the necessary information for it to perform its work and to work with the agency to develop multiyear objectives. Again, as Dr. Runge noted, the agency must set new standards at the maximum feasible levels.

We believe that the agency has a historical perspective and expertise to deal with those complex issues and as you noted, they have 6 years of thinking about it to draw on.

In closing, I would like to emphasize that it is not within the capability of just the manufacturer to achieve future CAFE levels. It is ultimately the customer who will decide through the marketplace and based on individual needs whether any fuel economy program is successful.

Thank you for your attention.
[The prepared statement of Mr. Robertson follows:]

PREPARED STATEMENT OF BERNARD ROBERTSON, SENIOR VICE PRESIDENT, ENGINEERING TECHNOLOGIES AND REGULATORY AFFAIRS, DAIMLER/CHRYSLER CORP.

Good morning, Mr. Chairman, and distinguished Senators. I am Bernard Robertson, Senior Vice President of Daimler/Chrysler with responsibility for Technology and Regulatory Affairs. I appreciate the opportunity to provide comments to the Committee about improving the fuel economy of light duty vehicles, the Corporate Average Fuel Economy program and the recent study of the program by the National Academy of Sciences (NAS).

The tragic events of September 11th have again raised debate on the need for the Nation to have a sound energy policy, one that provides for energy security and independence and that contains elements of energy production as well as conservation. The congressional debate over the balance between increased production and conservation of energy, and the most effective means to achieve each, has often been heated. At Daimler/Chrysler, we recognize our responsibility to minimize any potential adverse effects of our products, whether they be in the area of safety, air quality, or fuel consumption. In the latter area, we believe the best way to reduce petroleum consumption in the automotive sector is to focus on technological advances in energy efficiency and for government and industry to send the correct signals to the market to value that increased efficiency. Our billions of dollars of investment in advanced technology vehicles is evidence of our strong and continued commitment in this area. Daimler/Chrysler is a technology leader, with research and development that encompasses fuel cells, hybrid drivetrains, cylinder de-activation, lightweight materials and advanced, clean diesels.

Daimler/Chrysler manufactures a full line of products, including passenger cars, minivans, sport utility vehicles, and pick-up trucks. One hundred years of experience in the auto industry have taught us that America is a mobile society, that vehicle ownership is associated with personal freedom, that industry competes fiercely for customers, and that only those companies that satisfy market demands, while simultaneously supporting shareholder value, will succeed in the long term. Customers want vehicles that have an exciting design, high quality, durability, an affordable price that translates to good value for the money spent, and the utility to meet all the consumer's transportation needs—be they transporting the family, hauling materials for home improvement, or moving one's child into a college dormitory. Our customers want safe vehicles, a certain level of performance and handling, and somewhere on the list of desirable attributes is fuel economy.

The NAS study specifically refers to the importance of market demand. However, while Americans clearly desire to reduce their gasoline expenditures, fuel economy, as a new vehicle attribute, even with recent spikes in fuel prices and the subsequent events to the September 11th tragedy, tends to rank low compared to the vehicle characteristics just mentioned. Thus, while we offer a range of fuel economy in our vehicles, consumers tend to select other options/vehicles at the expense of fuel economy. Indeed, they often spend more money—in terms of choices of engines, transmissions, and other features—that result in lower fuel economy than provided by the base vehicles. In a competitive free market, we can not dictate how the customer sets his or her priorities and selects a specific vehicle with unique attributes. All we can do is offer vehicle choices that hopefully will draw a new vehicle buyer to our product rather than those of a competitor. Therefore, any government mandated fuel economy program must recognize that manufacturers by themselves can not achieve a specific level of fleet fuel economy and must consider these aspects of the customer purchase decision in order to be successful.

Similarly, how people actually use their vehicle will have a role in determining the fuel consumption of the vehicle. Excessive speeds, jack-rabbit starts, poor vehicle maintenance, unnecessary cargo, and the number of miles traveled, all influence the amount of gasoline consumed. Consumers are not irrational when it comes to fuel consumption. When gasoline prices rose last year, consumers traveled less, the first time in 20 years that total vehicle-miles of travel decreased. But while the use of gasoline in existing vehicles declines when prices rise, the price of gasoline has not reached levels that dramatically affect the purchase decisions of new vehicle consumers. Indeed, today's low prices signal to the consumer that gasoline is a commodity that can be consumed in quantity and has relatively little national value. The consumer *must* play a more prominent role if reduced fuel consumption is to become a national priority.

One aspect of fuel economy within the auto manufacturers' control is the technology we incorporate in our vehicles. This is where we compete vigorously, and you

see evidence of such a contest today for advanced technology vehicles, specifically hybrid power trains and fuel cell vehicles. We are all working hard to bring these *revolutionary* advances to market at an affordable price as we're enticed by their 20-100 percent better fuel efficiency, but *evolutionary* changes to conventional internal combustion engines and transmissions also hold great and more near-term promise. There is no question that the fuel efficiency of individual new cars and trucks will increase. The industry achieved significant gains during the past 25 years, increasing both passenger car and light truck fuel efficiency—the amount of gasoline needed to move a given weight of vehicle a specified distance—by 2 percent per year on average. This trend will continue in the future. The challenge being discussed today is whether the customer will decide to apply the efficiency gains to fuel economy or to attributes such as safety or other features.

The National Academy of Sciences report highlighted the need for providing industry adequate leadtime. The NAS recognized the complexities in bringing new technologies to market, and portrayed the adverse financial, employment, competitive, and safety effects, if sufficient leadtime is not provided. I would like to concentrate today on this point, explaining how new fuel-efficient technology is developed, demonstrated, brought to production, and spread across the fleet. In addition, my testimony will address the NAS report's discussion of the capital constraints on the simultaneous adaptation of numerous technologies.

The mantra of "speed to market" is heard loud and clear within the walls of the Daimler/Chrysler Technology Center. Unfortunately, sometimes the way this is portrayed in the media is not aligned with the business and engineering world. A 12–18 month new product cycle time and a customer order filled within 2 days of placement on the internet are exciting possibilities, but far from the world that exists today. Starting with an "off-the-shelf" powertrain, the development cycle for a new vehicle will likely start several years before launch. If the vehicle is to include a new engine and transmission, for instance the all-new 4.7L V–8 engine and multi-speed automatic transmission in our new Jeep Grand Cherokee, the development of these powertrain components begins 2 years earlier, stretching the full system development time even longer.

Finally, the product, for example, the Jeep Grand Cherokee, is launched with this new fuel efficient powertrain combination that achieves 10 percent better fuel economy than the vehicle it replaced, even though significant emissions, safety and product content features were added which increased the weight of the vehicle. We invested more than $2.5 billion to develop this new powertrain and to build the plant in Detroit, Michigan to manufacture it. Not only was significant capital required for this venture, but also tremendous human resources had to be devoted to the effort. To get the best return on this investment, the same family of engine/transmission combinations will be adapted to other products consistent with their renewal cycles, everything from the new Jeep Liberty, to the Dodge Durango sport utility and the Dodge Ram pickup truck. This rollout to the other products can easily take another 4-5 years. And, the financial capability and the staffing limitations of the manufacturer can limit this rate of technology diffusion. Hence, the best case timeline requires about 10 years of development for new technology to reach all the products of a full line manufacturer.

Two other issues immediately arise. What if the technology is not proven and still must be invented and refined? And, is there commercial acceptance of the technology? A case in point is the fuel cell. Although the technology has been around for decades in spaceship and satellite applications, its use in powering vehicles remains in development with significant challenges remaining for affordability, range, fueling infrastructure, service, and repair, to name a few. Daimler/Chrysler has several demonstration fuel cell projects that serve to advance our knowledge on this emerging vehicle technology and test the market acceptance, such as the California Fuel Cell Partnership, and a multinational demonstration of fuel cell powered urban buses.

In this case, where the invention of new technologies is needed, the timeframe is stretched considerably. Inventing is not amenable to a specific timetable, but let's assume a system can be invented in 3 years. The next 2 years will involve adapting the technology to a specific product. A year or two before production will be needed for testing the product design. Spreading this technology across a product line will take several more years. Several recent examples, including electronic fuel injection and airbags, demonstrate that 10–15 years is required to introduce a feature that customers demand.

Having adequate leadtime to develop new technologies and products is not our only timing concern. Given the billions of dollars required to launch new products, it is essential that a manufacturer be able to recoup those investments. We have recently invested $3 billion in St. Louis, Missouri, to launch a new version of our

popular Dodge Ram Pick-up. About $2 billion was invested to convert a plant in Newark, Delaware, to build the Dodge Durango. The NAS report recognized that fuel economy standards that required premature retirement of engines, drivetrains, or entire vehicles, could have serious adverse effects on companies' employment and financial conditions. At Daimler/Chrysler, we have, over the past year, launched two new versions of our most popular vehicles—the minivan and our Dodge Ram pickup truck—both of which are manufactured in Missouri. We would expect these vehicle programs to have a life of about 8 years, during which their essential design and performance will not change significantly. New fuel economy standards that do not consider such investments will have the severe adverse financial and employment effects cited by the Academy.

The Committee's invitation letter also asked that alternatives to the current CAFE program be addressed. The CAFE program is not the most effective means to reduce petroleum consumption. As an earlier NAS study (1992) makes clear: the CAFE program has "defects that warrant careful examination, and [chief among these] is the fact that the CAFE system. . .has been increasingly at odds with market signals. . .[and thus] manufacturers are required to sell vehicles with higher fuel economy regardless of consumer interest in purchasing such vehicles." This can best be illustrated by the situation in Europe and Japan, where gasoline prices—essentially due to government taxes—are nearly three times higher than in the U.S. As a result, small cars have two to three times the market share that they have in the U.S. and through more flexible policies regarding diesel engines (which have 20–40 percent higher fuel economy than an equivalent-sized gasoline engine), diesel penetration has risen to 30 percent in Europe, and is expected to increase further, compared to less than 1 percent here.

Nevertheless, with all its flaws, CAFE is a program that we understand and we have made long-term product decisions to comply with the program's standards. While we and others have examined alternatives to the current CAFE system, they turn out to be either politically unacceptable or have significant "unknowns" or problems that prevent us from endorsing them at this time. While a weight-based approach to fuel economy has been much discussed, we concur with the NAS report which notes that "additional analysis will be required" before it can be seriously viewed as a viable alternative to CAFE. It is premature to enact legislation in this area given the uncertainties on how such a program would work and what the competitive and fuel savings effects might be.

Likewise, I wish to point out that because of the complexity of the fuel economy issue and its tradeoffs of fuel savings with employment in the U.S. auto industry, differential competitive effects, and possible serious safety consequences, the Academy refrained from advocating a "CAFE number." While there are a wide range of fuel economy numbers in the report, the Committee wisely, we believe, stated that they "are NOT recommended fuel economy goals" and NAS Committee Chairman Portney, in testimony at a joint hearing of this Committee and the Energy and Natural Resources Committee, stated that "the committee does not recommend whether, or by how much, government should raise standards."

Nevertheless, I also note some problems with the methodology and potential misapplication of information in certain sections of the NAS report. For example, on engine gas exchange efficiency losses, the report suggests that an efficiency improvement of up to 39 percent is available. Yet the total loss in efficiency through these processes in a typical gasoline engine is less than half this value. These and other issues lead to overestimates of improvements in fuel economy cited in the report and we have discussed them with the Academy in a public meeting this past October.

In addition, several of the fuel economy bills and proposals we have seen in the Congress cause us great concern. We have seen proposals that would require truck CAFE to increase by 30 percent in the next 5 years and the combined car/truck fleet to achieve a 39 mpg CAFE within 10 years. We can find no scientific basis for such numbers; nor are they contained within the NAS report that the Congress commissioned.

The complexity of any fuel economy program was adequately highlighted in the NAS report and leads to our belief that future CAFE standards can best be addressed by the legislation already enacted by the Congress—the Energy Policy and Conservation Act—which created the CAFE program. This legislation, enacted in 1975, established a regulatory process to address the level and form of the standards. We believe that the National Highway Traffic Safety Administration is poised to consider new light truck CAFE standards, once Congress lifts the prohibition on such rulemaking. Those standards, by law, must be set at the "maximum feasible" level. We believe the regulatory process is the best venue to address fuel economy issues. It is an open process in which everyone from manufacturers, to the environmental community, to Members of Congress, can make their views known. And, we

believe NHTSA has the experience to best balance the conflicting tradeoffs addressed in the NAS report. Daimler/Chrysler looks forward to working with NHTSA to establish the "maximum feasible" fuel economy levels for future trucks.

In closing, Daimler/Chrysler takes pride in being a leader in technological innovation and we are committed to introducing new technologies that minimize the environmental impact of our vehicles. We believe the best way to reduce petroleum consumption is to focus on technological advances—such as in the areas of hybrid and fuel cell power sources—and through sending the correct signals to consumers on the value of energy. If customers do not demand high fuel economy, then any technology developed by the auto industry and any CAFE standard and timing established by regulation will not be optimally effective in reducing fuel consumption. Given all that we know about industry timelines, capital requirements, technology development, and other considerations, no CAFE or other fuel consumption program will work in 2001, 2011, or 2021 if the customer is not part of the equation, and values the attribute of fuel economy.

Thank you for your attention and I would be pleased to answer any questions you may have.

Senator KERRY. Thank you, Mr. Robertson.

Mr. Friedman.

STATEMENT OF DAVID FRIEDMAN, SENIOR ANALYST, CLEAN VEHICLES PROGRAM, UNION OF CONCERNED SCIENTISTS

Mr. FRIEDMAN. Thank you, Mr. Chairman, and thank you for this opportunity to speak to this Committee.

My name is David Friedman. I am a Senior Transportation Analyst with the Union of Concerned Scientists. For anyone not familiar, the Union of Concerned Scientists is a non-profit partnership of scientists and citizens that has been working at the intersection of science and policy for over 30 years. I myself am trained as an engineer, so my testimony will basically be from the perspective as an engineer looking at these issues.

Today I would like to summarize my testimony and request the full testimony appear.

Senator KERRY. Without objection, everybody's testimony will be put in the record in full as if read.

Mr. FRIEDMAN. Thank you. I think we are all here because everyone recognizes how serious the problems are associated with our dependence on oil. Whether those problems are associated with environmental problems or energy security problems or the financial problems that price spikes in gasoline and oil prices produced in our country.

I think that one of the most important things in a recent study that we released this summer drilling in Detroit shows that raising fuel economy standards to 40 miles per gallon over the next decade is the fastest, least expensive and single most effective thing that we can do to reduce our dependence on oil.

Every automaker here has the technology to do this. We have heard conflicting views on automakers saying we have the technology. Other automakers say we do not have the technology. Every day, whether in magazines like *Automotive News* or in research papers or in the newspapers, we see examples of how these car companies have the technologies to improve fuel economy.

One of the dangers that we face if we do not increase fuel economy standards is that we will lose these technologies because fuel economy standards are not increased, these technologies will instead go toward making vehicles larger, more powerful, higher top

speeds and we will lose the opportunities that we have today. And it is actually a very large opportunity.

If we could reach 40 miles per gallon over the next decade in 2012 alone, we would be saving more oil than we imported last year from Saudi Arabia. We would be saving about 1.9 million barrels of oil per day. Over that 10-year period, we would have accumulated about 3 billion barrels of oil saved. That is about equal in 10 years to what we could get from the Arctic National Wildlife Refuge in 50 years. I would say that is a pretty good bargain to be able to get 50 years worth of oil in 10 years instead.

One of the things I would like to bring up is the chart that I prepared that compares some of the results from our work as well as the National Academy of Sciences and what this is is the first set of columns for the National Academy of Sciences, we can see their path to technologies and the average vehicle and the average case for the past two technologies, they showed that within 10 years, you could reach 34 miles per gallon.

In our study, we showed that you could actually do a little bit better: 36 miles per gallon if you shaved some weight off of the heavy sport utility vehicles and pickup trucks and the heavier vehicles out there in the market. That is less than 10 years using existing technologies.

In 10 to 15 years, the average case in Path 3 from the National Academy of Sciences study showed you could reach 39.8 miles per gallon as a fleet average fuel economy, 40 miles per gallon is possible. It is technically achievable with existing and emerging technologies. We showed that again if you add on weight savings, you could go even further. You could get close to 42 miles per gallon.

None of this was achieved using advanced technologies like hybrids or fuel cells. This was all done using technologies that again, as I said, the car companies we have here have today, for example, as was mentioned, General Motors showed the cutoff on displacement on demand systems or Honda's advanced V tech engines or lightweight aluminum parts that were developed in Ford's aluminum intense vehicle program, or even high-strength low wage steels that have been developed by the American steel industry.

The technology is out there and if we start off by closing the light truck loophole by 2007 and then reaching 40 miles per gallon by 2012, we can be saving consumers $13 billion per year in 2012 and that is a number that is only going to grow to about $30 billion by 2020, so raising fuel economy standards is possible and it is also good for consumers.

Senator KERRY. When you give that figure, does it take into account the added cost of the vehicles for these technologies?

Mr. FRIEDMAN. Yes, it does. That is a net savings value so the vehicle costs varying anywhere from $1,000 to $3,000, depending on the vehicle, but they pay for themselves over 4 to 5 years, and then consumers are saving money after that. So if you are financing a vehicle for 4–5 years, you are actually going to start saving right away.

Our study also shows that we could see an increase in 40,000 jobs in the automotive industry alone due to increased fuel economy and vehicles.

This is due to two things.

One, the automakers will have to make investments to achieve these fuel economy standards, but investment is a good thing. I think we all see that in our economy. Investing means creating jobs. It means advancing technology which is also going to create jobs. Also the savings that consumers are going to see on these more fuel efficient vehicles means they are going to have more money to spend in the economy, which means jobs are going to be created everywhere.

I see my time is running low, so I would like to make one quick final note on safety and this is a lot of people have made the point—or tried to make the point—that the length between fuel economy and safety is a simple relationship in physics and I would contend that it is not a simple relationship in physics. It is a questioning of engineering. It is a question of design; making safe vehicles is a question of designing them to be safe vehicles.

We have the technologies to achieve 40 miles per gallon without compromising safety, without compromising performance, without compromising comfort of these vehicles and, in fact, if we focused the weight savings on the heaviest vehicles, we can improve safety.

So again, I would like to thank you for this opportunity to testify and also if you have any questions about issues of fuel cells versus conventional vehicles, I did spend the last 4 to 5 years before joining UCS on fuel cells and where they can bring us, and I think I can add some comments on that as well.

[The prepared statement of Mr. Friedman follows:]

PREPARED STATEMENT OF DAVID FRIEDMAN, SENIOR ANALYST, CLEAN VEHICLES PROGRAM, UNION OF CONCERNED SCIENTISTS

Thank you, Mr. Chairman and members of the committee for the opportunity to testify before you today. My name is David Friedman and I am a Senior Analyst in the Clean Vehicles Program at the Union of Concerned Scientists. UCS is a nonprofit partnership of scientists and citizens that has been working at the intersection of science and policy for over 30 years.

I am the lead author of the report "Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles," in which we provide a comprehensive assessment of both the technical and economic potential of achieving a safe and fuel-efficient fleet of passenger vehicles. Prior to my time at UCS I have been involved in several projects related to fuel economy, including modification of a Ford Taurus to reach 65 mpg and various analysis and support in assessing fuel economy potential in the early stages of the Partnership for a New Generation of Vehicles.

Today I would like to summarize some of the results from our fuel economy study as well as comment on several parts of the recent National Research Council (National Academy of Sciences) report on the "Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards."

THE IMPORTANCE OF FUEL ECONOMY

U.S. drivers consumed 121 billion gallons of gasoline in 2000 at a total cost of $186 billion. This level of consumption represents 40 percent of the oil products that the nation consumes. This number places these vehicles at the heart of the growing debate over oil supplies.

Today, U.S. oil dependence is greater than it has ever been as we import a record 10 million barrels of oil and petroleum products each day. These imports represent over half of U.S. oil product consumption, and as demand increases the proportion of imports will rise. About 25 percent of this imported oil comes form the politically unstable Middle East [1]—for example in the year 2000 we imported 1.7 million barrels of oil per day from Saudi Arabia and another 0.6 million barrels per day from Iraq. The cost of imported oil exacts a toll on our international balance of trade, as the United States currently sends about $200,000 overseas each minute to buy oil

[1] Based on EIA 2000a import values.

products and is estimated to spend $20 to $40 billion per year to defend oil resources in the Middle East.[2]

In recent years, the Organization of Petroleum Exporting Countries (OPEC) has regained its ability to substantially influence the price of oil throughout the world.[3] OPEC's market power can be expected to grow as its production approaches half of all world oil output in the next two decades. In the United States, our dependence on imported oil from OPEC and other foreign sources is expected to grow to 64 percent, making us even more susceptible to supply shortages and rapid rises in world oil prices. Historically oil price shocks and periods of inflation have coincided, resulting in significant harm to the U.S. economy and our balance of trade.

Transportation is also the source of roughly one-third of all the heat-trapping gases (greenhouse gases) linked to global warming that are released in the United States every year (EIA 2000a). Greenhouse-gas emissions from the U.S. transportation sector amount to more than most countries release from all sources combined.[4] The production, transportation, and use of gasoline for cars and light trucks resulted in the emission of 1,450 tons of greenhouse gases by the United States in 2000—over one-fifth of U.S. global warming emissions that year.[5]

Cars and trucks are the second largest single source of air pollution in the country, second only to electricity generation. As tailpipe standards are tightened, pollutants from passenger vehicles are falling to near the level of those produced in refining and distributing gasoline. As a result, transportation's impact on air pollution will soon approach an equal split between the tailpipe and the amount of fuel a vehicle uses. In the case of toxic emissions, pollutants that may be linked to cancer, the upstream emissions from fuel refining and distribution are the dominant source. The production and distribution of gasoline is also linked to many other negative environmental impacts including oil spills and groundwater pollution

Assuming current fuel use, the production and distribution of gasoline alone results in the emission of 848,000 tons of smog-forming pollution and 392,000 tons of benzene-equivalent toxic emissions in the United States each year.[6] Reducing these numbers significantly through improvements in fuel economy can mean great strides in protecting human health.

The effect our cars and light trucks have on our economy, our oil use, and our environment is only expected to get worse due to rising vehicle travel, a changing vehicle fleet, the impacts of vehicle emissions and fuel use under actual driving conditions, and stagnant fuel economy standards. Together these factors have led to a 24 mpg fleet average fuel economy in 2000, the lowest level in over twenty years:[7]

• Rising Travel. There are now more vehicles in the United States than people licensed to drive them. Combined with increasing travel rates per vehicle, the number of miles that Americans are driving continues to rise. Vehicle travel is expected to increase nearly 50 percent over the next 20 years,[8] a trend that will help drive up passenger vehicle fuel use.

• Shifting Markets. SUVs and other light trucks are allowed to use one third more fuel than cars under current CAFE requirements. This "Light Truck Loophole" caused consumers to use about 20 billion more gallons of gasoline in 2000 and cost consumers about $30 billion dollars more than if the fuel economy standards of light trucks was set to the same as that of cars. The light truck market has risen from 19 percent to 46 percent since 1975 and is expected to grow to at least 50 percent of the passenger vehicle market, driving fuel economy lower in the coming years.

• Real World Fuel Economy. Testing for CAFE standards is based on a pair of simulated driving cycles established in 1975. At the time it was unclear if these cy-

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[2] Overseas payments is a UCS estimate is based on the EIA 2000a import cost figure of $106 billion in 2000. Oil defense expenditures from Delucchi and Murphy 1996.

[3] OPEC is composed of the following countries: Algeria, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

[4] Only China, Russia, and Japan have higher total emissions (based on Marland et al. 1996).

[5] This UCS estimate is based on EIA 2000a. Each gallon of gasoline burned emits nearly 19 pounds of carbon dioxide, the primary pollutant responsible for global warming. The production and delivery of gasoline are responsible for another five pounds per gallon of global warming pollutants for a total of 24 pounds of carbon dioxide per gallon of gasoline used (Wang 1999).

[6] 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).

