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**Folder Title:**  
Climate Change Other Café/Clean Cars/Fuels [1]

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FINAL

October 30, 2000

On behalf of thousands of men and women at our nation's universities, national laboratories, and independent businesses, all working diligently on the challenges of the Partnership for a New Generation of Vehicles (PNGV), we were extremely disappointed in the portrayal of PNGV by Gregg Easterbrook in his article "Is Gore to Blame For The Oil Crisis" (Oct. 9). The article severely distorts the facts about the program and misrepresents the value of PNGV to our nation.

Easterbrook's article is so filled with erroneous statements and assertions that it is impossible to address each one. At one point, he says that the companies have not done anything through PNGV to address fuel efficiency, and then later he acknowledges that DaimlerChrysler, Ford and GM are putting forth vehicles that may improve fuel economy by up to 25 percent. He asserts that the companies are not implementing changes that could improve fuel economy in vehicles today (such as weight and horsepower reductions), but he fails to acknowledge that smaller, lighter vehicles with less horsepower have not been purchased by Americans over the past decade. In fact, throughout the 1980s, American automakers were routinely panned by the automotive press and Consumer Reports for the lack of performance of their vehicles.

But rather than just addressing the problems with Easterbrook's article, let's focus on some facts about the value of the PNGV program. Since its inception, PNGV research has been targeted at enabling technologies that can improve the fuel economy and reduce the emissions of both cars and light trucks. The family sedan was selected as the initial focus primarily because it was the most popular vehicle segment when the partnership began in 1993, and because the advanced technology resulting from the program could be transferred to both smaller and larger size vehicles.

Easterbrook says that after spending \$1.6 billion of government money, PNGV has produced nothing. To the contrary, the three companies have indeed used the PNGV research and have actually applied the work to conventional vehicles. For example, DaimlerChrysler has announced that its 2001 Jeep Wrangler will be offered with a high-strength, injection-molded hard top, and GM will offer customers a high-strength, corrosion-resistant composite pick-up box on its 2001 Chevrolet Silverado. Additionally, Ford has announced a hybrid electric version of the Escape for 2003. Without PNGV, these technologies likely would not have migrated to the marketplace as quickly.

Easterbrook also complains that the program was obviously faulty from the beginning because it put the government in charge of "commercial auto engineering." This is not the way the program operates. The auto industry has the lead role in shaping the directions and technology focus of the research. And the efforts are not designed to develop vehicles, but rather to achieve breakthroughs on the advanced technologies that can be used by automakers to dramatically improve the fuel economy of future products.

One of the biggest misconceptions about PNGV is that the federal budget for the program goes directly into the vaults of DaimlerChrysler, Ford, and General Motors. In fact, throughout the life of the program, nearly all of the government funding has gone to suppliers, universities and national laboratories. Furthermore, for fiscal year 2000, none of the government funds designated for PNGV will end up at the auto companies. On the other hand, DaimlerChrysler,

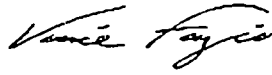
Ford, and GM spend over \$980 million of their own funds annually on PNGV-related research and development.

PNGV is working hard to accomplish its longer term objectives, and significant progress is being made. The National Academy of Science peer reviews this program regularly and documents the progress and major improvements of the program. The latest report concluded that "considering the magnitude of the challenge facing the program, PNGV is making good progress..."

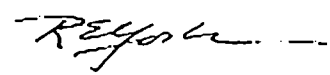
Mr. Easterbrook does the PNGV program and the American people a disservice by misrepresenting so badly the nature, basis and progress of these efforts. Rather than wasting money and holding back fuel economy improvements, PNGV offers hope for great progress in the future, while not harnessing the auto industry with misguided fuel economy rules and regulations that only make it harder for the companies to provide the products that American consumers obviously want to buy.



Steve Zimmer  
PNGV Director  
DaimlerChrysler



Vince Fazio  
PNGV Director  
Ford



Ron York  
PNGV Director  
General Motors



# American Council for an Energy-Efficient Economy

WASHINGTON, DC

October 19, 2000

TO: Those interested in climate technology tax credits

FROM: David Nemtzw, Alliance To Save Energy  
Howard Geller, American Council for an Energy-Efficient Economy  
Carol Werner, Environmental and Energy Study Institute  
Dan Lashof, Natural Resources Defense Council  
Charlie Higley, Public Citizen  
Dan Becker, Sierra Club  
Jason Mark, Union of Concerned Scientists

RE: Tax credits for hybrid vehicles

The Clinton Administration has proposed a tax credit of up to \$3,000 for purchasers of qualifying hybrid electric vehicles. This proposal, and variations of it, is included in a number of bills introduced in the 106<sup>th</sup> Congress such as H.R. 2380 (Matsui), H.R. 4270 (Kildee), S. 2685 (Levin), S. 2904 (Bingaman), and S. 3152 (Roth).