[7] Heavenrich and Hellman. *Light–Duty Automotive Technology and Fuel Economy Trends 1975 Through 2000*. An Arbor, MI. U.S. Environmental Protection Agency. 2000

[8] Energy Information Administration. *Annual Energy Outlook 2001*. Washington, DC: U.S. Department of Energy.

cles represented real world driving conditions, but today it is quite clear that they do not. Estimates show that real world fuel economy is about 17 percent below tested values and this shortfall is expected to increase over the next two decades.[9]

• Stagnant Fuel Economy Standards: CAFE standards for cars and light trucks have not changed in more than a decade. The original schedule called for an increase in car fuel economy to 27.5 mpg by 1985. While this goal was delayed for a few years, the standard has been at that level since 1990. The light truck standard reached approximately today's level in the late 1980s while separate standards existed for 2 and 4-wheel drive vehicles, and, like passenger cars, was stalled for a short period until reaching today's 20.7 mpg requirement.

We estimate that these factors, along with continued stagnant fuel economy standards, would lead to an increase in passenger vehicle fuel use over the next two decades of 56 percent, to 189 billion gallons per year, by 2020. The result would be fuel costs to consumers of $260 billion dollars at a gasoline price of $1.40. Total oil demand would rise from today's 20 million barrels per day to over 27 million barrels per day by 2020, 64 percent of which would be imported form outside the U.S. In addition, annual greenhouse gas emissions from the passenger vehicle sector would rise to 2,260 million tons of carbon dioxide equivalent while emission of 1,320,000 tons of smog-forming pollutants and 612,000 tons of benzene-equivalent toxic emissions would be produced in the United States each year.

REFORMING REGULATIONS TO REDUCE THE IMPACTS OF DRIVING

The U.S. is not locked into the predictions noted above. A systematic approach to reducing fuel use would address all of the key factors noted above: stagnant fuel economy standards, shifting markets, real world fuel economy, and rising travel. Within this systematic approach, increasing fuel economy standards to 40 mpg by 2012 is the single most effective, fastest and least expensive path to reducing our future dependence on oil.

Fuel Economy Standards

The 2001 National Research Council study has identified the CAFE standards enacted in 1975 as a key factor in the near doubling of new passenger car fuel economy (15.8 mpg in 1975 rising to a peak of 28.5 in 1998) and the 50 percent increase in the fuel economy of new light trucks (from 13.7 mpg in 1975 to today's 20.7 mpg). In addition, this study notes that CAFE standards have played a leading role in preventing fuel economy levels from dropping as fuel prices declined in the 1990s. UCS estimates that current fuel economy levels maintained by CAFE saved consumers over $90 billion in 2000. The NAS report estimates that in the year 2000 alone, increased fuel economy reduced gasoline use by 43 billion gallons, or about 2.8 million barrels of oil per day (UCS estimates the figure to be about 60 billion gallons of gasoline, or 3.9 million barrels of oil per day).

These savings put to rest concerns over the effectiveness of improved fuel economy. While fuel use has risen by 30 percent since the CAFE law was passed, this is primarily due to an increase in the amount of travel by Americans each year—which would have resulted in an even large increase in fuel use had vehicle fuel economy not improved.

Savings of same magnitude as seen in the past can be achieved in the future if fuel economy standards are again increased. UCS analysis has shown that cost-effective technologies for near-term and longer-term improvements in vehicle efficiency exist today. If these technologies are used to increase fuel economy over the next 20 years, our passenger vehicle oil use could be turned around (i.e. we could stop the growth in fuel use and even turn back the clock to 1990 levels if standards are raised sufficiently), the amount of money consumers spend on gasoline could be substantially reduced, and the impact our driving has on the environment could be cut in half. Below is a short list of conventional technologies that have already been developed by automakers that could significantly increase the fuel economy of today's cars and light trucks, many of which are already in some cars today.

EXISTING CONVENTIONAL TECHNOLOGY OPTIONS FOR FUEL ECONOMY IMPROVEMENT.

Vehicle Load Reduction

- Aerodynamic Improvements
- Rolling Resistance Improvements
- Safety Enhancing Mass Reduction
- Accessory Load Reduction

[9] *Ibid.*

Efficient Engines

- Variable Valve Control Engines
- Stoichiometric Burn Gasoline Direct Injection Engines

Integrated Starter Generators

Improved Transmissions

- 5- and 6-speed automatic transmissions
- 5-speed motorized gear shift transmissions
- Optimized shift schedules
- Continuously Variable Transmissions

Estimates from a study released by the American Council for an Energy Efficient Economy, by DeCicco et. al., indicate that a combination of these technologies, along with mass reductions targeted at the heaviest vehicles, can produce a fleet of cars and trucks that averages over 40 miles per gallon. The table below shows the costs and net savings associated with these improvements in fuel economy. The result is an increase in fuel economy of over 70 percent and a net saving to the average consumer of over $2,000. Increasing fuel economy standards results in a win-win situation where consumers and the environment are both better off. In this case, 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 at the same time we are reducing our oil dependence.

Fuel Economy and Lifetime Savings from Existing Conventional Technologies.

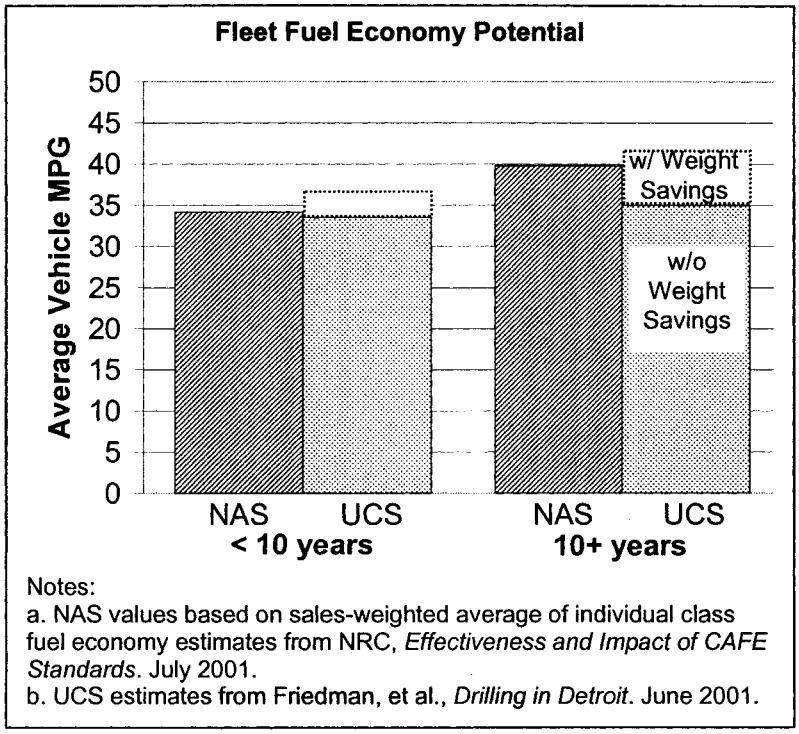
	CAFE Rated Fuel Economy (mpg)	Real World Fuel Economy (mpg)	Fuel Economy Improvement vs. baseline (%)	Cost of Fuel Economy Improvement	Lifetime Fuel Cost Savings	Net Savings	Greenhouse Gas Savings (tons)	Avoided Toxic Emissions (lb.)	Smog Precursor Savings (lb.)
Small car	48.4	38.7	57	$1,125	$2,595	$1,470	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

a Source: DeCicco, An, and Ross. Technical Options for Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010–2015. Washington, DC. American Council for an Energy Efficient Economy. 2001.

b CAFE fuel economy reduced by 20 percent.

c Assumes a 15-year, 170,000-mile vehicle lifetime and a 5 percent discount rate. Average life based on scrappage rates from Davis 2000. Vehicle mileage based on 1995 National Personal Transportation Survey (NPTS) data.

We have compared the UCS/ACEEE fuel economy results with those from the recent National Research Council report and we find that the costs and improvements in fuel economy are very similar. Using the results from NRC Path 3 technologies (NRC 2001, page 3–24) we estimate that a fleet fuel economy of 33 to 47 mpg could be reached at a retail price increase of about $1,700 to $3,800 per vehicle. This compares favorably to UCS/ACEEE estimates of a fleet fuel economy of 36–49 mpg at retail price increase of about $1,200 to $3,900. (Friedman et. al, pages 84–87) In both cases, consumers would be saving thousands of dollars at the gas pump. In most cases, this would be more than enough to pay for the cost of the fuel economy improvements, resulting in a net savings to consumers.



The figure shows the results of the NAS work for Path 2 and Path 3 technologies as well as comparable UCS and ACEEE analyses. The combination of both the UCS and the NRC results indicate that it is clearly feasible to reach a fleet average fuel economy of 40 mpg. We feel that such a standard could be phased in over 10 years, while the NRC analysis shows that similar fuel economy levels could be achieved within 10–15 years if weight reduction is not prominently used to reach improved fuel economy. In less than 10 years, both the NAS and UCS results agree that a fleet average of close to 35 mpg is technically feasible and cost effective.

The benefits to reaching a 40–mpg fleet by 2012 are quite significant. By 2012, we would have accumulated savings of 125 billion gallons of gasoline, this is about one full year's worth of gasoline and is 25 times the savings sought though the House energy bill, H.R. 4. In that same year, we would be saving about 1.9 million barrels of oil per day. This is more than the 1.7 million barrels per day we imported form Saudi Arabia last year and over three times the amount of oil we imported from Iraq. Consumers would also see significant benefits, with the U.S. economy seeing net savings of 12.6 billion dollars in 2012 alone. On top of these financial benefits, over 40,000 new jobs would be created in the auto industry and close to 70,000 would be created in the U.S. economy as a whole. In the end, increasing the average fuel economy of cars and trucks would both aid us in reducing our dependence on oil and help stimulate the economy.

Before the 40–mpg standards are phased in, UCS analysis indicates that average light truck fuel economy could be raised well above today's 20.7 mpg standard to that of cars (28.1 mpg) for about $670 in mass production. This increase in fuel economy could be achieved within 5 years using technologies available in cars today. By 2010, this increase in fuel economy would save 35 to 40 billion gallons of gasoline, more than seven times the meager savings offered in the existing House Energy Bill, H.R. 4. The overall benefit to consumers would be $7 billion dollars per year in 2010 alone and would be accompanied by significant reductions in greenhouse gas, toxic, and smog forming pollutants.

SHIFTING MARKETS

The NRC report (page 5–11) identifies "economic incentives for manufacturers to assure that their vehicles are classified as trucks." These are the "light truck loophole" and the "gas-guzzler tax." The fact that the fuel economy standard for light trucks is set at 20.7 mpg, lower than the 27.5 mpg for cars, means that automakers have to spend less money on the fuel economy of trucks. The resulting lower price combined with the current strong demand for light trucks means that automakers can make more money from light trucks and therefore have an incentive to classify more vehicles as light trucks. In addition, the gas-guzzler tax, which applies to cars below 22.5 mpg, does not apply to light trucks, creating yet a further incentive to make sure vehicles are classified as light trucks.

Together with lower tailpipe emissions and safety standards, these loopholes have and will continue to enable the sales of more vehicles with lower fuel economy, increasing fuel use and air pollution. The tailpipe air pollution loophole for light trucks will be phased out by 2009 under EPA's Tier 2 regulations. The vast majority of these "light trucks" are no longer used for commercial purposes and are instead used as passenger vehicles. The NRC report (page 5–10 and page 5–11) indicates that "The car/truck distinction has been stretched well beyond the original purpose." and that redefining the car/truck classification or reducing economic incentives for manufacturers to define their vehicles as trucks could alleviate the problems.

Since the existing loophole no longer serves its intended purpose and is enabling increased fuel use and increased costs to consumers, the light truck loophole in CAFE should be closed by 2007 as a first step in fleet-wide increases to fuel economy standards. Once this is done, all cars and light trucks can be classified as passenger vehicles and the gas-guzzler tax can be applied to all such passenger vehicles.

REAL WORLD FUEL ECONOMY

Given that current data shows real world fuel economy to be 17 percent lower than CAFE certified fuel economy, CAFE reform should also include a shift in fuel economy measurement towards more realistic driving cycles. This has been pursued for emissions through the incorporation of the SC03 and US06 driving cycles. The SC03 cycle includes the use of air conditioning, which is not included in standard CAFE testing. The US06 driving cycle is more akin to modern urban driving with harder accelerations and higher speeds. Incorporating these driving cycles or some other measure to ensure "truth in testing" could serve to provide a more certain increase in fuel economy.[10]

RISING TRAVEL

The increase in total vehicle miles traveled in the U.S., due partly to increases in individual travel, cannot be addressed by increased fuel economy standards.[11] One determinant of the amount of individual travel is the cost of gasoline. Increasing gasoline taxes or instituting a tax on the amount of carbon in a fuel (to account for global warming effects associated with the emissions of carbon from burning the fuel) would likely result in some decrease in daily travel. Estimates are that a 100 percent increase in the cost of gasoline would result in about a 10 to 20 percent reduction in the amount each vehicle travels (Greene et. al., 1999), though estimates of this value vary widely. Significant increases in the price of gasoline alone, or smaller increases along with increases in the CAFE standards, would result in a reduction in gasoline use—however, a reform option that relies on large increases in gasoline costs would face substantial political obstacles.

To put this into perspective, if we consider an increase in fleet fuel economy to 40 mpg, accounting for a rebound effect, fuel use would be reduced by about 40 percent compared to today. Long term elasticity fuel use price elasticity estimates range from –0.5 to –0.9,[12] indicating that a gasoline price increase of 44 percent to 80 percent would be required above today's values. Assuming last year's average of $1.54 per gallon, this translates into a $0.68 to a $1.23 per gallon tax. However, this assumes a baseline fuel economy at today's level, which is influenced by exist-

[10] While it will improve the certainty of the fuel economy achieved, "truth in testing" will not, by its self, lead to an increase in fuel economy.

[11] In fact, increased fuel economy standards without increased gasoline or carbon taxes would reduce the cost of driving. This could lead to an increase in driving on the order of 1 to 2 percent per 10 percent increase in fuel economy.

[12] The –0.5 high end value from Patterson, *Transportation's Contribution to Global Climate Change*. U.S. Department of Energy presentation. 1999. The –0.2 value from Agras and Chapman, 1999, and falls near the high end of elasticities from Niovella and Crandall, 1995.

ing CAFE standards. If we add in the tax that would be required today if CAFE did not exist, estimated at $1.12 per gallon,[13] the total increase could be as much as $1.80 to $2.35 per gallon. That would have required bringing 2000 gasoline prices up to as much as $3.89 per gallon.

SAFETY

I will discuss the topic of safety and fuel economy further in a moment, however, I would like to address some key reforms that can take place under CAFE to improve vehicle safety. The key issue that can be addressed through CAFE is the danger that the "not-so-light" light truck class imposes on other drivers. Because these trucks are heavy, stiff and have high bumpers, they represent a greater risk to car drivers, pedestrians, bicycle and motorcyclists.

This is a fact that seems to be agreed upon by the entire NRC/NAS panel in their recent report (both the majority opinion and the dissent opinion point to reductions in fatalities from decreasing the size of light trucks). While we do not agree with the magnitude of the life savings in the report, we believe the direction is correct—we feel the magnitude is actually larger—and therefore can accept them for demonstrative purposes. The clear message is that any policy that creates an incentive for light trucks to get lighter will save lives. Closing the light truck loophole would create such an incentive and would therefore provide an increase in safety.

An additional measure to achieve similar ends is the addition of means for controlling the "Crash Aggressivity (CRAGG) index" as introduced in the House Energy Committee. This is an index that evaluates the stiffness, structure height, and mass of a striking vehicle. Use of the CRAGG index would highlight the safety hazards of light trucks which are very stiff, high and heavy. Regulated reductions in the fleet-wide CRAGG index could produce an opportunity for the Senate to save lives.

COMMENTARY ON THE NATIONAL ACADEMY OF SCIENCE/NATIONAL RESEARCH COUNCIL REPORT

The following are brief comments on some of the key sections of the NAS/NRC fuel economy panel report. This is not intended to be an exhaustive analysis and critique of the report, but instead highlights issues of key concern to UCS.

Rational for Regulation of Fuel Economy

The NAS/NRC panel report provides clear justification of the value of regulating fuel economy. In their first recommendation it is stated that, "Because of concerns about greenhouse gas emissions and the level of oil imports, it is appropriate for the federal government to ensure fuel economy levels beyond those expected to result from market forces alone." (page 6–6).[14] UCS firmly agrees with this statement. Based on our assessment of the available technologies and the impacts of their use, we believe that a near term goal of closing the light truck loophole by making light truck fuel economy standards the same as cars by 2007 provides significant net benefits to society. In the longer term, we believe that a goal of 40 mpg by the middle of the next decade is both technically achievable and also provides significant net benefits to society through consumer savings at the gas pump, reduced oil use, reduced global warming and other pollutant emissions, and reductions in highway fatalities.

Fuel Economy Assessment

Overall, UCS analyses agree with the general results for potential fuel economy improvements and associated costs using what the NAS/NRC terms existing and emerging technologies. Under some specific comparisons, UCS estimates of fuel economy are somewhat higher than those of the NAS/NRC. One key reason for this is that our estimates are based on detailed vehicle modeling that ensures inclusion of the synergistic effects between technologies that the NAS/NRC menu approach can miss. Another key reason for the difference is that in our analysis we rely more heavily on safety enhancing weight reductions for the light truck class, which enables higher levels of fuel economy to be reached at lower costs.

One significant exclusion from the NAS/NRC analysis is an evaluation of the consumer savings of improved fuel economy. The panel chose a potentially misleading name for their summary analysis. This analysis was termed a "break-even fuel economy analysis for 14-year payback". This might seem to imply that the savings on

[13] Present value of $0.80 estimate for 1989 from, Kaoujianou. *The effects of Corporate Average Fuel Efficiency Standards in the U.S.*. Journal of Industrial Economics, 1998.

[14] Alternatively, the report also states that, "Regulations such as the CAFE standards are intended to direct some of industry's efforts toward satisfying social goals that transcend individual car buyers' interests." (page 2–16)

gasoline costs is just equal to the added cost of the fuel economy improvements, resulting in no net savings. In fact, as described in their report on page 4–4, this analysis looks at the point where the marginal savings on gasoline is equal to the marginal cost of fuel economy improvements. In other words, the analysis sought to find the point where the last dollar spent on improving fuel economy saved exactly one more dollar on gasoline cost over the vehicle lifetime. This is a classic economic analysis that is more appropriately termed an "economically efficient analysis" and actually finds the point where the net savings over the life of the vehicle is at its maximum. Thus, the analysis performed by the NAS/NRC panel theoretically identifies the fuel economy levels where consumers save the most money. In public testimony, the NAS panel has noted that this is the case and has attempted to clarify the issue (I believe the NAS has submitted such a clarification to this committee). I have included an attachment to this testimony, which shows the NAS/NRC report Table 4–2 but also includes the savings that would accrue from these vehicles.

I have performed an additional analysis using the results for the Path 3 technologies as identified in the NAS/NRC report on page 3–24. The results for the average cost/average fuel economy level in Path 3 are presented below assuming a discount rate of 5 percent (this discount rate corresponds to an 8 percent new car loan, corrected for inflation).

	Base mpg	Base Adj mpg	Average FE (mpg)	Incremental Cost	Net Savings
Cars					
Subcompact	31.2	30.1	46.13	$ 2,055	$ 358
Compact	27.9	27.0	41.94	$ 2,125	$ 635
Mid Size	24.9	24.1	41.05	$ 3,252	$ 354
Large	21.2	20.5	37.59	$ 3,655	$ 1,034
Light Trucks					
Small SUVs	26.0	25.1	43.7	$ 2,762	$ 812
Mid SUVs	21.1	20.4	36.22	$ 3,515	$ 1,003
Large SUVs	17.7	17.1	32.71	$ 3,417	$ 2,497
Small Pick-ups	22.6	21.8	39.98	$ 3,480	$ 930
Large Pick-ups	18.1	17.5	32.33	$ 3,137	$ 2,407
Mini Van	22.1	21.4	39.41	$ 3,137	$ 1,379
Average Car			43.6	$ 2,308	$ 454
Average Light Truck			36.1	$ 3,299	$ 1,453
All			39.8	$ 2,765	$ 915

Here we see that consumers are saving between $360 and $2,500 above the cost of the fuel economy improvements for different vehicles. The average fleet fuel economy is 39.8 mpg with an average cost of $2,765. UCS estimates predict a higher fuel economy at this cost, however, the NAS/NRC results still demonstrate the ability to save money while achieving a fleet-wide average fuel economy of 40 mpg. Thus, when using a discount rate of 5 percent, NAS/NRC numbers show that the cost of a 40 mpg fleet will pay for itself over a vehicle's life, even saving consumers nearly $1,000.

One final issue related to the fuel economy assessments in the NAS/NRC report is the inclusion of their calculated externality values. The panel identifies the externalities associated with the oil market and the environmental impacts of gasoline use valued at $0.26 per gallon of gasoline. While we feel that this value is low, even this amount would show a net increase in savings to society from improved fuel economy standards. For example, in the average Path 3 example above, the societal savings of a 40-mpg fleet fuel economy would be $1,573 per vehicle and would vary between $775 and $3500, depending on the vehicle.

Safety

We disagree strongly with the majority of the assertions made by the majority panel regarding vehicle safety and fuel economy improvements. The key to making

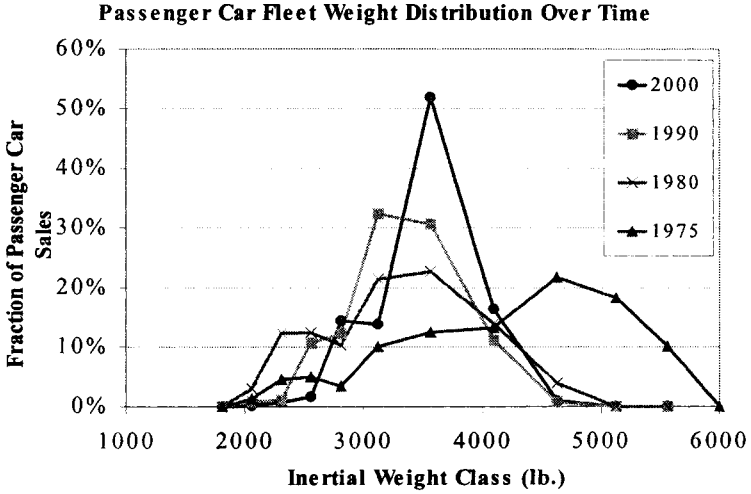
a vehicle safe is in its design. Proper design techniques, use of powerful computing resources and high strength materials enable designers to reduce the weight of vehicles while simultaneously including efficient crush space to absorb the impact in a crash and therefore reduce the forces experienced by the vehicle occupants. Existing crash data does not provide the ability to differentiate between vehicle weight, physical dimensions, and vehicle design and therefore statistical analysis based on this data cannot evaluate the direct relationship between changes and weight and changes in vehicle safety.

On the other hand, we agree generally with the findings of the panel minority in the dissent chapter on safety and note that significantly more analysis would need to be done before adequate quantification of the impacts on fuel economy changes on safety could be produced.

In addition to the key problems raised in the dissent chapter, I would like to point out at least one conspicuous assertion that was made in the safety analysis. One of the key reasons why we reject the use of past data to assess current and future safety impacts of weight reduction is that vehicle technology is changing over time. On page 2–27 of the NAS/NRC report, an assertion is made that "the ratio of fatality risk in the smallest vehicles of a given type compared to the largest remained relatively similar." However, this ratio is never presented to the reader. Calculating this ratio for the data in the NAS/NRC Table 2–2 produced the following results:

vehicle type	vehicle size	occupant deaths per million registered vehicles one to three years old			Ratio of occupant deaths in a class relative to those in the heaviest vehicles of that class			% change in ratio over time	
		1979	1989	1999					
car	mini	379	269	249	2.37	1.95	1.87	-18%	-4%
	small	313	207	161	1.96	1.50	1.21	-23%	-19%
	midzise	213	157	127	1.33	1.14	0.95	-15%	-16%
	large	191	151	112	1.19	1.09	0.84	-8%	-23%
	very large	160	138	133	1.00	1.00	1.00	0%	0%
	all	244	200	138	1.53	1.45	1.04	-5%	-28%
pickup	< 3000	384	306	223	NA	3.26	1.94	NA	-40%
	3-3.9k	314	231	180	NA	2.46	1.57	NA	-36%
	4-4.9k	256	153	139	NA	1.63	1.21	NA	-26%
	5k +	0	94	115	NA	1.00	1.00	NA	0%
	all	350	258	162	NA	2.74	1.41	NA	-49%
SUVs	< 3000	1064	192	195	NA	1.29	2.12	NA	64%
	3-3.9k	261	193	152	NA	1.30	1.65	NA	28%
	4-4.9k	204	111	128	NA	0.74	1.39	NA	87%
	5k +	0	149	92	NA	1.00	1.00	NA	0%
	all	425	174	140	NA	1.17	1.52	NA	30%

All of the data above, other than the last columns labeled " percent change in ratio over time" are the original data from the NAS/NRC report. The added columns above indicate that the ratio of fatalities in the smallest vehicles to the largest ones in each class changed during each 10 year period, with these changes being as high as a 64 percent increase for SUVs and a 40 percent decrease for pickups. Clearly the ratios did not remain either relatively similar over time, or among the classes. Even without the existing disagreements relative to the past safety data, this seriously threatens the validity of using the data to predict current or future safety impacts.



Further eroding their analysis is the fact that the type of vehicles in the fleet have changed drastically over time. The figure below shows how the weight distribution of cars has changed since CAFE was first passed. The key feature that stands out is that we used to have a lot of cars of many different weights with an overall high average weight. Now we have a lower overall average weight and the weight distribution is less spread out. This means that changing the weight of today's vehicles has a much different effect than it would have in 1975 or even 1990 and therefore past data simply cannot be used to predict current safety performance.

This issue of changing safety relationships over time brings to the fore another important issue, that of improved safety technology. Some of the differences above are likely attributable to improvements in the design of the vehicles as well as incorporation of improved safety technologies and/or better use of existing technologies. In our report, we have estimated the potential reductions in fatalities from simply increasing seat belt use from today's 70 percent up to 90 percent and found that 6,000 to 10,000 lives could be saved through increased seatbelt use. Improved safety belt design could save an additional 3,000 to 5,000 lives, for a total of 15,000 lives saved by safety belts alone. These potential life saving methods completely outweigh any negative safety impacts associated with weight/size reduction even if the majority analysis is accepted.

As noted above, however, we do not agree with the majority analysis. In our report, we demonstrate that it is the disparity in weight that is the key influence on safety and that influence is a negative one—the more you mix heavy and light vehicles, the less safe the highways will be. This fact is accentuated by the presence of light trucks that are heavy, stiff and have high bumpers. These three factors combine to make these vehicles very aggressive in crashes.

Analysis by Joksch et. al. indicates that in a front end collision, light trucks produce an increase in fatality risk by a factor of 3 to 5.6 when striking a car compared to a car striking a car.[16] In front-driver-side collisions light trucks pose risk factor 2 to 4.5 times that of a car when striking another car on the driver-side.[17] Further demonstrating the risks imposed by light trucks, recent analyses done by Ross and Wenzel shows that the top four selling cars in 1995–98[18] impose less of a risk in 2-vehicle crashes on other vehicles on the road than do SUVs and pickup trucks. For vehicles 2- to 5-years old, there were 79 percent more deaths per vehicle caused by the SUVs than by cars and more than four times as many deaths caused

[15] Joksch, Massie, Pichler. *Vehicle Aggressivity: Fleet Characterization Using Traffic Collision Data".* NHTSA. 1998. No vehicles had airbags. Data used was for 1991–1994.

[16] *Ibid.*

[17] The Taurus, Accord, Civic and Camry. *Wards's Motor Vehicle Facts & Figures 2000 for model years 1997 and 1998.*

by pickups than by cars.[19] Correcting for the influence of age does not significantly alter these effects.[20]

Even more important are the findings by Ross and Wenzel that the risk of death in all crashes to the person driving one of the four best selling cars is lower than the same risk associated with driving one of the four best selling light trucks which are all heavier than the cars.[20] These results indicate that for modern vehicle designs with their associated size and weight, not only are the most popular cars less dangerous to others on the road, they are also safer for the driver compared to the top selling light trucks.

The NAS/NRC panel findings agree that reducing the weight and historically associated characteristics of light trucks could reduce the fatalities on our highways, however, in most of their fuel economy assessments they did not include weight reductions. In Path 3 where they did include some weight reduction, it was only 5 percent and was only in 3 of the 10 vehicles investigated, thus providing a very small benefit to safety. Our analysis indicates that a 10 percent weight reduction along with streamlining and an efficient variable valve controlled engine would enable light trucks to have the same fuel economy standard as cars. As indicated by Green and Keller, this would conservatively have saved 176 lives in 1993. Reaching higher fuel economy levels could require a 20–30 percent reduction in weight, implying a fatality reduction of 352 to 528. We feel that if more accurate assessments of the negative impacts of today's aggressive light trucks were developed, these fatality reductions would be further increased, especially since they can be achieved using high strength materials that maintain occupant safety while reducing aggressivity.

Weight Based Standards

The NAS/NRC report presents an altered fuel economy standard system termed E–CAFE, for Enhanced CAFE. A summary of the key impacts of this system is as follows:

- The weight based system creates incentives to add weight to smaller vehicles.
- As a result, this system creates a disincentive to adopt one of the most cost-effective fuel economy strategies (weight reductions) for many vehicles, one which PNGV has been working on for years.
- The weight based system also does not guarantee a specific fuel economy level and market shifts could still keep fuel economy on the decline.
- The NAS/NRC panel only provided an example of how the standards should be set. Evaluating and comparing the different impacts of various forms of the standard would be very complicated and leads to significant difficulty in setting fuel economy levels.

This system is predicated on a fuel economy standard that is based on a vehicle's weight. The heavier the vehicle the lower the required fuel economy, up to a weight cap, above which the fuel economy standard becomes constant (i.e. independent of weight as we have today). The cap creates an incentive for the heaviest vehicles to shed weight, which we agree seems like a positive step as it would improve overall vehicle safety, however it is, in essence, not very different from simply modifying the current flat light duty truck standard. The only difference is that some of the lightest trucks would not be included, they would instead be replaced by the heaviest cars.

For the vehicles below a weight cap (4,000 pounds in their example), there is no mathematical advantage to adding or reducing weight. As a result automakers have no incentive to make the vehicles near the cap somewhat lighter and therefore safer for the overall fleet. Further, automakers actually have an incentive to increase the weight of the vehicles below the cap thus creating a very large loophole similar to the current light truck loophole. This incentive is not created by the proposed standard, but instead by the existing market forces. Automakers can make larger profits on heavier vehicles today, therefore, there is an inherent financial incentive to increase sales of the heavier vehicles that are more profitable, as we have seen with SUVs. This shift in sales would increase the overall size and weight of the fleet at no penalty to a company's ability to meet the weight based fuel economy standards because the standards drop as the vehicle becomes heavier. Therefore, economic pressures turn the weight neutral slope into an incentive to increase weight, likely

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[18] The Ford F Series, Chevy C/K pickup/Silverado, Explorer, and Ram Pickup. *Wards's Motor Vehicle Facts & Figures 2000* for model years 1997 and 1998.

[19] Risk by drivers for cars and light trucks provided in personal communication with Marc Ross and Tom Wenzel, September 7, 2001.

[20] Risk by drivers of top four selling SUVs is 26 percent higher than the risk to drivers in the top four selling cars and the risk to drivers of the top four selling pickups is 68 percent higher than that in the top four selling cars.

producing a fleet of vehicles that all move towards the 4000 lb. mark set in the NAS/NRC example, with an overall reduction in fleet fuel economy. A fleet that minimizes the variations in weight is good for overall safety, however, the cap set in the standard would effectively become an imposed fleet weight. Lower fleet weights could be just as safe, if not safer and would produce larger oil savings. A flat average 40 mpg standard across all car and light truck classes would instead encourage the heaviest vehicles to get lighter and therefore create a fleet that is both safer and more efficient.

The next concern is that, even if we ignore the first issue, the exact fleet fuel economy under this method is quite uncertain. As we have seen with the rise in light truck sales eroding fuel economy, a potential rise in vehicle weights could produce a net drop in fuel economy, even with the example 4000 pound limit. Further, the uncertainties of the political process create the risk for an even higher limit passing, which could further erode fuel economy levels.

Dual-fuel Vehicle Credits

The NAS/NRC panel, in their fifth recommendation on page 6–6 suggests the elimination of the dual-fuel vehicle credit system. UCS agrees that this system has not functioned as intended and automakers have received credit for their vehicles using alternative fuels they have never consumed. One solution is to eliminate these credits as suggested by the NAS/NRC panel, which we would find acceptable. Another alternative is to tie the amount of credit received by the automakers to the actual amount of each alternative fuel used in the previous year. Such a system would ensure that extra fuel economy credit is only given to the degree that the sales of these vehicles enhances the actual use of alternative fuels and would thus preserve the intent of the credit without the current pitfalls.

Availability of Higher Fuel Economy Vehicles

One assertion made by in the NAS/NRC report that is often put forward by automakers is that, "consumers already have a wide variety of opportunities if they are interested in better gas mileage." (page 1–3) While it is strictly true that there are a number of models on the U.S. market that achieve more than 30 mpg, all of them force the consumer to give up some feature or some amount of performance to obtain the improved fuel economy. They cannot, however, accept in a very few cases, elect to pay more for a vehicle with the same features and performance, but with higher fuel economy. The result is that consumers do not truly have a choice to express a desire for improved fuel economy, all else being equal.

Our analysis and that done by the NAS/NRC panel indicate that the fuel economy of passenger vehicles can be increased while maintaining the size, performance and the various features consumers expect. Our analysis also indicates that consumers can purchase these vehicles without sacrificing and likely increasing overall crash safety. These improvements in fuel economy do come at a cost, but were these vehicles to be offered, consumers would have a true choice of getting all they expect from a car or light truck today, but with higher fuel economy and the associated net savings.

Conclusion

Raising fuel economy standards is the fastest, least expensive and most effective thing Congress can do to reduce our future dependence on oil. The oil savings associated with reaching an average fuel economy of 40 mpg by 2012 for all new cars and light trucks would be 1.9 million barrels per day in that year alone—this is four times the expected peak output from the Arctic Refuge at today's oil prices and over three times the oil we imported from Iraq last year (and more than we imported from Saudi Arabia). The cumulative oil savings would be about 3 billion barrels of oil or 125 billion gallons of gasoline. That means that in 10 years we would save almost as much oil as is recoverable at today's oil prices from the whole Arctic Refuge in its 50–60 year lifetime. That is also 25 times the oil savings called for in the House energy bill, H.R. 4. At the same time we are significantly cutting our oil dependence, consumers are saving 12.6 billion dollars in 2012 and close to 100 billion dollars per year by 2015, while the auto industry will see a growth of over 40,000 jobs in the U.S.

We feel that between our work, the most recent NAS/NRC fuel economy study as well as a wealth of other literature available today, it is clear that the technology exists to cost effectively increase fuel economy with resulting benefits to oil use, consumers and the environment. These significant improvements in fuel economy can be achieved with existing technology, enabling us to achieve progress in fuel economy in the near term as we watch the market for hybrid electric and fuel cell vehicles grow. We can see both near and longer term increases in fuel economy and these increases can be accompanied by the same safety, comfort and performance

consumers expect today and could even improve the overall safety of America's highways if the light truck loophole is closed.

Thank you for the opportunity to testify before the Committee today. I would be happy to answer any questions you may have.

Attachment—Analysis of Savings in the NAS 14-Year "Break-Even" Study

The assessment performed by the NAS panel in chapter four of their report finds the point where the financial benefits to a consumer are maximized, ignoring the financial impacts of externalities. This is done through a process where the last dollar spent on improving fuel economy is just offset by an additional dollar saved from that same improvement in fuel economy. This identifies an equilibrium point associated with significant savings that were not reported in the NAS/NRC report. Below I have re-created Table 4–2 from the NAS/NRC report and I have included the net savings consumers would experience using the NAS/NRC conservative assumption of a 12 percent discount rate. I have also included a summation of the vehicles into class and an overall fleet average fuel economy

			Low Cost/High mpg			Average			High Cost/Low mpg		
	Base mpg	Base Adj mpg	new mpg	Incremental Cost	Net Savings	FE (mpg)	Incremental Cost	Net Savings	FE (mpg)	Incremental Cost	Net Savings
Cars											
Subcompact	31.2	30.1	38.9	$ 543	$ 614	36.2	$ 513	$ 343	33.3	$ 379	$ 105
Compact	27.9	27	35.8	$ 657	$ 747	33.3	$ 640	$ 434	30.6	$ 520	$ 143
Mid Size	24.9	24.1	33.8	$ 872	$ 973	30.5	$ 789	$ 549	28.2	$ 668	$ 252
Large	21.2	20.5	30.3	$ 1,087	$ 1,367	28.8	$ 1,178	$ 1,000	27.5	$ 1,286	$ 631
Light Trucks											
Small SUVs	26	25.1	35.1	$ 832	$ 926	32.6	$ 818	$ 593	30.1	$ 729	$ 283
Mid SUVs	21.1	20.4	30.3	$ 1,070	$ 1,422	28.2	$ 1,056	$ 1,042	26.2	$ 1,000	$ 669
Large SUVs	17.7	17.1	26.3	$ 1,308	$ 1,882	25.1	$ 1,348	$ 1,549	23.9	$ 1,367	$ 1,210
Small Pick-ups	22.6	21.8	32.2	$ 1,031	$ 1,273	29.8	$ 1,008	$ 896	27.6	$ 931	$ 550
Large Pick-ups	18.1	17.5	28.6	$ 1,415	$ 2,058	26.7	$ 1,466	$ 1,603	24.9	$ 1,489	$ 1,145
Mini Van	22.1	21.4	32.1	$ 1,092	$ 1,333	29.9	$ 1,101	$ 956	27.7	$ 1,059	$ 577
Average Car			36.7	$ 645	$ 728	34.0	$ 610	$ 414	31.3	$ 483	$ 146
Average Light Truck			30.2	$ 1,161	$ 1,539	28.2	$ 1,168	$ 1,146	26.2	$ 1,131	$ 759
All			33.4	$ 883	$ 1,102	31.0	$ 867	$ 751	28.7	$ 782	$ 429

These results show that, even using the conservative discount rate, consumers would be saving $340 to $1,600 above the cost of fuel economy improvements under the average cost average fuel economy scenario. These results show the maximum net savings for consumers and the associated fleet fuel economy varies between 29 mpg and 33 mpg. If a more reasonable discount rate, based on current automobile loan rates of 7–8 percent, corrected for inflation to yield 5 percent, had been used, the average fuel economy levels would be higher and the costs would also be higher. The savings and fuel economy levels would further be higher if the value of externalities was included in the analysis.

Senator KERRY. Thank you, Mr. Friedman, we appreciate it.

Mr. Louckes.

STATEMENT OF THEODORE LOUCKES, CHIEF OPERATING OFFICER, PAICE CORPORATION

Mr. LOUCKES. Mr. Chairman, thank you for the invitation to address this Committee regarding fuel economy issues.

I am Ted Louckes, Chief Operating Officer of the Paice Corporation. Paice is an American company. We have offices in Silver Spring, Maryland and Livonia, Michigan. Our management team and board of directors include engineers with more than 200 years of experience in the automotive industries.

My career has been in the automobile industry, including 40 years with General Motors where I served as Chief Engineer of the Oldsmobile division. We are here today to present an American technology that can meet the challenge of improving fuel economy in passenger cars and light trucks.

The Hyperdrive system, as we call it, is a unique power train that delivers a combination of fuel efficiency and vehicle performance that has not yet been achieved. Unlike hybrids in the market today, it is well suited for the wide range of vehicles that consumers choose to buy, including SUVs, minivans and light trucks.

The Hyperdrive will work in any climate, climb steep hills and haul big loads. Most significant, our studies indicate that Hyperdrive can be produced at costs competitive to today's conventional power trains, largely because it uses similar technologies and the materials are the same as used today—nothing new, nothing exotic or expensive. We are in the process of securing funding from automakers, automobile suppliers, financial investors and perhaps the U.S. Government to finalize the subsystem and component design, build demonstration vehicles and, therefore, accurately determine the cost of producing the hybrid system. We believe that ours is the only hybrid drive system available today that can be commercially produced in large volume and be successful in the marketplace.

Based on high voltage, and high powered semiconductors, high horsepower electric motors and downsized internal combustion engines, the Hyperdrive is unique and superior among hybrid power trains. Our patented method of control, the selective use of all the on-board power sources for maximum efficiency under all driving conditions, is the key to its success.

Our written testimony provides details of the system, our test data, and our engineering calculations of what Hyperdrive can achieve in terms of improving fuel economy through a complete range of vehicles. We have proven the concept of the Hyperdrive power train by testing a full size prototype system on a dynamometer.

The prototype was built to replicate a large passenger car and operated on the EPA test cycles. And the result was a combined fuel economy of 44 miles per gallon. This compares to 24 miles per gallon for the comparison car. Using this data, we are able to model and calculate the fuel economy and performance that can be expected from Hyperdrive and all sorts of vehicles.

Our modeling results indicate that we can, on average, increase the fuel efficiency of the complete vehicle subject to CAFE regulation by roughly 50 percent.

With potential fuel economy improvements of this magnitude, application of Hyperdrive and a large volume production vehicle would significantly reduce our Nation's total gasoline consumption.

For the matter of possible government support, we and the auto industry would benefit from support of the national laboratories. We suggest that Argonne National Laboratory, which has substantial experience in the simulation and analysis of hybrid electric vehicles, should model the Hyperdrive power train to corroborate our conclusions regarding fuel economy and vehicle performance.

We have been in contact with automakers in the United States, Europe, and Japan for more than a year. Several of these OEMs are evaluating the technology and its cost to justify the investment it will take to bring this to market.

Mr. Chairman, we thank you for the opportunity to tell you about our technology and we will be very happy to answer questions.

[The prepared statement of Mr. Louckes follows:]

PREPARED STATEMENT OF THEODORE LOUCKES, CHIEF OPERATING OFFICER, PAICE CORP.

Thank you for the opportunity to testify before your Committee regarding Corporate Average Fuel Economy (CAFE) issues. I serve as Chief Operating Officer of Paice Corporation. We are an American company (our offices are in Livonia, Michigan and Silver Spring, Maryland) with an American technological solution to the challenge of increasing fuel efficiency in passenger cars and light trucks. Paice is an acronym for Power Amplified (battery and traction motors) Internal Combustion Engine. Paice Corporation has designed, patented [1, 2, 3, 4, 5] and tested a hybrid electric vehicle (HEV) powertrain system called the Hyperdrive. I come before you today to explain how the Hyperdrive system works and to describe our estimates of its potential impact on fuel economy of automobiles subject to CAFE regulation.

The Hyperdrive System, a unique series/parallel hybrid electric powertrain for automobiles and light trucks, delivers a previously unattainable combination of fuel efficiency and vehicle performance at cost premiums that are reasonable when compared to conventional powertrains. Moreover, the Hyperdrive is well suited for a wide range of passenger vehicles, including SUVs, light trucks, and minivans. While other HEV designs can improve fuel economy or reduce emissions, no such design can produce these benefits in as wide a class of vehicles or at costs as favorable as the Hyperdrive. For these reasons, Paice Corporation believes that it has developed the only HEV powertrain system, to date, capable of being profitably produced on a large scale.

Paice Corporation has successfully demonstrated the benefits of the Hyperdrive System on a full-scale prototype powertrain on a dynamometer with funding from The Abell Foundation of Baltimore, Maryland, and is raising additional funding to incorporate the Hyperdrive into vehicles intended for large-scale production. The Company is currently in discussions with automakers throughout the world regarding production-intent vehicle prototype programs.

Paice is a small company that has attracted a unique group of highly experienced automotive industry officials for its development efforts. For example, Dr. Alex Severinsky, Chairman and Chief Executive Officer and founder of Paice Corporation, has been granted 21 U.S. patents, including three (3) on the Hyperdrive. He has unique technical knowledge of operations of electric motors, electronic power converters, electric storage batteries, and control of electro-mechanical systems. As for myself, prior to joining Paice Corporation where I am the Chief Operating Officer, I was with General Motors for 40 years, including a four-year military leave to participate in the Korean War, and retired as Chief Engineer of the Oldsmobile Division. Among other programs at GM, I was responsible for the development of the first overhead cam, 4-valve engine for American passenger cars and the introduction of the world's first airbag system.[6] Another of our staff, Nathanael Adamson, Executive Vice President, served Ford Motor Company for 32 years and gained domestic and international experience in product development, program control, marketing, and business management of consumer and industrial products in the automotive industry. In addition, David Polletta, Vice President of Engineering, has 18 years of experience in engineering and management of EV and HEV projects and 12 years of experience at Ford Motor Company as a supervisory engineer in commercial truck engines and powertrain engineering.[7]

On our board of directors, we have several former auto industry officials. For example, Robert Templin, a retired GM Executive, has over forty years of experience in the design, development, and production of automobiles and powertrains. Over the years, he has held such GM positions as Technical Director of the Research Laboratories, Chief Engineer of the Cadillac Motor Car Division, General Project Manager of Special Product Development, and Special Assistant (Engines) to the President of GM. In addition, George Kempton has over 40 years of management experience in automotive and industrial products, including powertrain components for commercial vehicles and most recently he left Kysor Industrial Corporation where he was Chairman and Chief Operating Officer. Finally, Robert Oswald who recently left his position as a member of the Robert Bosch GmbH's Board of Management, and Chairman, President and CEO of Robert Bosch's North American subsidiary Robert Bosch Corporation, after serving there for more than a decade.

Our testimony today is divided into several topics: first, an overview of the characteristics of the Hyperdrive powertrain system; second, modeling results that demonstrate the Hyperdrive powertrain system's potential for reducing fuel consumption in three selected vehicles (a compact car, a full-size car, and a large SUV); third, a discussion of why the Hyperdrive powertrain makes it possible to profitably commercially mass produce an HEV (and thereby deliver the fuel economy and emissions results that HEVs make possible); and fourth, a discussion of the implications of the Hyperdrive system for fuel consumption. It is important to note that powertrain developments at Paice Corporation continue at a rapid pace. What we present here is a current overview of our development effort that will change as we make further improvements and refinements to our system.

As will be discussed in greater detail below, the Hyperdrive system can increase fuel efficiency in the selected vehicles modeled for this testimony by approximately 50 percent. We encourage the Senate Commerce Committee to ask the Argonne National Laboratory to model our results to corroborate our conclusions regarding fuel economy and performance. We also encourage the Senate Commerce Committee to request that the Oak Ridge National Laboratory[8] estimate what impact the Hyperdrive system would have on future fuel consumption, based on the modeling results from Argonne. In this regard, Paice Corporation would welcome the opportunity to work with automakers and/or the federal government to produce a demonstration vehicle that can be tested to reconfirm the conclusions discussed here today and to more precisely determine the cost of producing such a system.

I. The Paice Hyperdrive System

Fundamental Principles

An auto industry executive was recently quoted as saying: "we can't dictate customer choice, nor should we try to.[9] This statement is widely accepted as a governing axiom in automotive marketing. To compete against current and future powertrains, any HEV system as well as the Hyperdrive must be at least equal, and even superior to existing powertrains in all respects. Only this will result in market forces choosing the adoption of fuel saving powertrain technology. Accordingly, our development of the Hyperdrive was guided by the following fundamental considerations:

- The system should run on readily available gasoline or diesel fuel.
- The internal combustion engine (ICE) should be used to convert liquid fuel chemical energy into mechanical energy, as it is the most efficient means yet discovered.

[9] Fuel Targets for Sport Utilities Pose Difficulties for Automakers, *The New York Times*, November 23, 2001, p. C1.

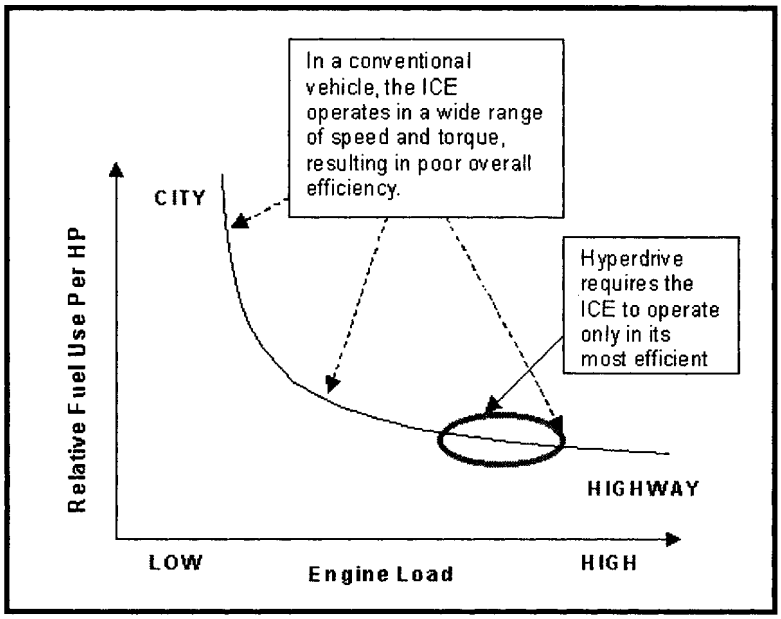

Fig. 1. Use of ICE in the Hyperdrive

• The system should use the ICE only in its most efficient operating region; that is, under those load conditions in which Brake Specific Fuel Consumption (BSFC) is minimized. In Figure 1 we present graphically how the ICE is used in the Hyperdrive in comparison with current powertrains.

• Use of the ICE in this way will result in increased fuel efficiency as well as improvements (i.e. reductions) in exhaust emissions. Emissions can also be reduced by use of advanced computer control of the engine air-fuel ratio, catalyst preheating and a simplified engine operating cycle (eliminating ICE transients). While a number of current production vehicles are already meeting California's Ultra-Low Emission Vehicle (ULEV) requirements, the Hyperdrive can assist in achieving this level in the full range of vehicles and at lower cost.

• Sophisticated software control algorithms must be employed to control powertrain components, without any need for an increase in driver skills or driver awareness.

• Customer expectations must be satisfied without compromise. Present levels of acceleration, convenience of operation, and operating/ownership cost must be equal to or be better than those offered by present powertrains.

• Manufacturing raw material requirements must be satisfied by using the same readily available materials already used in present high-volume automotive production, i.e. iron, lead, copper, aluminum and silicon. Special material needs, such as catalytic agents, must be no more critical than they are today.

• System flexibility and cost must be applicable over a wide range of vehicle weights and sizes to allow the benefits to be achieved over the entire passenger vehicle market.

• Current restrictions imposed on design flexibility by vehicle space, weight, drag and architecture requirements should be reduced to allow more freedom for design variations.

• Physical size and arrangement of the drive components must be flexible enough to allow installation in existing body and chassis concepts to avoid the costs, lead times and investments in plants and equipment that radical new vehicle programs would require.

• Vehicle, powertrain and fuel system service requirements must be compatible with the skills, training and diagnostic capability available at the retail level.

Testing and Test Results

Based on these principles, Paice Corporation built and tested the Hyperdrive system (Figure 2) on a dynamometer load representing a typical 4,250 lbs. large passenger car. In Figure 2, we present arrangements and rating of components in the Hyperdrive powertrain system as tested and in Figure 3 we present some photographs from the testing.

Hyperdrive Test Results		
	Conventional	Hyperdrive
City Driving (FUDS)	19 MPG	38 MPG
Highway Driving (HWFET)	33 MPG	54 MPG
Combined	24 MPG	44 MPG

Table 1. Summary of fuel economy test results

Table 1 presents a summary of the fuel economy test results. To verify these results, we have measured energy losses in all parts of the Hyperdrive together with energy applied to the load, and compared this with the energy coming from the fuel. These results coincided within tolerances of measurements. This allowed us to calibrate our control software model, which we have used to determine the expected results of using the Hyperdrive system in other vehicles discussed below (a compact car, a full-size car, and a large SUV).

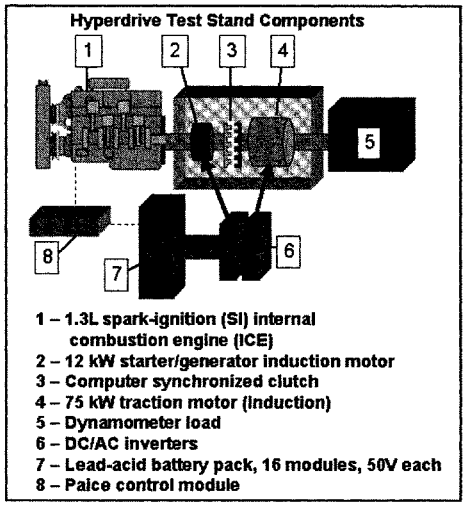

Fig. 2. Test prototype of the Hyperdrive

Key Technical Principle

The key technical principle underlying the Hyperdrive system is that it employs a unique method of control (use of the engine) that optimizes the operation of the internal combustion engine in hybrid electric vehicles.[1, 2, 3, 4, 5] This method of control results in the achievement of operational thermodynamic efficiencies[1] of 32–34 percent as compared to the recognized maximal attainable efficiency of 35 percent for spark-ignition internal combustion engines. By way of comparison, the internal combustion engine in conventional vehicles typically operates at overall efficiencies of around 20 percent. Our improved overall operating efficiency is supported by the configuration of components in the Hyperdrive, including a lead-acid battery system that stores the energy generated by the engine (and regenerated while braking), and high-power electric motors that propel the vehicle when the engine cannot be used in its most efficient operating region. Recent advancements in high voltage power semiconductors, coupled with extensive positive experience in new lead-acid battery

applications, have provided the practical basis for the commercialization of our technology.

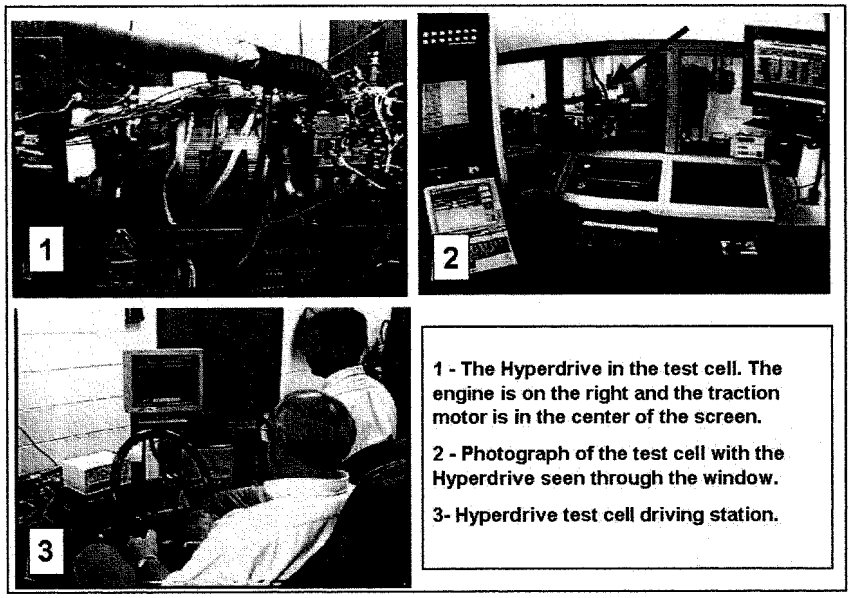

Fig. 3. Hyperdrive in the dynamometer test cell

How the Hyperdrive System Works

The internal combustion engine (ICE) of a conventional vehicle is required to deliver power under a wide range of loading as a function of driving condition. This is an inefficient way of producing mechanical power from the energy in gasoline or diesel fuel. If the ICE were allowed to operate *only* in its optimal operating region, *fuel efficiency improvements of roughly 50 percent* would be possible (depending on the size and type of vehicle and its intended application). This is the fundamental principle behind the Hyperdrive as is illustrated in Figure 1.

Paice achieves this high level of performance and fuel economy by introducing a battery system that captures the energy output of the ICE (which is operated only in its most efficient range) and an electric motor that uses this electrical energy to power the vehicle when the ICE cannot be used efficiently or when power requirements are higher than can be delivered by the ICE alone. The motor also acts as a generator to recover energy from the vehicle during deceleration. (There are other significant features of the Hyperdrive, but the foregoing is illustrative of the basic concept that results in the dramatic improvements in fuel economy.)

The operation of all of these components and their function is managed by the Paice Control Module, a multiprocessor with associated control software and embedded proprietary control algorithms. Through this patented method of control of the drive components, the Hyperdrive system improves powertrain efficiency by roughly 50 percent over conventionally powered vehicles (depending on vehicle type and application). Other than the Paice Control Module, the various hardware components in the Hyperdrive system already exist in one form or another in conventional vehicles. The differences lie in the relative sizes of components, their functional relationships and, most significantly, the software incorporating Paice's patented method of control, which enables the components to function as a highly efficient system. Thus, the Hyperdrive represents an evolutionary step in automobile technology, and does not require advanced development efforts or dramatic changes in manufacturing infrastructure.

Modes of Operation

There are four typical modes of operation that illustrate the basic functionality of the Hyperdrive: city driving, recharging during city driving, acceleration, and

cruising on the highway. In addition to these four, there are a number of other modes defined in the control algorithm.

The Hyperdrive system includes a clutch—essentially a device that is either engaged or disengaged. The clutch must be engaged for the mechanical power from the engine to be delivered directly to the driving wheels. The most frequent condition controlling whether the clutch is engaged or disengaged is vehicle road load reflected on the engine shaft. If this load is sufficient for the engine to be used near its maximum efficiency, then the clutch is engaged. Otherwise, it is disengaged. Generally, the clutch *is not* engaged during low speed city driving and *is* engaged during rapid acceleration and highway driving.

In Figure 4, below, the clutch is disengaged in low speed city driving. In part A of Figure 4, the battery is above its minimum state of charge and the traction motor drives the vehicle. At this point, the vehicle is operating like an electric car. The battery is used in a narrow range of the state of charge, normally in 50 percent to 70 percent under partial state of charge (PSOC) condition, to assure long operating life. The amount of energy used in this electric-only mode is far below the PNGV definition of "dual mode hybrid". The Hyperdrive system operates like an electric car upon initial starting of the vehicle and during the intervals between times in which the battery is being charged.

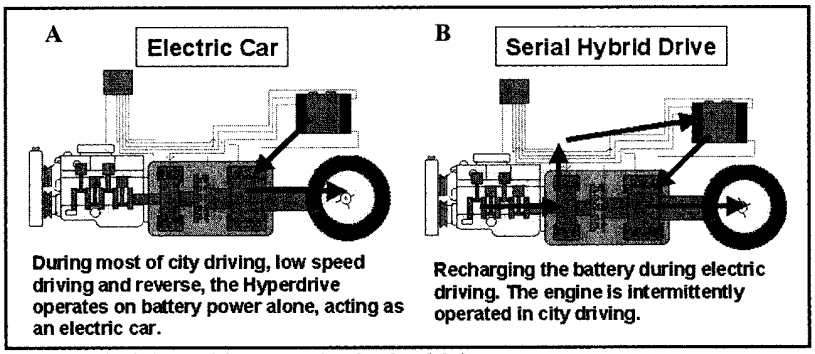

Fig. 4. Typical Hyperdrive operation in city driving.
A) An Electric Car; B) A Serial Hybrid

Part B of Figure 4, shows a time period in city driving after the battery has been used to power the traction motors. Once the battery has reached its minimum state of charge, 50 percent or so, the starter/generator motor starts the engine. Upon starting the engine, a load is applied by the starter/generator motor (now operating as a generator) so that the engine runs close to its minimal BSFC operating condition. The power produced by the starter/generator is split. One part of it is delivered to the traction motor, making the Hyperdrive operate as a serial hybrid. The balance of the power is used to recharge the battery. Upon reaching the maximum level of battery charge, about 70 percent, the engine is stopped.

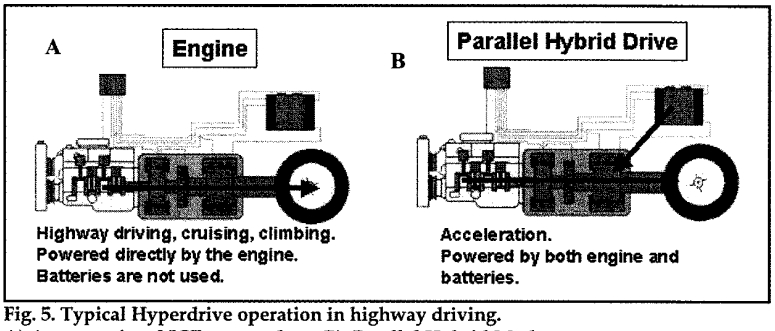

Fig. 5. Typical Hyperdrive operation in highway driving.
A) A conventional ICE powered car; B) Parallel Hybrid Mode

In Figure 5, the clutch is engaged to accelerate onto and cruise on the highway. When time-averaged road load on the Hyperdrive is sufficient to place the engine in a region close to its minimum BSFC, the clutch is engaged. If the engine was off, it is started and synchronized by the starter/generator motor. At this point the engine begins to provide the average power demands of the vehicle. In this mode, the Hyperdrive acts as a conventional powertrain with its transmission in the direct drive position. This is depicted in Part A of Figure 5.

For vehicle acceleration or deceleration, all motors are used in a manner that minimizes energy loss in all electrical and electronic components. The Paice Control Module can assure this on a millisecond-by-millisecond basis. Acceleration with only the traction motor is shown in Part B of Figure 5. This is parallel hybrid mode. Engine torque is controlled to lag motor torque to assure operation with the most efficient air/fuel mixture. This allows for material reduction of engine-out emissions, not only for EPA test purposes but also under any driving conditions. Because electric motors provide excellent torque response to the driver's command, optimized levels of car responsiveness become possible, even varying the shape of this response as a function of the driver history and driving condition.

II. Modeling of Selected Vehicles

Effect of the Hyperdrive System on the Fuel Economy of a Fleet of Vehicles Subject to CAFE

Paice Corporation has modeled three vehicles (a compact car, a full-size car, and a large SUV) to provide benchmark data on expected fuel economy improvements in vehicles that can be produced in large volumes utilizing the Hyperdrive. The selection is limited to vehicles subject to CAFE regulation; that is, with Gross Vehicle Weight (GVW) under 8,500 lbs.

In Table 2*, we present a summary of composition of vehicles subject to CAFE regulation that were sold in year 2000, along with the fuel economy average for each class. By combining sales volumes with combined fuel economy values, we calculated the overall combined fuel economy to be 24.6 mpg.

*This data is based on a study conducted by Oak Ridge Laboratories. Davis, SC 2001. Transportation Energy Data Book: Edition 21, ORNL–6966, available at *http://www.ornl.gov/webworks/cppr/y2001/rpt/111858.pdf.*

Vehicles subject to CAFE regulation in year 2000		
Vehicles	Units sold (in thousands)	Combined average fuel economy, mpg
Automobiles	**8,978**	**28 mpg**
Minicompact	19	26
Subcompact	1,789	31
Compact	2,398	30
Midsize	3,352	27
Large	1,297	25
Two Seater	122	26
SUV/Light truck	**8,307**	**21 mpg**
Small Pickup	1,072	22
Large Pickup	1,969	19
Small Van	1,272	23
Large Van	369	18
Small SUV	756	24
Medium SUV	2,167	20
Large SUV	702	18
All vehicles	**17,285**	**25 mpg**

Table 2: Summary of makeup and fuel economy of year
Source: Oak Ridge Transportation Energy Data Book

On the following pages, we show the results of our modeling for three particular vehicle classes represented in Table 2. These are a compact car (page 10), a full-size (large) car (page 11), and a large SUV (page 12).

Using the Hyperdrive system:

- a compact car exhibits an increase from 31 to 45 mpg (a 45 percent improvement);
- a full-size car exhibits an increase from 27 to 39 mpg (a 44 percent improvement); and
- a large SUV exhibits an increase from 16 to 26 mpg (a 62 percent improvement).

We believe that these modeling results represent the type of increase that all vehicles subject to CAFE can produce using our powertrain.

Compact Car

In Figure 6, we present the configuration of components in the Hyperdrive in a compact car. Given this configuration, in Table 3, we present a comparison of performance between a conventional compact car and a similar car with the

Hyperdrive. For this comparison, we specifically selected a *top performer* in both driving characteristics and fuel economy.

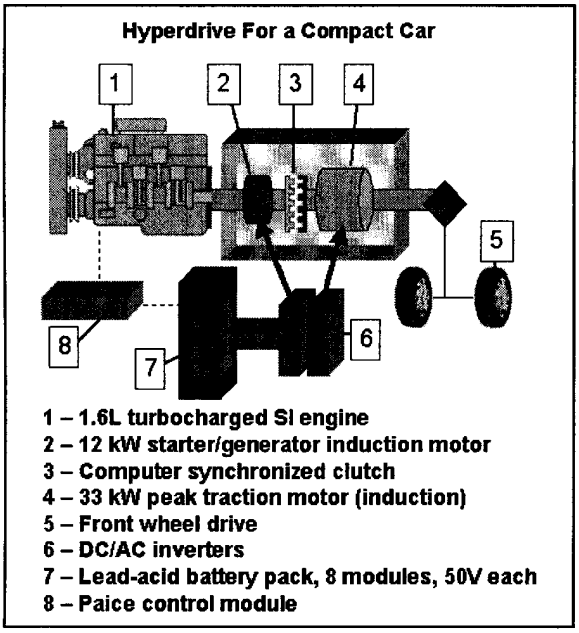

Fig. 6 Configuration of Components in the Hyperdrive in a Compact Car

It is important to note that combined fuel economy is improved from 31 to 45 mpg, or 45 percent. The passing performance is better with the Hyperdrive, accelerating from 55 to 75 mph in 5 seconds versus 6.7 seconds. Gradeability with the Hyperdrive on a continuous basis is better at 80 mph and otherwise meets requirements of the auto industry.*

*As an illustration of the significance of gradeability standards, climbing even a 10 percent grade at 45 mph for 5 minutes will elevate the vehicle by approximately 2,000 feet, or as high as a 160-story building.

Hyperdrive in a Compact Car Performance Comparison			
		Conventional	Hyperdrive
Engine			
Type		2.0L	1.6L Turbo
Peak Power		100 kW	95 kW
Motor			
Type		N/A	Induction
Continuous		N/A	8 kW
Peak		N/A	33 kW
Generator			
Type		N/A	Induction
Continuous		N/A	12 kW
Battery Pack			
Type		N/A	Lead-Acid
Modules		N/A	8
Voltage		N/A	400 V
Capacity		N/A	4 Ah
Weight		N/A	85 kg
Gearing			
Transmission Type		Auto 3 Speed	N/A
Generator Ratio		1	1
Motor Ratio		N/A	2.333
Final Drive Ratio		3.55	4.1
Fuel Economy			
ETW[1]		2,875 lbs.	3,000 lbs.
City		26 mpg	**41 mpg**
Highway		40 mpg	**50 mpg**
Combined		31 mpg	**45 mpg**
W.O.T.[2] Performance @ ETW			
Top Speed		> 105 mph	> 105 mph
0-60 MPH		9.2 sec.	9.0 sec.
55-75 MPH		6.7 sec.	5.0 sec.
35-55 MPH		4.2 sec.	3.7 sec.
Gradeability @ 3,875 lbs. GCW[3]			
	Objective		
@ 80 mph	5.5 %	7.9 %	8.5 %
@ 65 mph	7 %	16.5 %	8.9 %
@ 45 mph	10 %	17.5 %	10.1 %
Starting Grade	30%	> 30%	> 30%

[1] ETW – Emission Test Weight
[2] W.O.T. – Wide Open Throttle
[3] GCW – Gross Combined Weight

Table 3 Compact Car Performance Comparison

While the Hyperdrive car is a little heavier than its conventional counterpart (125 lbs. in total), this difference is already factored into the fuel economy results. We

believe that implementation of the Hyperdrive in a compact car will meet or exceed customer expectations for performance and provide 45 percent improvement in fuel economy.

Full-Size (Large) Car

Next, in Figure 7, we present the configuration of components of the Hyperdrive in a full-size (large) car. Again, we specifically selected a *top performer* in fuel economy. In Table 4, we present a comparison of performance between a conventional full-size car and a similar car with the Hyperdrive.

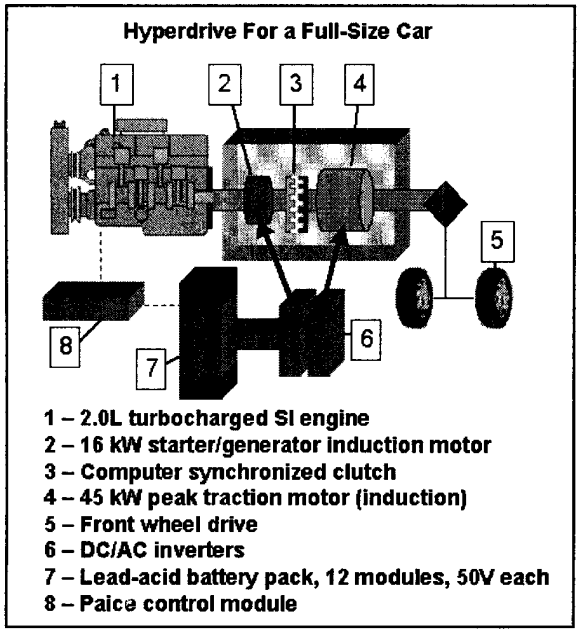

Fig. 7 Configuration of Components of the Hyperdrive in a Full-Size (Large) Car

As shown here, combined fuel economy improves from 27 to 39 mpg, or 44 percent. Again, passing performance is better: 4.4 seconds versus 5.7 seconds. The weight of the Hyperdrive vehicle is 125 lbs. greater than its conventional counterpart and this has been factored into our findings. We believe that implementation of the Hyperdrive in a full-size (large) car will meet or exceed customer expectations for performance and provide 44 percent improvement in fuel economy.

Hyperdrive in a Full-Size Car Performance Comparison			
		Conventional	Hyperdrive
Engine			
Type		3.0L	2.0L Turbo
Peak Power		100 kW	95 kW
Motor			
Type		N/A	Induction
Continuous		N/A	12 kW
Peak		N/A	45 kW
Generator			
Type		N/A	Induction
Continuous		N/A	16 kW
Battery Pack			
Type		N/A	Lead-Acid
Modules		N/A	12 x 50 V
Voltage		N/A	600 V
Capacity		N/A	4 Ah
Weight		N/A	110 kg
Gearing			
Transmission		Auto 4 Spd	N/A
Generator Ratio		1	1
Motor Ratio		N/A	2.333
Final Drive Ratio		3.77	4.25
Fuel Economy			
ETW[1]		3,750 lbs.	3,875 lbs.
City		22 mpg	**35 mpg**
Highway		35 mpg	**45 mpg**
Combined		27 mpg	**39 mpg**
W.O.T.[2] Performance @ ETW			
Top Speed		> 105 mph	> 105 mph
0-60 mph		8.2 sec.	8.2 sec.
55-75 mph		5.7 sec.	4.4 sec.
35-55 mph		3.6 sec.	3.3 sec.
Gradeability @ 5,500 lbs. GCW[3]			
	Objective		
@ 80 mph	5.5 %	10.1 %	6.3 %
@ 65 mph	7 %	17.3 %	8.9 %
@ 45 mph	10 %	18 %	10.1 %
Starting Grade	30%	> 30%	> 30%

[1] ETW – Emission Test Weight
[2] W.O.T. – Wide Open Throttle
[3] GCW – Gross Combined Weight

Table 4: Hyperdrive performance comparison in a full-size car

Large SUV

Figure 8 shows the Hyperdrive modeled to represent a large SUV with the Gross Vehicle Weight of 8,500 lbs., the *highest weight vehicle subject to CAFE regulations*. In this configuration, the Hyperdrive replaces the mechanical 4x4 drive with an electrical component and, because of a large difference in load range, we use a two-speed automatic transmission. In Table 5, we present a comparison of performance between a conventional large SUV and one equipped with the Hyperdrive. Importantly, unlike other HEV designs that must compromise performance, with the Hyperdrive system there is no change in trailer towing capacity.

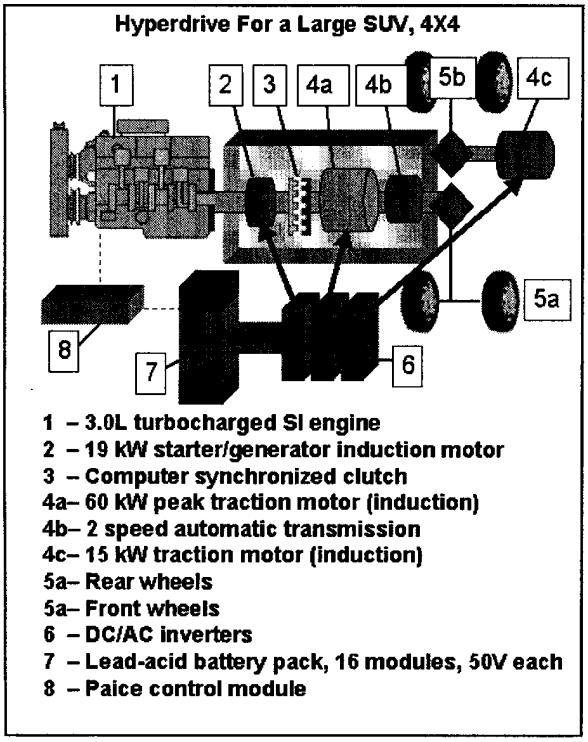

Fig. 8 Configuration of Components in Hyperdrive in a large SUV

Combined fuel economy is improved from 16 to 26 mpg, or 62 percent. Acceleration with the Hyperdrive SUV is markedly superior, accelerating from standstill to 60 mph in 7.7 seconds versus 9.6 seconds. Top speed is limited by tire rating. Gradeability meets the requirements of the auto industry in the conventional SUV. We believe that implementation of the Hyperdrive in a large SUV will meet or exceed customer expectations for performance and provide 44 percent improvement in fuel economy. Unlike other HEV designs, the Hyperdrive does not need to eliminate or greatly reduce trailer-towing capacity in order to provide the fuel consumption benefits desired.

Hyperdrive in a Large SUV (8,500 lbs. GVW[1]) - Performance Comparison		
	Conventional	Hyperdrive
Engine		
Type	5.4L	3.0L Turbo
Peak Power	194 kW	205 kW
Both Traction Motors		
Type	N/A	Induction
Continuous	N/A	15 kW
Peak	N/A	75 kW
Generator		
Type	N/A	Induction
Continuous	N/A	19 kW
Peak	N/A	19 kW
Battery Pack		
Type	N/A	Lead-Acid
Modules	N/A	16 x 50 V
Voltage	N/A	800 V
Capacity	N/A	11 Ah
Weight	N/A	250 kg
Gearing		
Transmission Type	Auto 4 Speed	Auto 2 Speed
Generator Ratio	1	1
Motor Ratio	N/A	2.9
Final Drive Ratio	3.55	4.1
Fuel Economy		
ETW[2]	5,750 lbs.	5,750 lbs.
City	14 mpg	**25 mpg**
Highway	22 mpg	**27 mpg**
Combined	16 mpg	**26 mpg**
W.O.T.[3] Performance @ ETW		
Top Speed	> 110[4] mph	> 110[4] mph
0-60 mph	9.6 sec	7.7 sec
40-60 mph	5.4 sec	3.6 sec
Gradeability @ 13,500 lbs. GCW[5]		
@ 80 mph	3.5 %	3.2 %
@ 65 mph	7.0 %	8.2 %
@ 45 mph	7.7 %	8.5 %
Starting Grade	26 %	26%

[1] GVW – Gross Vehicle Weight. CAFE regulation limit is 8,500 GVW.
[2] ETW – Emission Test Weight
[3] W.O.T. – Wide Open Throttle
[4] Tire rating limited
[5] GCW – Gross Combined Weight

Table 5: Large SUV Performance Comparison

III. Economics

We believe that a Hyperdrive vehicle can be produced with the same as or better performance characteristics than conventional vehicles, and with improvements in fuel efficiency and emissions, without substantially increasing cost. For example,

Paice Corporation believes that the Hyperdrive could cost approximately $1,700 more than the conventional powertrain that it would replace in the large SUV application. Sources of data for this estimate came from prior experience of auto industry suppliers, new components suppliers and from our own experience. To further refine our cost estimates we are currently establishing a program to build a demonstration vehicle with all of the components specifically designed for their intended use by qualified automotive suppliers.

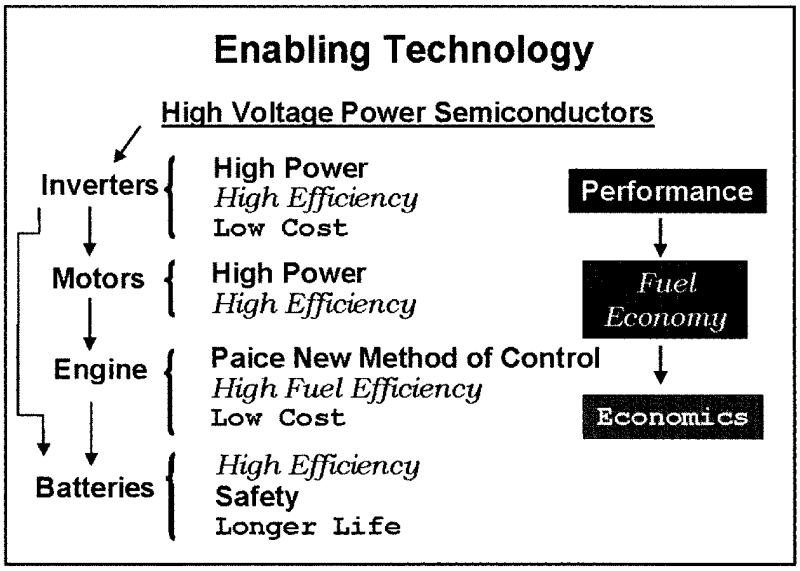

Figure 9: Enabling Technology "Chain Reaction"

As an illustration of life cycle cost savings, the fuel economy benefit for the large SUV is 10 mpg. Thus, as a rough estimate, if the vehicle is driven 12,000 miles per year (average for American drivers) and has an expected life of 10 years, this fuel economy improvement will yield approximately 2,900 gallons in fuel savings.*

The decision as to whether the fuel savings justify the increased manufacturing cost is, of course, not purely quantitative. Evaluation of the secondary effects, however, is not within the expertise of the Paice team.

Building a cost competitive Hyperdrive system for large vehicles became possible only after commercial introduction of high voltage power semiconductors, specifically 1,400 Volt IGBTs. This occurred in 1998, the year we started building a prototype of the Hyperdrive. In Fig. 9 we present the "chain reaction" of effects of high voltage power semiconductors.

The existence of high voltage semiconductors offers the ability to make inexpensive and efficient DC/AC inverters. This in turn permits introduction of powerful traction motors. With powerful traction motors, elimination (or, in some cases, simplification) of the transmission is made possible. When using all these components, the Hyperdrive implements our new method of engine control to achieve near-maximum thermodynamic efficiency of spark-ignition engines (32-34 percent as com-

*In its report "Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards", the Congressionally-authorized National Academy of Sciences (NAS) CAFE Study Panel evaluated break-even fuel efficiency using two evaluation cases. Case 1 assumed that a vehicle is driven 15,600 miles in its first year of service, decreasing 4.5 percent for each of the remaining years of its 14-year services life. This results in total mileage of 165.000 over the vehicle's assumed 14-year life. For Case 1, the CAFE Study Panel also assumed a current gasoline cost of $1.50 and applied a 12 percent discount rate to render a current year present value analysis. (The panel also applied an additional discount to the reported EPA mileage (15 percent) and assumed a penalty for future vehicle weight gains (3.5 percent)). Applying this analysis to the fuel economy improvements realized with the Hyperdrive-powered large SUV (16 mpg to 26 mpg), the present value of the fuel savings is $3,920. This compares favorably to the anticipated increase of $1,700 in system cost. (The panel also reviewed a simpler Case 2 in which fuel use over 3 years was evaluated, without discount. This case would yield savings over 3 years of $2,057, also greater than the anticipated increase in system cost.)

pared to the maximum of 35 percent). There are also additional benefits of using lead-acid batteries at lower currents, such as increased operating life and lower cost.

The Hyperdrive is essentially an evolutionary improvement of the conventional gasoline (or diesel) powertrain. It uses the same component technology, but in substantially different ratios. The engine is smaller. The transmission is either eliminated or reduced. The starter motor and alternator become more powerful and larger in size and weight. The lead-acid battery is increased in size and weight. There are more powerful electronic power controllers than just existing voltage regulators: the DC/AC inverters. However, these inverters employ the same basic type of components that exist in vehicles today. The operation of all of the components is coordinated through a highly sophisticated powertrain computer controller, similar in nature to existing engine control modules from a components viewpoint. Thus, the Hyperdrive relies on very similar components very similar to those currently in use and the resulting system weight is almost identical. Altogether, this leads to total cost that is modestly greater than present powertrain configurations.

IV. Potential for Improvements in Fuel Efficiency

Based on the fundamental principles of thermodynamic efficiency, we believe that the fuel efficiency of our powertrain represents close to the practical limit of what is technically possible in passenger vehicles. We presented modeling results for three vehicles: a) compact car, b) full-size (large) car, and c) large SUV. Using the Hyperdrive system, a compact car exhibits an increase in combined fuel economy from 31 to 45 mpg (a 45 percent improvement), a full-size car exhibits an increase from 27 to 39 mpg (a 44 percent improvement), and a large SUV exhibits an increase from 16 to 26 mpg (a 62 percent improvement). We believe that these modeling results are representative of the type of increase that all vehicles subject to CAFE can produce using our powertrain.

Vehicles	Fuel Economy by Vehicle Type In CAFE Regulated Vehicles (mpg)		
	Conventional	Hyperdrive	Improvement
Automobiles			
Minicompact	26	44	**70%**
Subcompact	31	47	**51%**
Compact	30	48	**59%**
Midsize	27	43	**61%**
Large	25	39	**55%**
Two Seater	26	43	**65%**
SUVs/Light Trucks			
Small Pickup	22	30	**36%**
Large Pickup	19	28	**48%**
Small Van	23	31	**35%**
Large Van	18	28	**53%**
Small SUV	24	37	**57%**
Medium SUV	20	30	**45%**
Large SUV	18	25	**45%**

Table 6: Fuel economy in CAFE regulated vehicles (8,500 lbs. GVW and less) – selected conventional vehicles compared to comparable vehicles modeled with the Hyperdrive

To provide a more complete picture of the improvement in fuel economy that could be expected in other classes of vehicles, we identified the relevant characteristics of all of the vehicle categories listed in Table 2 (the categories defined in the Oak Ridge Transportation Energy Data Book and currently subject to CAFE regulation) and designed the Hyperdrive system for a *representative vehicle in each category*. A summary of our modeling results showing the original fuel economy of each representative vehicle, the fuel economy that results from incorporation of the Hyperdrive system, and the percentage improvement from such incorporation is pro-

vided in Table 6.* With potential fuel economy improvements of the magnitude shown here, application of Hyperdrive to a large volume of production vehicles would significantly reduce total gasoline consumption and consequently, the requirements for oil imports.

All of the fuel economy improvements presented herein are based only on the use of the new Hyperdrive power train. Further small improvements are still possible, such as through ICE engine optimization, but such improvements will be subject to the law of diminishing returns as the Hyperdrive is operating the engine within 1–3 percent of its possible maximum thermodynamic efficiency. Furthermore, improved fuel economy from the use of lighter materials, smaller aerodynamic drag, and lower resistance tires (those potential improvements discussed by the report of the Union of Concerned Scientists.

4. United States Patent Application number 09/822,866, Severinsky and Louckes, Hybrid Vehicles, published November 8, 2001. Available at http://www.paice.com/patents/.

5. World Intellectual Property Organization PCT Patent Application, PCT/US99/18844. Published March 23, 2000. International Publication number WO 00/15455. Title page available at http://www.paice.com/patents/.

6. Louckes, Ted and Timbario, Tom, The Hybrid: A Challenge and an Opportunity for IC Engines, Proceedings of the AVL International Congress on Internal Combustion Engine versus Fuel Cell—Potential and Limitations as Automotive Power Sources, Graz, Austria, September 2001. pp. 145–160. Available at http://www.paice.com/library.html.

7. Polletta, David, Fuel Economy and Performance Impact of Hybrid Drive Systems in Light Trucks, Vans, and SUVs, presented at the SAE Bus and Truck Conference, Chicago, IL, October, 2001. SAE paper number 2001–2826. (c) 2001 Society of Automotive Engineers, Inc. Available (with permission of SAE) at http://www.paice.com/library.html. are not included in our analysis and would potentially result in additional improvements in fuel efficiency.

Of course, any HEV can only reduce overall fuel consumption in a meaningful way if it is commercially mass-produced. As discussed above, we believe that the Hyperdrive system has the only cost effective configuration of HEV that is fully scalable and is not cost prohibitive to mass-produce. As a first step toward the mass production of a Hyperdrive vehicle, our projections for cost will have to be substantiated through a manufacturing cost analysis of actual components in an actual vehicle that exhibits the performance and fuel economy advantages described above. Once cost projections are verified in the prototype vehicle, we would expect that participating automakers will begin the process of preparing for large-scale production of vehicles with the Hyperdrive system. If a development program were to begin now, automobiles with the Hyperdrive could be commercially introduced into the U.S. market within five years. We are hopeful that this process will commence in the near future in view of the level of interest being demonstrated by several leading automakers and key component suppliers.

It should be noted that such a transition will take substantial time to complete. To begin with, it will take Paice Corporation two years to deliver a complete demonstration vehicle and two additional years for the automakers to test and evaluate the vehicle and go through the expensive process of preparing for production. Once a vehicle with the Hyperdrive system appears on the market, subject to the level of customer acceptance and commitment on the part of the automaker, it will then take a number of years for the transition of the full range of the automakers vehicle lines.

While the Hyperdrive system can deliver fuel economy improvements of roughly 50 percent across the full range of automobiles and light trucks, an additional question is in which vehicles is it most appropriate to begin implementing the Hyperdrive powertrain. We believe that the greatest fuel savings can be realized by introducing the Hyperdrive system into the SUV/light truck class of vehicles. To understand why this is the case, one must evaluate the issue of fuel efficiency under a gallons per mile analysis, as well as the traditional miles per gallon analysis.

As illustrated by Figure 10, under a miles per gallon (MPG) analysis, introduction of Hyperdrive technology results in an increase from 31 to 45 mpg for a compact

*The three Hyperdrive vehicles modeled and presented in section 2 above were chosen to represent the Hyperdrive system as compared to the top performing vehicles for compact and full size (large) cars and the heaviest SUV subject to CAFE regulation. In Table 6, the Hyperdrive was modeled to be representative of the class as a whole. As a result, the fuel economy results for the categories "Compact Automobile", "Large Automobile" and "Large SUV" in Table 6 differ somewhat as compared to the results for the three specific vehicles selected and described above in section 2.

car (a 14 mpg increase) as compared to an increase from 16 to 26 mph for a large SUV (a 10 mpg increase). Thus, from a MPG standpoint, it appears that greater value is added by incorporating the Hyperdrive powertrain into a compact car.

However, under a gallons per mile (GPM) analysis, those same increases in fuel efficiency result in dramatically different amounts of gallons used over 12,000 miles (one year of driving). As Figure 10 illustrates, using the Hyperdrive system in the same compact car yields a savings of 120 gallons per 12,000 miles. Conversely, using the Hyperdrive system in the same large SUV yields a savings of 290 gallons per 12,000 miles—more than double the fuel savings from the compact car.

While other factors bear on fuel economy, we feel that it is logical to focus on the number of gallons consumed for a specific distance traveled. Moreover, it makes sense that the Hyperdrive technology will yield the greatest per vehicle fuel savings when introduced into the SUV/light truck class of vehicles, because passenger cars are already more fuel-efficient than SUVs and light trucks and, therefore, don't have as much room for improvement. Consequently, if the goal is to yield the greatest fuel savings in the categories of vehicles currently on the road, the Hyperdrive system should be introduced first in the SUV and light truck vehicle class.

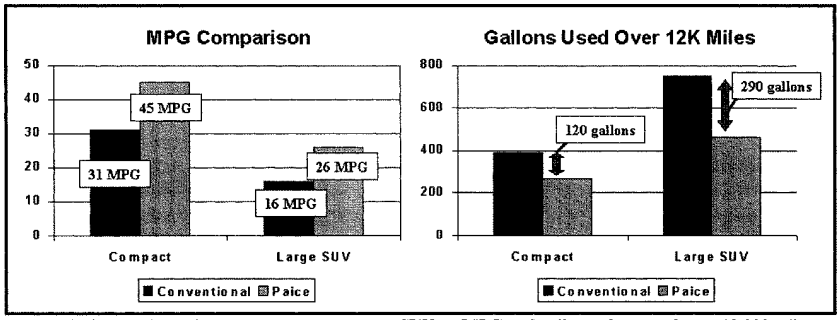

Figure 10: Comparison of a compact car and a large SUV on MPG and gallons of gas used over 12,000 miles

Additionally, we recommend that the Senate Commerce Committee ask Argonne National Laboratory to use its modeling software to corroborate our technical data and modeling. Their software is designed specifically for hybrid-electric vehicles and is able to match performance of physical models within 1–2 percent accuracy. It will allow the Government to corroborate our technical results without spending millions of dollars for physical prototypes, and will take weeks instead of years to complete. We also recommend that the Senate Commerce Committee take ANL's data and ask Oak Ridge National Laboratories, the originator of the report referenced in this testimony, to do a detailed analysis of the impact of the Hyperdrive on oil uses in the future. Paice Corporation is prepared to work with these national laboratories in performing such studies and to meet with the Senate Commerce Committee or other parties to discuss the results.

Conclusion

The Paice Corporation has designed and developed a hybrid electric powertrain, which results in ICE fuel efficiencies in the range of 32–34 percent, approaching the limit of thermodynamic efficiency for spark-ignition engines. Current automobile ICEs operate at around 18–22 percent, so the Hyperdrive has a potential to deliver significant gains in fuel economy.

We have successfully demonstrated fuel economy improvements in a full-scale prototype of the Hyperdrive on a dynamometer and used the data derived from such tests to model three selected vehicles, a compact car, a full-size car, and a large SUV. As compared to their conventional counterparts, the vehicles powered by the Hyperdrive exhibited an increase in combined fuel economy as follows:

Compact car—from 31 to 45 mpg (a 45 percent improvement)

Full-size car—from 27 to 39 mpg (a 44 percent improvement)

Large SUV—from 16 to 26 mpg (a 62 percent improvement)

The Hyperdrive is suitable for all vehicles covered by current CAFE regulations, and we believe that the modeling results presented are generally representative of the type of increases in fuel economy that can be realized in all vehicles subject to CAFE.

Regardless of the type of regulations imposed, Paice believes that national fuel consumption can only be meaningfully reduced in the long term if the auto industry

can produce cars at acceptable cost that suit the needs and desires of consumers and that are at the same time highly fuel-efficient.

Hyperdrive cars will match or better the performance of existing vehicles. They will also have conveniences and features not feasible in present day cars. Hyperdrive cars will be more heavily dependent on real-time control software and other more advanced technologies than present ones and do things we can't even imagine now, as cell phones did just a few years ago. In a truly American way, they will save gas, and they will be better products.

We are confident that the Hyperdrive can be a valuable tool in enhancing fuel economy, improving our environment and reducing our dependency on foreign oil. We look forward to working together with the Government and the auto industry in achieving these goals.

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3. United States Patent Application number 09/392,743, Severinsky and Louckes, *Hybrid Vehicles Incorporating Turbochargers*, allowed October 12, 2001. A copy of this patent will be made available at *http://www.paice.com/patents/* once it is published by the U.S. Patent and Trademark Office.

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8. This data is based on a study conducted by Oak Ridge Laboratories. Davis, SC 2001. Transportation Energy Data Book: Edition 21, ORNL–6966, available at *http://www.ornl.gov/webworks/cppr/y2001/rpt/111858.pdf.*

Senator KERRY. Thank you very much, Mr. Louckes.

I guess any sort of non-expert layperson's reaction to the testimony is to quickly turn to the industry and say why not or where is this? What's your reaction to that particular technology and if it is as good as he says it is, why aren't the Big Three chasing these guys like bandits?

Mr. ROBERTSON. We have had dialog with Paice in the past. I have to say not recently. We, I think we all recognize that as we sit here, the potential for hybrids, we feel that we have a number of both proprietary and non-proprietary approaches to hybrids which can yield, depending upon how it is done between 20 and 30 percent better fuel efficiency in and of itself, and the big challenge of course is doing it cost effectively.

The last time we looked at the Paice system, it was a 900 volt lead acid volt battery system with a diesel. There are a number of issues with that. We are very enthusiastic about the diesel. We would love to use diesel in this market like we do in Europe, but I think you know, there are some real impediments to that which we are all working hard on. 900 volts is a real challenge. I think the industry is trying to drive the voltage down as low as possible for all of the obvious reasons, and batteries, lead acid batteries are

attractive from a low-cost point of view, but that is the end of the positives.

Most of us are trying to get to lithium ion and probably starting out with nickel metal hydride and will go to lithium iron as soon as there is a supplier able to supply them.

In a nutshell again, I would have to say we have not looked very recently and would be happy to do that. I have no basis to quarrel with the testimony, but for a variety of technical reasons, we think that the approach that we are taking and the approach we have already announced for 2003 and 2004 production will be more cost effective, more attractive and hopefully, equally effective.

Senator KERRY. Do you want to comment also, Mr. Olson?

Mr. OLSON. Briefly. I am not aware of whether engineers at our parent corporation in Japan have talked to Paice. I know that we tend to be an intensely not-invented-here company. We like to do our work internally. We have three different types of hybrids already in Japan.

It is a very, very promising technology. We think it is a core technology for the mid-and longer term and we intend to deploy it aggressively. We will have more announcements about that in the near future.

Mr. LOUCKES. If I could just add something.

Senator KERRY. I was going to come back to you.

Mr. LOUCKES. Our technology is not based on diesel. The data I am speaking to you about, in a written submission, is based on spark ignition engines. However, we are doing a project for one of the overseas companies using a diesel engine and it is far better, of course, but it is not dependent on that.

With regard to high voltage, that is one of the keys to the economies of this type of approach. And of course, we have been through a great deal of examination with Underwriters Laboratories as to the relative safety of this application as compared to a 200–and 300-volt application and it was found by them to be even safer.

The key is that as you go to higher voltage, the cost of power electronics goes down as a square of the current and so one of the keys to getting low cost in hybrids is to get the cost of the electronics and power electronics and motors at lower levels. When you take it to higher voltage, that is possible.

With regard to lead acid batteries, we have a tremendous background of experience. There is current testing going on that indicates that this application can use lead acid batteries very successfully, perhaps even more successfully than nickel metal hydride or lithium iron and in the sense that we use it very gently. It is very, very well proven to operate successfully in all climates, at extreme temperatures, both low and high. Lead acid batteries have been in the automotive industry for well over 50 years, as long as I have been in it.

Senator KERRY. Where are you in the development and testing of this at this point?

Mr. LOUCKES. Well, as I indicated, we have built a prototype system. We have tested it on a dynamometer according to the standard testing as well as random driving and we are in the process now of working with potential suppliers and automotive industry——

Senator KERRY. How long does it take to get this into vehicle design?

Mr. LOUCKES. We could get a complete prototype program done from 2 years from whatever day you start, and based upon my experience in the industry to take that to production successfully with due care and production reliability all established is probably another 2 to 3 years after that before you could be in volume. To be honest with you, perhaps it could be done sooner, but that is the prudent thing. I would say——

Senator KERRY. What does your modeling suggest is the cost to the customer?

Mr. LOUCKES. Well, for example, and we have, of course, a lot of experience of our own on the cost of these components. We have in-house in our own organization a very experienced cost analyst who has worked with the industry in the United States for many years. We see a large sports utility 4-by-4 at about plus-$1,700.

Senator KERRY. Plus-$1,700 and the savings in fuel, so it would be 50 percent of the savings?

Mr. LOUCKES. $1,700-plus for an improved performance and with a fuel economy that I indicated that went from 16 and combined to 26.

Senator KERRY. So what's the lifetime? And I have not done the math on it.

Mr. LOUCKES. Well, in 10 years, you will save about $3,000.

Senator KERRY. 10 years. Most people do not keep their cars 10 years.

Mr. LOUCKES. No. But I am just talking about 12,000 miles a year. And it depends upon the cost of fuel. Of course, if you take today's fuel, that is what I am talking about.

Senator KERRY. Have you discussed your technology with automakers in Europe and Japan?

Mr. LOUCKES. Yes, I have.

Senator KERRY. Is there a differential in the interest between domestic and foreign automakers?

Mr. LOUCKES. There appears to be at this time.

Senator KERRY. Meaning?

Mr. LOUCKES. We seem to be getting a more ready acceptance from the suppliers, the automobile makers overseas. Of course, we are an American company and we hope that we can work with the U.S. auto industry to bring this technology to market because ours provides significant advantages over other hybrid technologies.

Senator KERRY. Let me come back for a moment if I can to Mr. Robertson. Your comments a moment ago about NHTSA. I just want you to know for the record that I respect the industry and its uniformity in the industry. You all would prefer to have NHTSA handle this, and that is clear in the testimony today.

But let me just make it clear to everybody that that is a wish that I am afraid cannot be farther to the fact in this situation. There is an energy bill that is going to come down the pike in January, whether this Committee moves or not, someone is going to introduce something on the floor of the Senate.

What we are trying to do is address fuel economy in the most orderly and thoughtful way possible, which is through the committee process, but there is an inevitability to some kind of passage, a cer-

tainly, a confrontation, on the issue of CAFE standards. But I have to say to you that you have got to be sensitive to the politics that I discussed earlier, about the road we have traveled here, the kinds of comments that have been put on the table in prior years and particularly, with respect to NHTSA.

Here is where credibility gets put to the test, unfortunately, in the flip-flop according to who's where, who's in power, and where, obviously, they think they are going to "do better," and better seems always to be not how do we find the best median here, but how do we just keep the status quo. And so in 1989 and 1991, both Chrysler and GM urged this Committee to defer to NHTSA and oppose the Committee's strong CAFE legislation because, of course, NHTSA was then regarded by the industry as being in friendly hands.

In 1995, when NHTSA was poised to issue revised standards, Andrew Card, on behalf of the automakers, told a House Committee that NHTSA held too much authority over CAFE and urged Congress to take back CAFE policy responsibility, which as we know in 1995 it did through the detriment of this 6 years of thinking without any kind of fact gathering or genuine effort to make a change. So from my perspective, there has been such obvious forum shopping that it is hard to take your suggestion that it is anything more than a continuation of that and it is not going to have an impact on the Committee's need to try to find a way to work with you on this and so I know you stated it for the record. It is out there. But I am just saying for the record that the Committee is going to proceed forward to try to come up with something through the legislative process.

I can't guarantee you it is going to be non-confrontational, but I would like to be as non-confrontational as it could be. I'd like to find a way to see if we couldn't meld a combination of efforts here that makes for good policy, and I hope we will be able to do that in some way and perhaps we can.

Mr. ROBERTSON. Mr. Chairman, may I?

I certainly respect those points, and the reality is as you cited it and with regard to your comments earlier this morning about forum shopping, I can't quarrel with that. I can't make a persuasive case otherwise.

I would only say that I think you have conducted this hearing today in a very objective manner, if I may say so, and allowed people to bring out their views and have been very patient in that, and I commend that.

In listening to it all, it is clear that it is a very, very complex subject and the deeper you dive into any element, whether it is an attribute-based system or has safety really been affected or not, just how do you interpret the National Academy results. It is a very, very complex subject and I can only say that we hope that however it is done and whether it is done in Congress or at NHTSA or in conjunction, we hope that it is done by all means quickly, but in the very thorough manner and I can only plead that the appeal of the NHTSA approach is that they have the staff and the technical people on the premises that we think can add to that analysis.

Senator KERRY. Well, we will certainly reach out to them. Look, I want this to be objective. This is important stuff, and it has a serious impact on people. I think there are a lot of things to weigh and I found as one digs into it, there really are interesting, interesting and really fairly delicate balances between where the gains have been made.

I think there was some cherry picking in the initial part of CAFE, and so the weight components and some of the carburetion and other kinds of gains that were there to be grabbed were much easier to grab. That having happened, there is an obvious hybrid option here and hybrid takes you way up in the 1960s, 1970s, 1980s of MPG, it depends on what the particular technology in vehicle is.

But clearly, if consumer choice is going to be one of the things we are trying to measure, in the current marketplace, it is hard to find what's going to drive consumers toward that, unless it is really equal in performance. I mean, some salesman is going to have to be able to sit here and say "Hey, let me see this car." It has got the same acceleration, exact same comfort level, the same driving characteristics and so forth and if it doesn't, I can see how a buyer is going to say, "Well, that is kind of new and I am not sure about it yet, and this is all tried and true and that is where I want to go." So you know, we have got to think through all of these kinds of things. There are also some inherent, and I say this nicely, but I think some deficiencies. I am not in the auto industry.

If I had been in the business 30 or 40 years ago, I would have driven my company in a very different direction. I think Europe has taught us that through the years. We have seen their products and the influence they have had on our market, but we still always tend to kind of push the extreme of the marketplace and there is an American culture about it, too. We all grew up thinking differently about the automobile than people in other countries and culture is part of your marketplace and you have to obviously appeal to that.

So I am aware of this, and I am trying to find a way to get the parameters of the realities here, what is the reality of the NAS review? What is the reality of the technology? What is the reality of what we could gain if there is some cherry picking left, how much does that amount to in terms of miles per gallon gained, and how fast can we push the envelope and what incentives should we appropriately use to push that envelope and maybe we can be creative about this and think about it as a mix and match a little bit. I am not sure of the answer to that yet. But we are open to looking at that as thoughtfully as possible.

Mr. Friedman, let me just ask you, you have listened to the industry and I found again with all due respect, often people can sit on the outside of the industry itself and look at the technology and say these are ready available, but then you run into the kinds of complications that Mr. Robertson or others have tried to describe.

Is the lead acid battery perhaps more dangerous or is not it more dangerous? You have different points of view about these things. How sure are you when you talk about the technological feasibility, and the prior panel said they had agreed to disagree with the National Academy of Sciences. We have not made a judgment yet, but

how sure are you of the notion that outside of hybrid, there are these miles per gallon to be gained from current level of technologies.

Mr. FRIEDMAN. I would have to say that I am very sure. I think the analogy you made earlier to cherry picking is a very good one. We did have a lot of cherries to pick in the late 1970s and early 1980s to improve fuel economy, but the great thing about cherry trees is the cherries grow back and technology is a lot like that, technology progress keeps moving forward.

And in the last 15 years, where fuel economy standards have basically stayed stagnant, many technologies have come on line that are now just like the cherries that we were able to pick before.

Senator KERRY. Such as?

Mr. FRIEDMAN. Such as, for example, one of the technologies General Motors mentioned, cylinder cutoff systems. Such as continuously variable transmissions.

Senator KERRY. But they are using them.

Mr. FRIEDMAN. They are using them. They are starting to bring them into vehicles.

Senator KERRY. What percentage of vehicles? Does anybody know?

Mr. OLSON. Do you mean CVT? CVTs are very low usage yet.

Senator KERRY. And what kind of gains are available in them?

Mr. FRIEDMAN. The gains from continuously variable transmission can be quite significant, especially when combined with an advanced engine. One of the really impressive things about a lot of the technologies is that actually in a lot of cases the benefits can add between the two.

Continuously variable transmissions can easily give you anywhere between 5 to 10 percent increase in fuel economy depending upon the vehicle and efficient engines such as advanced versions of variable valve technology engines that are some versions of which are on the road today can get you another 10 to 15. Together they can get you a little bit more because they work off each other to increase the benefits. And there is a lot of examples of where those synergies do exist.

Senator KERRY. You are suggesting that in the stagnation of the last years without any impetus from NHTSA, without any enforcement, with the sort of permissive decline as well as with the cost of fuel, there has been an open season on retrenchment, if you will.

Mr. FRIEDMAN. We are in an ironic position that the policy that was brought up earlier to take all vehicles off the road and replace them with new cars would actually decrease the fuel economy of the fleet.

The cars we are selling today are lower in fuel economy than they were 10 to 15 years ago. These cars are more fuel efficient but their fuel economy is lower. A lot of the technologies, we have lost some technologies because of that stagnation, but at the same time, technology progress as you were saying and summarizing is not stopped, and there is a lot of technologies out there and I think the automotive news picture that was shown previously shows some additional examples of that and that is what the National Academy of Sciences study focuses on is all existing and emerging technologies.

This is not rocket science. These are not brand new technologies. These are things the automakers have been looking at for quite a while.

Senator KERRY. How about that, Mr. Olson?

Mr. OLSON. One of my colleagues just tapped me on the shoulder and said to remind you again of what I said in my testimony. Sixty-two percent of our engines now have variable valve technology.

Senator KERRY. That is what I thought I heard you say.

Mr. OLSON. I should have said it again.

Senator KERRY. That is all right. I thought I heard 62 percent now, but what is the Chrysler story?

Mr. ROBERTSON. We have a relatively small number of engines right now that have variable valve timing. We have——

Senator KERRY. Could you gain much from it?

Mr. ROBERTSON. In and of itself, there is a small potential improvement. Obviously we are trying to do a variety of these things, cylinder deactivation was mentioned. We have one engine with that. We will have another one next year. The cylinder deactivation is really only applicable to 8-cylinder or 10- or 12-cylinder engines, simply because when you shut off half the engine, obviously you are down to 4 cylinders in the case of an 8; or 3 in the case of a 6-cylinder. You then start to run into some of these other sort of subjective issues like will the customer accept a V–6 that feels like a 3 cylinder when it is in deactivation mode?

Those are the kind of day-to-day challenges that obviously we all deal with. The other comment I wanted to make though, and frankly one of the areas in which we agreed to disagree with the National Academy as Ms. Cischke indicated, is to what extent you can add these things together. And again, as a member of the Academy, I am not inclined to dump on the Academy, but where we disagreed probably more than anything else.

Senator KERRY. How cumulative they are?

Mr. ROBERTSON. Yes. Can you add a CVT at 5 to 10 percent on top of an efficient engine on top of this, that, and the other?

Senator KERRY. What about that, Mr. Friedman? Is that fair?

Mr. FRIEDMAN. Well, that was a point that was brought up at the National Academy of Sciences meeting and, in fact, it produced some very strong reactions from the panel members on the National Academy of Sciences. The automakers accused the National Academy of Sciences of violating the laws of thermodynamics. That is not jaywalking. That is a felony to a scientist, I mean, this is serious.

[Laughter.]

Mr. FRIEDMAN. And yet, they later retracted that and said no, well, we actually wouldn't talk about it that way. The engineers on the National Academy of Sciences panel are confident. I am confident that they did the best job that they could. There is some potential on the very, very high end for some double counting. I did not even show those numbers. Those numbers showed that you could get to 46 miles per gallon.

Senator KERRY. So the conservative low end median is what level?

Mr. FRIEDMAN. The median range from Path 3 technologies is what I have up there. That is the average range is 38.9 miles per gallon from Path 3. From Path 2——

Senator KERRY. Over what period of time?

Mr. FRIEDMAN. That is 10 to 15 years. Path 2, which is within 10 years, is 34.2 miles per gallon and that is without using weight savings. All of these vehicles are either the same weight as vehicles are today.

Senator KERRY. Do any of those things, Mr. Ditlow, compromise safety?

Mr. DITLOW. No, they do not. I mean, for example, if you go to weight savings, you can use higher strength, lower weight materials, as a substitute.

Senator KERRY. What does that do to cost?

Mr. DITLOW. It will raise the cost, but it will not raise the cost significantly.

One of the dilemmas within the automobile industry, though, is the cost philosophy is if you have a dollar additional cost per vehicle spread over 15 million vehicles, that's $15 million, so if it is $10, that is $150 million and so any time you deal with the automobile industry, you are dealing with big numbers and so, but what the automobile industry is not looking at is the cost savings to consumers because their cost accounting ends at the sticker price and so the savings to the consumer in terms of reduced gasoline consumption don't get reflected into the cost accounting of the automobile manufacturers.

I want to add one thing about NHTSA. As an observer of NHTSA over the years, the ability of that agency to do analytical work in fuel economy today is 1/10th of what it was in 1980. I mean they have just dramatically cut back the number of staff and the amount of resources in that budget.

Senator KERRY. We're not sure they remember how to do it. It has not been in the forefront of their work and I do not mean to be snide about it, but that is a question I do not know the answer to.

What is the lead time? Mr. Robertson, and Mr. Olson, what sort of lead time is reasonable to assume here and I am looking at the manufacturing cycles, design cycles. I mean, I know you do not want to accept the notion of any particular figure, but if there were some mix and match here that we do decide to do, what is the most reasonable lead time that you think we ought to try to embrace even as perhaps a very, very, varied span of time X, minimum X maximum.

Mr. ROBERTSON. There are two major components to lead time. One is just simply the development, the more "stretch," the technology, obviously, the longer it takes to develop it and to prove that it is reliable and so on under all conditions, then the other aspect of it is the extent to which we have already gotten invested and have a cycle plan for turning over products. If we have to replace a transmission plant, for example, that we just spent the billions of dollars to tool.

We have a schedule for retooling those things and retooling models which is in the sort of eight to 10-year range, so when the Academy said 10 to 15 years to populate technologies across the whole

fleet, that from our point of view, that is probably a reasonable amount of time, that doesn't mean it takes 10 to 15 years to develop a particular technology, but if you look at some of the significant turnovers that we have seen before the shift from carburetors to fuel injection, that took about 15 years to convert the whole fleet and so on. In that case, there was a certain amount of customer pull to facilitate it.

Senator KERRY. Well, I think Mr. Friedman, let me just check with you on this. In this "Drilling in Detroit" report, you estimate that the automobile equipment sector could provide the creation of 40,000 jobs by 2010 and over 100,000 jobs by 2020. The auto companies, on the other hand, are clearly arguing that this requirement would result in the loss of jobs.

How do we reconcile these two approaches?

Mr. FRIEDMAN. Well, I think part of it is that if you look at a lot of the analyses by the auto industry on the impacts of raising fuel economy standards, one of the strongest assumptions that is made there is that any plants that make vehicles that do not meet that standard would have to shut down and that is equivalent to giving up and I think it is clear what National Academy of Sciences results, the technology is there that they do not have to give up. They can modify the vehicles over time and improve their fuel economy, so there is no reason for these jobs to be lost unless they give up on trying to compete in that market segment with those vehicles.

Senator KERRY. What happens to the niche that they have created now? Particularly General Motors is making money through the significant sale of the SUVs. It sells other cars at a loss, and that niche is a critical niche to the profitability and ability of the company to keep the people employed who are working there. Who knows what the economic impact might be on that particular division. What is your attitude about that?

Mr. FRIEDMAN. Well, I believe that they have the technology to ensure that they are not going to lose that niche. They can make these vehicles more fuel efficient, but just as comfortable and just as safe as what they have today. They are competing well in those markets. They have the technology to ensure that they can continue to competing in those markets.

Senator KERRY. Do you agree with that, Mr. Louckes? I mean, some of the things that other designs have put onto those vehicles have added weight, or altered the entire configuration, or the safety that they provide, or decreasing performance, and so forth. I mean, if they scale back on performance, is the vehicle still as marketable and still as interesting to the consumer?

Mr. FRIEDMAN. Our analysis shows you can reach the fuel economy levels, as does the National Academy of Sciences analysis say that you can reach these levels without giving those things up. Without changing the overall design of the vehicle, without changing or reducing the performance of the vehicle; in fact, in some cases you can improve the performance of the vehicle.

Senator KERRY. Do you agree with that, Mr. Louckes?

Mr. LOUCKES. Well, we do, based upon what we are trying to implement.

Senator KERRY. If your engine worked and if you could implement it, it works to the modeling.

Mr. LOUCKES. There is nothing unique about our engines, of course, but this is a complicated system and it will take a significant technical development program.

Senator KERRY. Your particular system, will it add weight? The lead batteries?

Mr. LOUCKES. Typical applications had a very small additional weight in a large sport utility, it is probably going to be a neighborhood of 250 pounds net. It depends upon the application. Where you have a passenger car, a typical passenger car, we eliminate the automatic transmission completely. We downsize the engine by about nearly half the size. That is offsetting weight to the added weight for the battery system. The power electronics are all very light. That doesn't really add up to much because——

Senator KERRY. What is the impact, Mr. Ditlow, of 250 pound add-on in terms of SUV in terms of what you were talking about?

Mr. DITLOW. In terms of reducing—well, you need to find some other weight substitutions, materials to reduce the weight of the SUV, but we are much more concerned about the stiffness of the SUV than we are about the weight of the SUV. Because if you have an SUV of the same weight, but it crumples very nicely in the front like a passenger car, that is going to be a safer SUV for its occupants than the occupants of the vehicle it strikes, regardless of whether the weight stays the same or not.

Mr. LOUCKES. Our calculations are based upon those added weights for the fuel economy that our modeling demonstrates. I have had a lot of experience on the safety side, too.

I was responsible for the first airbag systems in General Motors back in the early 1970s, and we are not going to change the basic structure of the vehicle with this technology at all. As a matter of fact, it may allow you to improve in certain areas in terms of crush space.

Senator KERRY. Just a final question for both of the manufacturers. Mr. Olson and Mr. Robertson.

What do you believe happens in terms of that sort of niche in the current marketing structure with a mandate to meet a higher standard?

Mr. OLSON. I am not sure I understand the question.

Senator KERRY. Well, if all of a sudden the CAFE standard goes up and you have X number of years to meet it, you are currently, you have got, there is a pretty good market out there with respect to these larger, more powerful, more capable cars with all of the creature comforts that have been put into them that add weight and so forth, and did not affect fuel consumption.

In your judgment, what happens to the Big Three in terms of their current domination, if you will, of that component of the market, which incidentally, foreign producers are now attacking a little more aggressively anyway?

Mr. OLSON. I made the point in my testimony that we are a full line manufacturer. And to give you an example, I looked at the sales year to date through November, 45 percent of our sales are LDT, light duty trucks; 48 percent of GM sales are in the light

duty truck category. Ford is much more dependent on that category, I will point out in all honesty.

If any CAFE changes are structured to be effective and they are structured to be fair and they are structured to better rely on the market with policy goals, we are confident in whatever race you set under way because we are confident in our technology. I will leave it at that. I do not know whether that answers your question.

Senator KERRY. Well, it underscores to me why some other people are concerned.

Let me just thank all of you for taking the time. I know this has been a long haul, but I think it is been very helpful and helped us lay an initial record. I am not sure when the next hearing will be. We will have an additional hearing to try to go further with some of these issues, working off of sort of this threshold than the prior hearing.

We may be in touch with some of you privately and personally just to sort of talk through some of this. We look forward to following up.

Thank you all very much. We stand adjourned.

[The hearing adjourned at 2:10 p.m.]

A P P E N D I X

PREPARED STATEMENT OF WILLIAM C. DUNCAN, GENERAL DIRECTOR, JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION

Mr. Chairman and Members of the Committee: On behalf of the Japan Automobile Manufacturers Association, I want to thank the Committee for the opportunity to submit this statement for the record in this hearing on fuel economy standards.

JAMA is the trade association of Japan's motor vehicle manufacturers, representing a significant number of the companies directly affected by the Corporate Average Fuel Economy (CAFE) standards, and in particular by the CAFE "fleet split" or "2-fleet" rule. JAMA has long taken the position that the CAFE fleet split rule; represents a regulatory burden on auto manufacturers that should be eliminated, without adversely affecting the goal of fuel efficiency.

In addition, JAMA notes that in the National Academy of Sciences (NAS) study entitled, "Effectiveness and Impact of Corporate Average Fuel Economy Standards," requested by Congress, the study's Finding 3 stated, "The committee could find no evidence that the '2-fleet rule' distinguishing between domestic and foreign content has had any perceptible effect on total employment in the U.S. automotive industry." Accordingly, the study made Recommendation 4: "Under any system of fuel economy targets, the 2-fleet rule for domestic and foreign content should be eliminated." We concur with this recommendation.

In March 2000, JAMA submitted. a paper on the fleet split issue to the National Highway Traffic Safety Administration. Since this paper provides substantial detail and analysis supporting JAMA's position on eliminating the fleet split rule, I would like to submit it as part of my statement for the record.

If the Committee has any questions or would like additional information on any aspect of JAMA's position, I would be pleased to respond.

Thank you.

Attachment

Corporate Average Fuel Economy Fleet Split Requirement: The Need for Deregulation; Japan Automobile Manufacturers Association

Introduction

On June 19, 1997 the Governments of Japan and the United States agreed to an Enhanced Initiative on Deregulation and Competition Policy. The Enhanced Initiative is a dialog intended to address regulatory measures which have the effect of unnecessarily distorting trade, raising costs and limiting choices for consumers. The ultimate objective of the Enhanced Initiative is the removal of sectional and structural impediments to expanded international trade and investment flows.

At its inception, the Enhanced Initiative recognized that the United States and Japan are part of an increasingly integrated world economy. Nowhere is this fact more evident than in the automotive industry, which is at the forefront of globalization, and is made up of multinational competitors with manufacturing operations throughout the world. Aspects of the Corporate Average Fuel Economy ("CAFE") regime exist in stark contrast to this reality, imposing restrictions and requirements that cut against the grain of a global automotive industry.

Specific provisions of the CAFE law and regulations are preoccupied with what is "domestic" and what is "foreign," an increasingly irrelevant, distinction in light of the automotive industry's development over the last 20 years, and particularly over the last 2 years. Unfortunately the distinction as imposed under CAFE is not trivial in terms of its burden on trade costs, and consumer choice, which is why the regulatory scheme is an appropriate topic of discussion under the Enhanced Initiative.

Simply put, the CAFE "fleet split" rule imposes artificial bureaucratic restrictions that increase costs, do not serve arty useful purpose, distort normal market-based decisions by multinational companies, and undermine other, equally desirable goals of U.S. policy. The "fleet split" should be eliminated.

Relevant Statute

As part of the U.S. response to the fuel shortages of the early 1970s, Congress enacted the Energy Policy and Conservation Act of 1975 requiring manufacturers of passenger cars and light trucks to meet specific fuel-efficiency (miles-per-gallon) standards that would be set by the Federal Government, through NHTSA. The Environmental Protection Agency ("EPA") also has a role in the testing and verification of fuel efficiency for vehicles. These Corporate Average Fuel Economy ("CAFE") standards were ostensibly designed to require the auto industry to produce increasingly more fuel-efficient vehicles in order to conserve energy.

The Act set a CAFE standard for passenger cars that has increased several times. Since Model Year 1986, the standard has been 27.5 miles per gallon for cars. The current standard for "light trucks," a category which includes sport utility vehicles ("SUVS"), mini-vans, and pickup trucks is 20.7 miles per gallon. These standards are applied on a fleet-wide basis for each manufacturer, requiring the numerical average of the fuel economy ratings for a manufacturer's entire line of vehicles to equal or exceed the appropriate standard for its category.

NHTSA is authorized to raise or lower the truck standard for a particular model year to achieve the "maximum feasible average fuel economy," taking into account technological feasibility, economic feasibility, the effect upon fuel economy of other Federal motor vehicle standards, and the need of the Nation to conserve energy. For the last several years, Congress has amended DOT appropriations acts to prohibit NHTSA from preparing, proposing, or promulgating any new fuel-economy requirement. Under the Act, a manufacturer that fails to meet the CAFE standard is liable for a monetary penalty. However, a manufacturer may offset its shortfall in meeting the CAFE standard 1 year with credits it has earned by exceeding the standard in other years.

A manufacturer's passenger car fleet must be divided into two parts for CAFE purposes, depending on content: its "domestic" fleet consisting of vehicles with 75 percent or more U.S./Canadian cuntent; and its "import" fleet of vehicles with less than 75 percent U.S./Canadian content. If a manufacturer produces both domestic and import fleets, each fleet must separately comply with the CAFE standard. The term "fleet split" has been applied to this arrangement. No such requirement exists with respect to light trucks, where the import and domestic fleets are combined.

The North American Free Trade Agreement ("NAFTA") Implementation Act of 1993 provided that the value added to a passenger automobile in Mexico will be considered to be domestic value as of January 1, 2004 and in all subsequent model years. This provision is being implemented in phases, with certain manufacturers currently permitted to elect the model year for which Mexican content in their automobiles will be treated as domestic content.

Artificial Bureaucratic Restrictions

The regulatory structure established to implement the CAFE fleet split is cumbersome. It does not reflect the actual conditions in the auto industry, nor is it sufficiently flexible to allow for changes in those conditions. Moreover, substantial record of questions and agency responses has grown up around these regulations. In short, the U.S. Government, through NHTSA, has become a "micro-manager" in the economic decisions of U.S. and foreign automakers involving where production and procurement are to be located.

How Fleet Split Works

The rules governing the separation of domestic and foreign passenger car fleets for CAFE purposes, found at 40 C.F.R. 600.511–80, establish the following requirements.

A manufacturer that produces passenger cars with both domestic and imported content is required to divide its fleet into two content-based sections. For CAFE purposes also, the U.S. and Canada have been treated as one country and cars with 75 percent or more U.S./Canadian content are considered "domestics." Cars with less than 75 percent "domestic content" are classified as "imports." Each of the two parts of this "split fleet" must comply separately with the CAFE standard.

Pursuant to NAFTA, cars produced in Mexico are now becoming "domestic" for CAFE calculations when at least 75 percent of the cost to the manufacturer of the vehicle can be attributed to value added in NAFTA. This new requirement will be completely phased in by January 1, 2004, although manufacturers already assembling cars in Mexico may elect to be included sooner.

Under CAFE, an automobile is considered to be domestically manufactured if at least 75 percent or more of the cost to the manufacturer is attributable to value added in the U.S., Canada, or Mexico (if the manufacturer has already elected coverage for vehicle assembly there), inclusive of labor and other overhead costs such as advertising and depreciation on plant and equipment.

Where content levels are close to the 75 percent threshold, the regulations require manufacturers to trace individual components to their raw material sources to attain an accurate measure.

Light trucks are not subject to the fleet split requirement.

Why CAFE Fleet Split Does Not Match Real World Conditions

Requiring the creation of two car fleets, on the basis of a legalistic, bureaucratically applied formula, is neither realistic nor practicable.

CAFE fleet split requirements disrupt and distort market-based decisions by auto manufacturers. The automobile industry is global. Auto companies need to be able to meet consumer demand, increase productivity, and keep costs low to succeed in a highly competitive climate where there is pressure to maintain price stability. They need to be free to make market-based choices about sourcing of parts and components and the selection of the most appropriate location of assembly. The benefits of globalization and flexibility are passed on to the consumer, in the form of lower costs and a wider variety of makes and models. Under the CAFE fleet split requirements, however, auto manufacturers must constantly balance potential CAFE penalties for their imported and domestic fleets against their desire to meet consumer preferences and keep costs down.

The original intent behind the twenty-five year old fleet split requirement was to preserve small car production in the United States, not to enhance fuel efficiency of automobiles sold in the United States, since that could be accomplished without separating the import and domestic fleets. At the time of implementation, the fear was that, absent such restrictions, Ford, General Motors and Chrysler would move small car production off-shore. Yet there is simply no evidence to substantiate that fear in today's setting. Indeed, as the chart below indicates, there is significant small car production in North America (and particularly in the United States) now. Moreover, it is unlikely that the billions of dollars invested in small car production and parts facilities in the North America by Japanese and U.S. automakers would simply walk away if the fleet split requirement were removed.

North American Production of Small Cars 1998

Model by Segment	United States	Canada	Mexico	Total
Lower Small				
Geo Metro	0	21,136	0	21,136
Suzuki Swift	0	2,481	0	2,481
Subtotal	0	23,617	0	23,617
Upper Small				
Chevrolet Cavalier	233,806	0	78,376	312,182
Chrysler Neon	203,101	0	55,630	258,731
Ford Escort	198,679	0	136,744	335,423
Geo Prizm	45,284	0	0	45,284
Mercury Tracer	27,760	0	1,872	29,632
Nissan Sentra	54,358	0	62,239	116,597
Pontiac Sunfire	96,851	0	7,212	104,063
Saturn	244,101	0	0	244,101
Toyota Corolla	158,180	150,413	0	308,593
VW Golf	0	0	60,066	60,066
VW Beetle	0	0	106,627	106,627
VW Jetta	0	0	123,037	123,037
Subtotal	1,262,120	150,413	631,803	2,044,336
Specialty Small				
Eagle Talon	295	0	0	295
Mitsubishi Eclipse	50,715	0	0	50,715
Nissan 200SX	6,102	0	0	6,102
Subtotal	57,112	0	0	57,112
Total Small	1,319,232	74,030	631,80	2,125.065

Source: Ward's Automotive Yearbook 1999. Segmentation based on Ward's sales segmentation.

Light Truck Exception

Whereas manufacturers of passenger cars have long suffered from the CAFE fleet split requirement, there is no comparable restriction for light trucks. While a provision within the CAFE regulations does require the separation of "captive imports," its impact is no longer of any significance. Like the fleet split requirement for passenger cars, the "captive imports" provision was first and foremost intended to prevent Ford, General Motors and Chrysler from shifting auto production (in this case light truck production) overseas. It served to curtail a 1980s trend by U.S. manufacturers to import trucks produced by foreign manufacturers and "re-badge" the imports under their own nameplates.

There is no logical reason for maintaining a fleet split requirement for passenger cars while applying no such distinction for light trucks. The fact that CAFE has served its purpose with respect to light trucks by enhancing fuel efficiency in those vehicles in the absence of any fleet split requirement is ample evidence that the requirement is unnecessary for passenger cars.

Renault-AMC and Volkswagen Exceptions

The U.S. Congress, 20 years ago, confirmed just how artificial and counterproductive the CAFE fleet split rule was (and still is) when it compromised the rule to serve the needs of AMC, which had just merged with Renault, and Volkswagen. AMC sought to import small-fuel efficient Renault models, but the rule prevented AMC from combining those imports with its domestic models to help it comply with CAFE standards. Volkswagen had established manufacturing facilities in Pennsylvania to make VW Rabbits. As VW increased its U.S. procurement, and the U.S. content of those Rabbits approached 75 percent, VW risked having its fleet split between "imported," lower mileage Porsches and Audis that did not meet CAFE standards, and "domestic," high-mileage Rabbits that did.

AMC and Volkswagen requested special exemptions from the CAFE fleet split, and Congress granted them. Both were allowed to combine their fleets, with limits placed on the level of foreign content and volume of imports permitted.

At the time Congress and the President agreed to this exemption, the justification was the need to encourage new investment and small car production in the United States. Twenty years later, the exception has now proven to be the rule. Many manufacturers have now established plants in the United States to build fuel-efficient cars. Yet the fleet split, long ago compromised solely to encourage such investment, remains in place. What was an unnecessary disincentive to U.S. procurement and investment then is even more so today. Certainly the VW and AMC Renault exceptions indicate there has been no defensible policy justification for this rule for many years.

Distortion of Normal Market-Based Decisions

The CAFE fleet split creates artificial conditions that influence auto manufacturing. The global auto industry has changed radically since this regulatory scheme was imposed, but CAFE has not changed in any substantial way. Under the CAFE fleet split, as noted above, decisions which should be made on practical economic considerations such as productivity, costs, access to suppliers, consumer demand, and profitability are being compromised to avoid the adverse regulatory consequences of CAFE penalties.

Non-Market Impact on Parts Sourcing

The CAFE fleet split requirements distort the normal market-based decisions of global auto manufacturers. Because auto manufacturers must meet separate fuel efficiency requirements for their imported and domestic fleets, their sourcing flexibility is limited and strongly influenced by the threat of CAFE penalties. In some instances, the sourcing practices of automakers in the U.S. market amount to a kind of CAFE shell game. For example, in a well-documented case Ford shifted the "citizenship" of its least fuel-efficient cars (at that time the Crown Victoria and the Grand Marquis) to stay ahead of the fleet split curve by simply switching out rear axles. This move saved Ford over a million dollars in CAFE penalties without changing the fuel economy of the cars at issue.

Even more important for JAMA member companies and other foreign manufacturers is the fact that the CAFE fleet split can penalize those companies when they seek to increase their procurement of U.S.-made parts. Since 1986, production of Japanese nameplate vehicles in the U.S. has increased almost 300 percent from 617,000 units in 1986 to 2.38 million units in 1998. JAMA member companies have for two decades made significant and sustained effbrts to procure auto parts for these U.S.-built vehicles from U.S. suppliers. As a result, JAMA member companies

have increased their procurement of U.S. auto parts from $2.09 billion in 1986 to $24.57 billion in 1998.

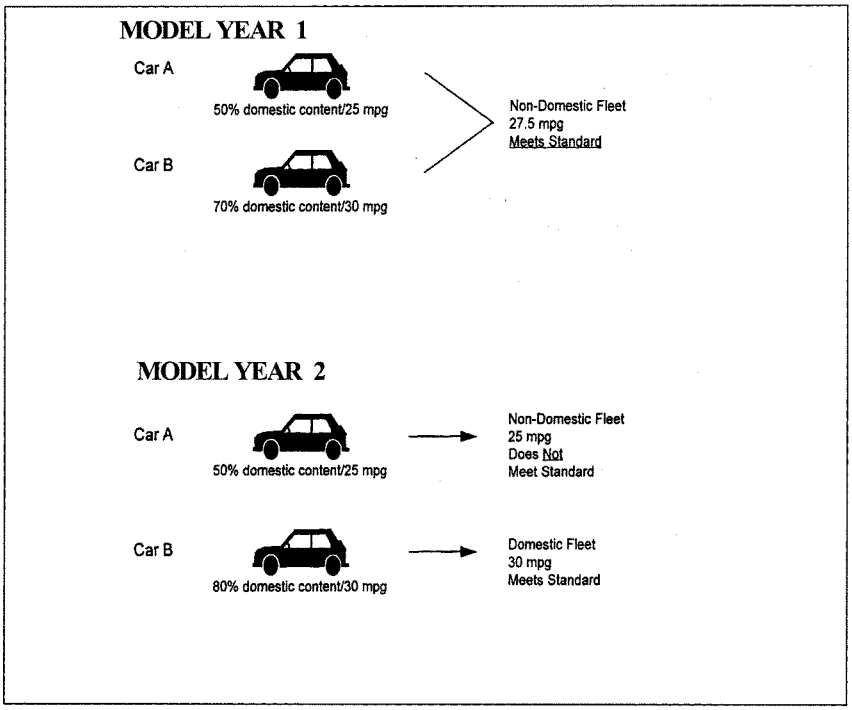
Ironically, however, the CAFE fleet split works against this effort and the benefits its creates. Japanese auto companies (and other foreign-based manufacturers) producing cars in the United States are forced by the CAFE fleet split to make a potentially uneconomic choice. They can increase local procurement at their U.S. plants and exceed the 75 percent content criterion for the cars they build in the U.S., so that they shift the mix of their "import" fleet, and risk paying CAFE penalties. Or, they can source parts from overseas to keep U.S.-built cars in their "import" fleet and avoid CAFE penalties.

This negative effect thus keeps foreign auto companies from increasing their U.S. parts purchases to avoid the possible shift in classification from "import" to "domestic." Such a change would limit their ability to import the larger cars that are in growing demand from U.S. consumers, but for which the volume of sales will not support a U.S. production facility.

The CAFE fleet split has the opposite effect on manufacturers with U.S.-produced fleets with content exceeding 75 percent. They have an added incentive to increase their foreign purchasing when it is to their advantage to have certain U.S.-produced cars reclassified from "domestics" to "imports" for CAFE purposes.

The diagram below generally illustrates this non-market impact on parts sourcing.

HOW CAFE FLEET SPLIT IMPACTS PARTS SOURCING



In this diagram, assume that all of these cars are being built in the United States. In Model Year 1, since Car A and Car B both do not meet the CAFE content requirement of 75 percent, the entire fleet is considered "imported," and meets the 27.5 mpg standard. In Model Year 2, the manufacturer has increased U.S. procurement for Car B, but Car A has retained its 50 percent content. As a result, the manufacturer's U.S. production of the same vehicles has now been split into two fleets, and the import fleet no longer meets the CAFE standards. No fuel economy benefits have been achieved, and the manufacturer is now exposed to CAFE penalties, all because it sought to buy more U.S. parts.

What these facts indicate is that the CAFE fleet split has encouraged, rather than eliminated or curtailed, the off-shore sourcing patterns of multinational auto companies operating in the United States. The "Big 3" source off-shore because they can, and the other companies do so because they must. When these sourcing decisions are driven by such CAFE considerations, they undercut the goal of increasing U.S. parts purchases.

In 1993–94, a GATT dispute settlement panel examined the CAFE fleet split rule, determining that it could not withstand scrutiny under Article III:4 (National Treatment) analysis. In summary, the panel concluded that the fleet split rule could not be justified simply because it balanced less favorable treatment of imported cars in some instances against less favorable treatment of domestic cars in other instances:

"In this case, less favorable treatment of large foreign cars (because they could not be averaged with small domestic cars, as large domestic cars could) would be balanced by less favorable treatment of large domestic cars (because they could not be averaged with small foreign cars, as large foreign cars could). The Panel noted that under Article HT–4 a contracting party cannot justify less favorable treatment to an individual product by showing that other products receive more favorable treatment . . . and concluded that the separate foreign feet accounting accorded less favorable conditions of competition to cars and car parts of foreign origin than those accorded to like domestic products, and thus was inconsistent with Article HT–4."

Report of the Panel on United States—Taxes on Automobiles. 29 September 1994 DS31/R.

As the GATT panel found, the CAFE fleet split requirement distorts trade and alters the competitive environment in which automobiles are manufactured and sold in the United States. This result is unwarranted and unnecessary in meeting the stated intent of the law.

Counterproductive

As this paper has demonstrated, the CAFE fleet split regulatory scheme is a burden on both manufacturers and consumers. It neither enhances efficiency nor reduces cost, but can have the opposite effect, and thereby serves to restrict competition in the industry and deprive consumers of the benefits such competition would produce—more of the vehicles they want at lower costs. In short, it inhibits both the productivity of the industry and the marketplace with no offsetting benefit.

By restricting the sourcing decisions of auto manufacturers, the CAFE fleet split requirement necessarily drives up manufacturing costs by preventing selection of the most cost-effective means of auto production. These costs are passed on to the consumer. In many cases, U.S. parts suppliers are unable to supply U.S. auto operations where the parts supplied could tip the balance between whether a car line is deemed domestic or foreign and therefore trigger CAFE problems. The opportunity costs that these suppliers lose are incalculable, but surely reach millions of dollars in lost sales for U.S. companies, lost investment by multinational companies that might otherwise locate or expand plants in the U.S., and many jobs for U.S. workers.

The CAFE fleet split requirement does more to foster gamesmanship in the calculation of "domestic" and "foreign" fleet fuel efficiency ratings than to encourage actual gains in fuel efficiency. Parts allocation has become a function of knowing how far or close an auto manufacturer is to meeting its "domestic" and "foreign" fleet requirements. Where an auto manufacturer's "domestic" or "foreign" fleet is below the CAFE standard, it is more likely to turn to creative parts sourcing or move car lines between the two classifications, rather than actually seek to increase the fuel efficiency of the car in question, to gain a competitive edge or avoid penalties.

CAFE standards would be more effective if they allowed fuel efficiency gains to be achieved through combining overall fleets in a global manufacturing context.

Conclusion

The CAFE fleet split is counterproductive, inefficient and unjustifiable in the new global manufacturing setting. It fails to achieve its stated intent of promoting fuel efficiency and preserving U.S. small car production. Instead, it works against those objectives by limiting any real incentive to enhance fuel efficiency or improve the environment. No legitimate U.S. interest is served by such an outcome.

This regulation creates burdens that adversely affect auto manufacturers, with a substantial burden falling on non-U.S. manufacturers with significant investments in the United States that support U.S. jobs and U.S. manufacturing. Because of the unjustified burdens this regulation creates, it should be repealed.

Enhancing fuel efficiency in automobiles is a worthy objective. However, the fleet split requirement is not a fuel efficiency issue. It is a burdensome, outdated and

counterproductive regulation for which there is no practical justification. This is particularly true today, when ownership and investment changes have made the distinction between a "domestic" and a "foreign" car virtually irrelevant. Companies operating in the U.S., like companies operating in any national economy, need to be free of regulations like the CAFE fleet split, which act as a drag on new investment and responsiveness to the consumer. Eliminating the fleet split will have no detrimental effect on auto companies' efforts to achieve new efficiency levels in their fleets. Eliminating the fleet split will almost certainly result in more sourcing of parts and assembly in the U.S., since it would no longer be necessary or desirable to make overseas production or sourcing decisions primarily to allow adjustment of content for CAFE purposes.

PREPARED STATEMENT OF THE ASSOCIATION OF INTERNATIONAL AUTOMOBILE MANUFACTURERS (AIAM)

AIAM appreciates the opportunity to express its views to the Committee regarding the important matter of motor vehicle fuel economy.[1]

AIAM member companies have for many years been leaders in offering fuel-efficient vehicles for the U.S. market. Historically, vehicles produced by our member companies have headed EPA's annual list of most fuel-efficient vehicles. Indeed, these companies have achieved success in the U.S. market to a significant extent through the offering of high quality, fuel-efficient vehicles.

AIAM member companies have achieved this fuel economy leadership by pioneering the introduction of advanced automotive technology. The Honda Insight and Toyota Prius hybrid vehicles are notable examples of this leadership. We anticipate that AIAM companies will continue to follow this advanced technology path that has led to their success.

AIAM supports the current reassessment of national energy policy by Congress and the Administration. As NHTSA Administrator Jim Runge stated at the hearing on December 6, the Department of Transportation (DOT) plans to proceed expeditiously to consider changes to the light truck standards as part of this reassessment. The recent report of the National Academy of Sciences (NAS) provides DOT with a strong starting point for its work. AIAM plans to participate fully in this process.

The existing CAFE authority has proven to be reasonably effective, and AIAM believes there is no need for Congress to take action at this time to revise DOT's legal authority. Moreover, the existing authority has an advantage over some alternative formulations to regulate fuel economy because it (like every other motor vehicle standard) imposes precisely the same requirements upon each manufacturer. We believe that competitive fairness is a critical element to any regulatory program, and the current program passes this test.

Nevertheless, the current CAFE system has been criticized by several parties and undeniably has elements that could be improved. If Congress decides to amend the current law, these program flaws should be addressed. However, any new legislation should embody three key principles:

- The requirements of the program must be applied *equally*. Any approach, such as uniform percentage improvement (UPI) standards, that imposes different numerical standards on the different manufacturers is inconsistent with this principle and therefore unacceptable. As discussed during the December 6th hearing, the UPI approach discriminates against companies that have achieved high levels of fuel economy and American workers employed by these companies. AIAM believes this approach is fundamentally unfair.
- The requirements raust be *technologically feasible* and *effective* in reducing petroleum consumption.
- The requirements must provide adequate *lead-time.* Fuel economy improvements can most effectively be implemented through careful integration of new technology. If sufficient lead-time is not provided, manufacturers may be forced to select less efficient technological approaches that may not be accepted by consumers.

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[1] AIAM members include American Honda Motor Co., Inc., American Suzuki Motor Corporation, Daewoo Motor America, Hyundai Motor America, Isuzu Motors America, Inc., Kia Motors America, Inc., Mitsubishi Motors America, Inc., Nissan North America, Inc., Peugeot Motors of America., Inc., Saab Cars USA, Inc., Societe Anonyme Des Usines Renault, Subaru of America, Inc., and Toyota Motor North America, Inc. The Association also represents original equipment suppliers and other automotive-related trade associations. AIAM members have invested over $20 billion dollars in new production and distribution capacity, creating tens of thousands of high-skill, high-wage jobs across the country in manufacturing, supplier industries, ports, distribution centers, headquarters, R&D centers and automobile dealerships.

Chief among the flaws of the current program is that the program operates almost exclusively on the supply side, in 1hat it simply directs manufacturers to produce vehicles having a specified level of average; fuel economy or higher. On the demand side, however, current market signals and incentives are insufficient to cause consumers to demand such vehicles, producing an imbalance in the marketplace. CAFE also has been and will continue to be insensitive to future market shifts. AIAM believes that marketbased measures would more efficiently promote national goals of energy security and reduced emission of greenhouse gases.

Nevertheless, we recognize that political realities may make it exceedingly difficult for the government to adopt more efficient strategies for promoting energy security and global climate policies, such as through higher or new fuel taxes. We also recognize that the seriousness of the current energy security and global climate concerns may justify a regulatory role for the Federal Government in enhancing vehicle fuel economy. These considerations lead us to support the efforts of this Committee to assess whether the current CAFE system can be revised to minimize its flaws, if not also to make it more effective.

If the Committee decides to pursue; structural changes to CAFE, AIAM and its member companies urge the Committee to align the program's incentives with accepted national goals and minimize those aspects of the program that interfere with the free functioning of the marketplace. We recommend that the Committee consider the following measures, most of which are also among the recommendations in the recent National Academy of Sciences report:

1. *Reject uniform percentage improvement (UPI) standards based on individual manufacturer performance.* The UPI format turns the incentives of the current program on their head, by penalizing the companies that have historically offered the most fuel-efficient vehicles and rewarding technology laggards. Standards formats must be competitively neutral. If Congress were to adopt the UPI format as part of CAFE, it would set a precedent for the use of that approach in other regulatory programs, sending a message to businesses nationwide (and their employees) that they could be punished if they do more than the absolute minimum required. These flaws in the UPI approach have been noted by two NAS Committees (1992 and 2001), the Office of Technology Assessment (OTA), the Justice Department, and other reputable organizations.

2. *Eliminate the domestic/import separate fleet requirement for passenger autos.* It is clear that the fears of small vehicle manufacturing moving offshore that led to the initial adoption of this requirement are no longer credible. Moreover, the current requirement perversely discourages increased U.S. content and employment.

3. *Create new tax credits and other incentives to encourage consumers to demand fuel-efficient vehicles.* Ideally, such credits and incentives should be performance-based and technology-neutral. Incentives are needed to facilitate the introduction of advanced technology into the market, since such technology frequently has high initial cost.

4. *Authorize credit trading.* A trading system would enhance the efficiency of the overall CAFE system by facilitating least cost compliance strategies. The government could become the seller of last resort for credits, thereby both establishing a maximum cost of compliance and enabling the replacement of the current civil penalty compliance system. We believe that this can be accomplished without sacrificing overall fuel economy improvements.

5. *Require improvements in fuel quality, such as near zero sulfur gasoline and diesel fuel, stability in distillation parameters of gasoline, and control of deposits.* Many of the advanced power-train systems that are being developed will require clean fuels.

6. *If changes to the current CAFE format are deemed appropriate, thoughtful attention should be given to a variety of attribute-based systems, such as market class, size, or weight-based standards.* A size or weight-based system could be designed either on a class basis or through a continuous mathematical function. Attribute-based systems can be developed that would permit manufacturers to compete on an equal-footing basis in any market segment.

7. *Provide adequate lead-time to allow manufacturers to plan and implement fuel efficiency improvements.*

Discussion of Key Issues

The following elaborates on the seven points highlighted above:

1. *Uniform percentage improvement standards.* AIAM absolutely opposes uniform percentage improvement (UPI) standards based on individual manufacturer performance. Simply stated, they represent bad public policy. The UPI standards format was extensively debated a decade ago in Congress. The standards format was roundly criticized and thoroughly discredited by several respected national organiza-

tions. This format would create unique fuel economy standards for each manufacturer, based on the manufacturer's performance in a base year. The same percentage increase would be required for each company, but the, actual standards differ due to differences in the fuel economy baselines. We are unaware of any current regulatory program that uses this standards format. Under UPI standards, if two manufacturers were to produce the same mix of vehicle sizes and technology in the same year, one manufacturer could be assessed civil penalties while the other could be awarded credits, due to differences in the two companies' baselines. We believe that a system that assigns differing compliance consequences to the same conduct by two entities is fundamentally discriminatory.

The 2001 NAS CAFE Committee pointed out the inequities associated with the UPI standards format. The Committee's report stated as follows:

The UPI system would impose higher burdens on those manufacturers who had already done the most to help reduce energy consumption. The peer-reviewed literature on environmental economics has consistently opposed this form of regulation: it is generally the most costly way to meet an environmental standard; it locks manufacturers into their relative positions, thus inhibiting competition; it rewards those who have been slow to comply with regulations; it punishes those who have done the most to help the environment; and it seems to convey a moral lesson that it is better to lag then (sic) to lead."[2]

The 1992 NAS Committee had similar criticisms of the UPI standards format.[3]

During Senate Commerce, Science, and Transportation Committee consideration of UPI standards a decade ago, the Office of Technology Assessment also criticized the UPI standards format.

The structure does not account for the fact that at least a portion of the current differences in companies' CAFES are (sic) due to . . . the companies' different efforts at moving advanced technology into their fleets. Our analysis of the fuel economy characteristics of various company fleets . . . indicates that some companies have fleet fuel economies that are well above the industry average even when the effects of fleet size distribution are accounted for. Thus, this type of standard penalizes manufacturers who have tried the hardest to increase their fleet fuel efficiency in the past. They now have the most difficult technological challenge, because they have already "used up" a larger portion of the technological headroom available to them from off-the-shelf technology. Companies that have hesitated to use the best available technologies . . . are instead rewarded by being presented with the lowest efficiency target . . . Also, it is possible that companies that wind up with the lowest efficiency targets could use the leeway these lowered targets afford them to increase vehicle performance to levels that companies with higher efficiency targets may not be able to match (because higher performance reduces fuel efficiency). [Such a result would] have not only rewarded the lower efficiency automakers with an easier target, but have given them a market advantage as well.[4]

The Justice Department reached a similar conclusion regarding UPI standards in a letter to the Consumer Subcommittee of the same Senate committee 10 years ago. The Justice Department letter states that . . . manufacturers with high average fuel economies will be impeded in entering U.S. markets for larger cars because such entry—even if they produce more efficient larger cars than are now available—could prevent them from meeting the new standards. Thus, competition would suffer and the fuel efficiency of a whole category of vehicles could be kept artificially low.[5]

We can only add our strongest possible agreement with these statements and note that nothing that has occurred over the past decade has improved the UPI standards concept.

At the December 6 hearing, it was claimed that the differences in fleet fuel economy between some of our member companies and the Detroit-based manufacturers is due simply to differences in model mix. Claims of this sort have been used in the past in an attempt to justify the UPI format, by suggesting that each company has the same potential to improve fuel economy, on a percentage basis. However, this claim is not true. We note, however, that even if the claim were true that the company-to-company CAFE differences are all due to mix, UPI standards would not be appropriate. The UPI format would still prevent a high MPG manufacturer from competing with a low MPG manufacturer in the large/luxury vehicle market segments, simply by virtue of the fact that the low MPG company first entered those

[2] Id, page 5–19.
[3] Id, page 181.
[4] Statement of the Office of Technology .Assessment to the Senate Commerce, Science, and Transportation Committee, 101st Congress, Senate Hearing 101–347.
[5] Letter from the Assistant Attorney General for Legislative Affairs to the Consumer Subcommittee, Senate Commerce, Science and Transportation Committee, January 26, 1990.

segments. Such barriers to market entry would be clearly discriminatory and anathema to the concept of a free market.

2. *Domestic/import separate fleet requirement.* The current law requires dividing a manufacturer's passenger automobile fleet into domestic and import classes that must comply separately with fuel economy standards. There is no similar requirement for light trucks. This requirement was originally intended to inhibit domestic manufacturers from simply importing large numbers of small, "captive import" vehicles as a strategy for increasing their average fuel economy. Today, AIAM companies are profitably producing fuel-efficient vehicles in the United States. Subsequent events, such as consolidation within the industry, have shown that, whatever the original validity of this concern, the concern should no longer exist. There is no reason to believe that the current market would accept large numbers of very small vehicles that were originally designed for foreign markets. Moreover, the provision has created a disincentive for foreign-based companies to increase the U.S. content of their vehicles to levels above 75 percent, since doing so would place the vehicles in a separate compliance fleet. This disincentive is real, not theoretical, and has cost U.S. jobs. AIAM member companies have been compelled to limit increases in domestic content levels in the past in order to avoid creating a new CAFE compliance fleet. For example, Nissan's efforts to increase the domestic content of its Tennessee-produced Sentra model were delayed by the separate fleet restriction. There have even been situations in which a company may have decreased the U.S. content of certain low efficiency domestic vehicles to a level below 75 percent, so that those vehicles can be averaged with the manufacturer's more fuel-efficient import fleet.

This year's NAS CAFE report[6] states that "the committee believes that the two-fleet rule no longer serves any useful purpose, but does increase cost to consumers." The 1992 NAS CAFE committee[7] concluded that the separate fleet requirement "has no obvious or necessary connection to the achievement of fuel economy" and encouraged Congressional consideration of repeal. In addition, NHTSA concluded a decade ago that the two-fleet requirement serves no purpose. We strongly concur in these assessments.

3. *Tax credits/incentives.* As previously noted, a major deficiency of the CAFE system is the insufficiency of its market signals on the demand side to encourage consumers to purchase fuel-efficient vehicles. The best market signal is an increase in the cost of driving. Given the current political realities that work against increased fuel taxes, the next best alternative may be to create a variety of market incentives to stimulate demand for fuel efficiency as a vehicle attribute. Such incentives would encourage manufacturers to develop and introduce advanced technologies by enhancing the market for vehicles that use such technologies. Advanced fuel-efficient technologies are frequently costly, particularly in their first years of introduction, so incentives would facilitate the introduction of these items by helping to bridge the price differential between these vehicles and conventional vehicles. Congress has considered a variety of technology-based incentives in recent years to encourage consumers to purchase advanced technology vehicles. AIAM member companies have generally supported these incentives. However, ideally, we believe that such incentives should be performance-based and technology-neutral, i.e., they should be designed to encourage the production and sale of fuel-efficient vehicles, regardless of the technology selected by the manufacturer to achieve high fuel efficiency.

4. *Credit trading.* New authority for credit trading between standards classes and between companies under the CAFE program would provide manufacturers with increased compliance flexibility in dealing with unanticipated market shifts. The 1992[8] and 2001[9] NAS CAFE Committees suggested this approach. Permitting such trading would also enhance the overall efficiency of the system. Concerns have been expressed that a credit trading system would primarily benefit foreign-based manufacturers of fuel-efficient vehicles. However, under a weight- or size-based system, there is no reason in principle why there should be any disparate effects of this sort. A variation on this credit theme that was discussed briefly at the February meeting is the establishment of the government as the seller of last resort of CAFE credits. Under this approach, the government would set a fixed price for the credits that it would sell. This price would be set above the effective cost of compliance for a reasonably efficient manufacturer, to maintain the incentive for manufacturers to meet the fuel economy targets. However, for a manufacturer that faces unusual

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[6] "Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards," National Research Council, 1992, page 5–13.

[7] "Automobile Fuel Economy, How Far Should We Go?", National Research Council, 1992, page 184.

[8] Id, page 184.

[9] Id, page 5–13 through 5–15.

compliance problems or should market shifts occur or technology not develop as anticipated, this approach has the advantage of establishing a maximum cost of complying with the requirements. In addition, manufacturers could be required to make up any fuel efficiency shortfalls within a specified period of time. The credit system could replace the current civil penalty system under the law, a change that the 1992 NAS CAFE Committee characterized as a "real advantage." In addition, the concepts of averaging and credit banking, which are part of the current system, should be retained.

5. *Fuels and fueling infrastructure.* As EPA recognized recently in its Tier 2 emissions standards and diesel sulfur regulations, advanced engine technology and high levels of fuel quality go hand-in-hand. Direct injection engine technology requires gasoline with very low sulfur levels, and advanced diesel engines will require diesel fuel with near zero sulfur levels in order to meet applicable emissions standards. Stability in distillation parameters of gasoline and control of deposits are also needed for future vehicles. In the longer term, special fueling infrastructure will be needed for fuel cells and certain types of hybrid vehicles. A coordinated and sustained effort will be needed to assure that appropriate fuels are available as new technologies are implemented.

6. *Standards format.* Should alternative standards formats be considered, they should be competitively neutral. These could be in the form of market class-, size- or weight-based standards. Under such standards formats, fuel efficiency improvements would be required for all vehicle classes. The burdens of the standards would be approximately the same, regardless of the mix of vehicles produced by the manufacturer.

The attribute-based standards concept described in the recent National Academy of Sciences report is interesting, but would require further analysis. If Congress decides that there is a need to change the standards format, an alternative formulation could be developed through rulemaking by the Department of Transportation. Some vehicle class-based approaches could be implemented within the scope of the existing statutory authority to set separate standards for different classes (for light trucks). See 49 U.S.C. 32902(a).

7. *Lead time.* Fuel economy improvements can be most efficiently implemented when they are timed to coincide with manufacturers' normal redesign cycles. The precise amount of lead-time needed would vary depending upon the magnitude of any standards increase. The 18-month minimum lead-time currently specified in the law is clearly insufficient to enable manufacturers to comply with new standards of significantly increased stringency. The recent NAS report recommended lead-time in the 10–15 year range for a significant CAFE increase. AIAM concurs with this conclusion.

Issues Raised at the December 6 CAFE Hearing

AIAM would like to comment on two additional issues raised at the December 6 CAFE hearing held by this Committee.

1. *"Light truck loophole."* Several pending legislative proposals would close the so-called "light truck loophole" by raising the light truck standard from its current 20.7 mpg level to 27.5 mpg, the current level of the passenger automobile standard. This CAFE increase is equivalent to that projected in the recent NAS study under the Case 1 "break-even" fuel economy analysis. However, Case 1 assumes: 1) the use of "Path 3" technology, the report's most aggressive technology scenario, 2) a 14-year payback period for the cost of new technology, a period much longer than many consumers would accept, and 3) lead time of up to 15 years. Thus, a light truck standard of 27.5 mpg would be very stringent, involve technological and economic risk, and require substantial lead-time. Moreover, simply raising the light truck standard to the passenger auto level would be inequitable, financially penalizing those manufacturers whose production is concentrated in light trucks relative to those manufacturers whose production was concentrated in cars.[10]

2. *On-road fuel economy discrepancy.* Another issue raised at the hearing involves the difference between fuel economy data used for standards compliance purposes and the mileage experienced on-the-road by drivers. One witness claimed that this difference is relevant to the standard-setting deliberations of the Committee. We believe this is a non-issue. Fuel economy standards data is generated using procedures specified in the law, i.e. 1975 EPA test procedures or procedures that give "comparable results." See 49 U.S.C. 32904(c). By specifying a test procedure baseline, Congress created a fixed "yard-stick" for measuring CAFE improvements. A gap between measured and on-road fuel economy existed in 1975, and that gap remains today. In fact, data used for CAFE standards purposes now reflects credits added

[10] 2001 NAS report, pages 5–36 through 5–37.

by Congress subsequent to 1975 to encourage the production of alternative and dual-fueled vehicles, potentially creating a larger gap between CAFE data and on-road fuel economy. Since no test procedure can practically replicate every individual's driving experience, there will always be some divergence between test procedure results and those experienced by any particular driver.

However, this gap is irrelevant from the CAFE standards perspective, so long as the test procedures encourage the manufacturers to implement technology that results in on-road fuel efficiency improvements. We are unaware of any data that suggests a problem of this sort with the data generated for standards compliance purposes. (It should be noted that the data used in fuel economy labels and the EPA/DOE Gas Mileage Guides is different from the data used for CAFE standards purposes. The label/Guide data is adjusted mathematically by EPA to provide consumers with representative information about anticipated mileage levels.) If Congress were to mandate the use of a new test procedure for standards compliance purposes, future fuel economy improvement potential would be assessed based on this new procedure, probably leading to numerically lower standards than would be the case using the 1975 procedures. However, in either case, the real world fuel economy performance would be the same.

HONDA NORTH AMERICA, INC.,
Dec. 19, 2001

Hon. JOHN KERRY,
Committee on Commerce, Science, and Transportation, United States Senate

DEAR SENATOR KERRY: Thank you for the opportunity to testify on fuel efficiency issues before the Senate Committee on Commerce, Science, and Transportation on December 6, 2001. Honda appreciates the opportunity to present information about our company's efforts to improve fuel economy, and we believe the hearing stimulated a good exchange of ideas.

During the hearing, you questioned Honda about the fuel economy of our vehicles compared to other manufacturers on a model-to-model basis. You referenced testimony from Susan Cischke of Ford Motor Co. and a chart submitted by Ford, labeled "Vehicle Fuel Economy Comparison." Unfortunately, Honda had not seen Ford's testimony or their chart prior to the hearing; thus, we were unable to respond at that time. Subsequent to the hearing, we examined Ford's testimony and are now responding to Ford's claims. We respectfully request that this letter and the two attachments be included in the hearing record.

The fuel economy comparisons submitted by Ford is incomplete, misleadingly selective, and in many cases compared apples to oranges. As a result, the data provides no basis for sound analysis:

• Ford only compared mid-size cars—all other car comparisons were excluded. Had they compared the compact car class, the analysis would have shown that the average fuel economy of the Honda Civic is almost 20 percent higher than the Ford Focus and over 25 percent higher than the Chevrolet Cavalier.

The "car" comparison included only 6-cylinder engines. While this appears fair on the surface, it is really an apples and oranges comparison. 6-cylinder engines are standard on the Ford Taurus, Chrysler Concorde, and Chevrolet Impala. 4-cylinder engines are standard on the comparable Honda Accord and Toyota Camry—the 6-cylinder engine is a performance option. This is because the advanced technology on Honda's engines provides very high power output for a given engine size, allowing a 4-cylinder Accord to have similar performance (and much better fuel economy) compared to other manufacturers' 6-cylinder engines. This is demonstrated by the fact that most Accord buyers feel the performance of the 4-cylinder is more than adequate for their needs—only 30 percent of Accord purchasers opt for the 6-cylinder engine.

• The small SUV comparison excluded the Honda CR–V.

• Ford only compared manual transmission models of small SUVs. Because of the performance characteristics of the engine, the Ford Escape is available with a 4-cylinder engine only with a manual transmission. This engine is so low-performance that Ford does not offer it with an automatic transmission—customers must take a 6-cylinder engine with much lower fuel economy if they want an automatic transmission. By contrast, the 4-cylinder engine on the Honda CR–V is sufficiently powerful that we do not need a 6-cylinder option to support an automatic transmission.

• Ford selected the Honda Passport for comparison with other mid-size SUVs. This is entirely inappropriate. The Passport is a very old design that will cease production after the 2002 model year. Ford excluded the Acura MD–X from the comparison, even though Honda sells over twice as many MD–Xs as Passports. The

MD–X is the best fuel economy performer in its class and has significantly better fuel economy than the other models listed by Ford, in addition to substantially more horsepower.

• The minivan comparison is also misleading, although in a less egregious way. The Chevrolet Venture and the Toyota Sienna are significantly smaller than the other minivans. Not only does the Honda Odyssey have substantially more horsepower than the other minivans listed, but it also has better fuel economy than the two other minivans of comparable size, the Ford Windstar and the Chrysler Caravan.

We have appended as Attachment 1 a corrected vehicle comparison. It is based on Ford's "Vehicle FE Comparison," but with the problems listed above corrected and a "horsepower" column added. These comparisons clearly contradict Ford's testimony that: "Contrary to what you may have heard or believe, on art apples-to-apples basis, the fuel efficiency of vehicles from domestic manufactures is comparable; to those from the international companies. Looking at today's fuel economy data, on a model-to-model basis, you will see very little difference in the fuel economy performance across the major manufacturers." That statement is simply inaccurate.

Given the variety of vehicles and engines offered by the major manufacturers, any comparison of individual vehicles could be selective; and potentially biased. Fortunately, a much better source of data is available. The Fuel Economy Trends report published annually by EPA includes average mpg data for each model. EPA uses confidential production information submitted by each manufacturer to calculate a sales-weighted average fuel economy of the different engine and transmission offerings within each model.

Attachment 2 lists the top mpg vehicles for each vehicle class in which Honda competes, listed in order of decreasing mpg. These are the sales-weighted mpg values from Appendix C of the 2001 FE Trends Report, except that manufacturers other than DC, Ford, GM, Honda, and Toyota have been eliminated. The vehicle classes listed in Attachment 2 are also taken from Appendix C of the 2001 FE Trends Report.

The sales-weighted model data clearly demonstrates that, on a model-to-model basis, Honda's vehicles have substantially better fuel economy performance than vehicles from DC, Ford, and GM. The only apparent exception is the minivan class, where the Honda Odyssey ranks behind the GM Venture. However, as previously explained, the GM Venture is much smaller than the Odyssey and has much lower horsepower. When size and power are considered, the Odyssey also has significantly better fuel economy performance than its competitors.

Honda's vehicles have better fuel economy primarily due to advanced engine technology. As discussed above, Honda's engines have very high power output. This is accomplished by careful design and use of many incremental technologies in our mass-market engines, such as 4 valves/cylinder, overhead camshafts, lightweight aluminum blocks, reduced engine friction, variable valve timing, and sequential multi-point fuel injection. Honda also pays attention to careful body design, to reduce weight and improve aerodynamics. The net result of these efforts can be seen indirectly in the class-leading fuel economy of our high volume vehicles.

In summary, the comparisons submitted by Ford do not accurately reflect comparable-model fuel economy performance. The Ford surnmary's omissions and careful selections lead to conclusions that are not supported by accurate and unbiased analysis. We trust that your Committee's examination will include all the relevant data, which shows conclusively that in fact there are very significant differences in fuel economy performance among the major auto manufacturers.

Sincerely,

EDWARD B. COHEN,
Vice President, Government & Industry Relations

ATTACHMENT #1

2002 FE Labels

Manufacturer	Carline	Engine	Cyl.	HP	Trans	City	Hwy	City/Hwy		
Compact cars										
Ford	**Focus**	**2.0**	**4**	**130**	**Auto**	**26**	**32**	**28**		
DC	**Neon**	**2.0**	**4**	**132**	**Auto**	**24**	**31**	**27**		
GM	**Cavalier**	**2.2**	**4**	**120**	**Auto**	**24**	**32**	**27**		
GM	**Saturn SL**	**1.9**	**4**	**100**	**Auto**	**27**	**37**	**31**		
Honda	**Civic**	**1.7**	**4**	**127**	**Auto**	**31**	**38**	**34**		
Toyota	**Corolla**	**1.8**	**4**	**125**	**Auto**	**30**	**39**	**34**		
Cars										
Ford	Taurus	3.0	6	155	Auto	20	28	23		
DC	Concorde	2.7	6	200	Auto	20	28	23		
GM	Impala	3.4	6	180	Auto	21	32	25		
Honda	**Accord**	**2.3**	**4**	**150**	**Auto**	**23**	**30**	**25**		
Honda	Accord	3.0	6	200	Auto	20	28	23		
Toyota	**Camry**	**2.4**	**4**	**157**	**Auto**	**23**	**32**	**27**		
Toyota	Camry	3.0	6	192	Auto	20	27	22		
SUVs										
Ford	Escape 4WD	2.0	4	130	Manual	22	25	23		
Toyota	RAV4 4WD	2.0	4	148	Manual	22	27	24		
Honda	**CR-V 4WD**	**2.4**	**4**	**160**	**Manual**	**21**	**25**	**23**		
Ford	**Escape 4WD**	**3.0**	**6**	**200**	**Auto**	**18**	**23**	**20**		
GM	**Astek 4WD**	**3.4**	**6**	**185**	**Auto**	**18**	**24**	**20**		
Honda	**CR-V 4WD**	**2.4**	**4**	**160**	**Auto**	**22**	**26**	**24**		
Ford	Explorer 4WD	4.0	6	210	Auto	16	20	17		
DC	Grand Cherokee 4WD	4.0	6	195	Auto	15	20	17		
GM	Blazer 4WD	4.3	6	190	Auto	15	20	17		
~~Honda~~	~~Passport 4WD~~	~~3.2~~	~~6~~	~~205~~	~~Auto~~	~~16~~	~~20~~	~~18~~		
Honda	**Acura MD-X 4WD**	**3.5**	**6**	**240**	**Auto**	**17**	**23**	**19**		
Toyota	4Runner 4WD	3.4	6	190	Auto	16	19	17		
Ford	Expetition 4WD	4.6	8		Auto	14	17	15		
GM	K1500 Suburban 4WD	5.3	8		Auto	13	17	15		
DC	Durango 4WD	4.7	8		Auto	13	18	15		
Toyota	Sequoia 4WD	4.7	8		Auto	14	17	15		
Toyota	Land Cruiser 4WD	4.7	8		Auto	13	16	14		
Small Pickups										
Ford	Ranger 2WD	2.3	4		Manual	24	28	25		
GM	S10 2WD	2.2	4		Manual	22	28	24		
Toyota	Tacoma 2WD	2.4	4		Manual	22	27	24		
Ford	Ranger 2WD	4.0	6		Auto	17	22	19		
DC	Dakota 2WD	3.9	6		Auto	18	29	18		
GM	S10 2WD	4.3	6		Auto	16	22	18		
Toyota	Tacoma 2WD	3.4	6		Auto	17	19	18		
Full Size Pickups										
Ford	F150 2WD	4.6	8		Auto	16	20	18		
DC	Ram 1500 2WD	5.2	8		Auto	14	19	16		
Toyota	Tundra 2WD	4.7	8		Auto	15	18	16		
GM	C1500 Silverado 2WD	4.8	8		Auto	15	20	17		
Minivans									length	width
Ford	Windstar	3.8	6	200	Auto	17	23	19	202	77
DC	Caravan	3.3	6	180	Auto	18	24	20	189/201	79
GM	Venture	3.4	6	185	Auto	19	26	22	187/201	72
Toyota	Sienna	3.0	6	210	Auto	19	24	21	194	73
Honda	Odyssey	3.5	6	240	Auto	18	25	21	201	76

ATTACHMENT #2

EPA 2001 Fuel Economy Trends Report
Model Year 2001 Nameplate Adjusted 55/45 MPG Listing - Appendix C
DC, Ford, GM, Honda, and Toyota Vehicles Only

Subcompact Car		MPG
Honda	Civic HX	38.2
GM	Metro	31.8
GM	Saturn SC	29.8
Toyota	Celica	29.5
Ford	Escort ZX2	28.1

Compact Car		MPG
Toyota	Prius	48.5
Toyota	Echo	35.5
Honda	Civic	33.6
Toyota	Corolla	32.9
GM	Prizm	31.5
GM	Saturn SL	30.2
Ford	Escort	29.3
Ford	Focus	28.1
DC	Neon	26.9
GM	Cavalier	26.3

Midsize Car		MPG
GM	Saturn L 4-cyl *	27.3
Toyota	Camry	25.5
Honda	Accord	24.8
GM	Monte Carlo	24.1
DC	Stratus	23.5
GM	Lumina	23.5
DC	Sebring	23.0
GM	Grand Prix	22.9
GM	Saturn L 6-cyl *	22.4
Ford	Sable	22.1
GM	Intrigue	22.0

Large Cars		MPG
GM	Impala	23.9
Toyota	Avalon	23.8
GM	LeSabre	22.8
GM	Bonneville	22.6
DC	Intrepid	22.4
DC	Concorde	22.2
Ford	Taurus	21.6

* Saturn L 4- and 6-cyl listed separtely - overall mpg unknown

Minivans		MPG
GM	Venture	21.7
Toyota	Sienna	21.1
Honda	Odyssey	20.5
DC	Caravan	20.1
Ford	Windstar	20.0

SUVs - 4WD		MPG
Toyota	RAV4	24.5
Honda	CR-V	23.0
GM	Aztek	20.8
Ford	Escape	20.5

Mid-Size SUVs - 4WD		MPG
Toyota	Highlander	19.8
Honda	Acura MDX	19.3
Honda	Passport	17.9
Toyota	4Runner	17.4
GM	Bravada	17.0
GM	Blazer	16.9
Ford	Explorer	16.9
Nissan	Xterra	16.9
DC	Grand Cherokee	16.8