Hybrid electric vehicles are a very promising technology for significantly reducing both the fuel consumed and pollutant emissions by passenger vehicles (i.e., cars and light trucks). However, the eligibility requirements must be structured in a way that does not leave any doubt that these benefits will be achieved. Under the proposal advanced by the Clinton Administration and supported by U.S. auto manufacturers, the amount of the credit would be based solely on the capacity of the energy storage system and amount of regenerative braking in the hybrid vehicle, and the credit would not take effect until 2003. We believe that it is essential to supplement and modify these requirements so that the credits start sooner and all qualifying hybrid vehicles achieve a significant improvement in fuel economy and reduction in pollutant emissions compared to conventional vehicles.

In particular, we recommend adding the following criteria to those originally proposed by the Clinton Administration: (1) a qualifying vehicle must achieve at least a 50% fuel economy improvement over the average for its vehicle class; (2) a qualifying vehicle must meet the Low Emissions Vehicle (LEV) emissions standards for gasoline-powered passenger cars through 2003, and the bin number 5 standard of the new "Tier 2" national emissions standards for passenger cars beginning January 1, 2004; and (3) vehicles meeting the tougher bin number 2 emissions standard should qualify for an additional \$500 tax credit. Without these modifications, our organizations cannot support the proposed tax credits since they could go to hybrid vehicles that provide little or no environmental and energy benefits.

In addition, we recommend that the tax credits for hybrid electric vehicles be available for hybrid vehicles placed in service beginning January 1, 2001. This would provide manufacturers with an incentive to introduce and mass produce these innovative vehicles as soon as possible. Since two manufacturers are already producing hybrid electric vehicles that meet these criteria, starting in 2001 would ensure the tax credits help rather than hinder leaders in hybrid technology. Also, the tax credits should remain in effect for at least five years so that vehicle manufacturers can plan their hybrid vehicle investments knowing that the tax credits will be in effect. Much shorter effective periods, such as the one year provided in S. 3152, are of little value to manufacturers.

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# America's Automobile Industry

*We're Someone You Already Know -  
Keeping The Country Moving  
More Efficiently, Cleanly & Safely Than Ever*



# DOE

# NEWS

**NEWS MEDIA CONTACT:**

**John B. Townsend II, 202/586-5806**

**FOR IMMEDIATE RELEASE**

**October 20, 2000**

## **Statement By Energy Secretary Bill Richardson Regarding GM Concept Car Reaching 80 MPG**

"I am pleased by the latest news from Detroit, and offer my congratulations to General Motors (GM) Corporation. Results of testing on this high mileage concept car are impressive indeed. Before now, there have been predictions about achieving the 80 miles per gallon goal established by the Partnership for a New Generation of Vehicles (PNGV). We now have even greater confidence this aggressive goal can be met with a 5-passenger sedan. General Motors announced test results at the conference of the American Society of Environmental Journalists today. According to those results, the Precept, GM's PNGV hybrid concept car, gets 90.4 miles per gallon in combined city-highway driving tests using diesel fuel. This translates to 79.6 mpg on a gasoline equivalent basis.

"These numbers validate the success of the PNGV program. The major automakers are moving closer to the goal of delivering production prototypes of affordable family sedans capable of achieving up to 80 miles per gallon with very low emissions. The challenge remains to move these exciting fuel-saving technologies into production cars that American drivers can buy. We are hopeful that GM and other automakers will begin producing vehicles with significantly higher fuel economy. The sooner they can get these vehicles moving through the assembly lines, the sooner they will be in showrooms and on the highways.

"We are again experiencing how the volatility of petroleum prices can affect our daily lives. This accomplishment shows how the federal government and American industry are working to reduce our dependence on imported petroleum. This announcement could not come at a more appropriate time. I applaud General Motors' leadership role in the Partnership for a New Generation of Vehicles and for its efforts to help our nation achieve this important milestone in our joint program."

10/19/2000 18:09 FAX

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~~Confidential~~. Hold for release until after 1:00 p.m. EST, Friday 10/20/2000.

General Motors will announce on Friday, October 20, 2000 that the GM Precept Technology Demonstration Vehicle (TDV) has achieved fuel economy of 90.4 MPG (79.6-MPG gasoline equivalent). This environmental concept vehicle was displayed for the first time at the January 2000 North American International Auto Show and has won national and international acclaim for both its styling and technology.

Since January, a multi-disciplinary engineering team led by Dr. Ron York at GM's Advanced Technology Vehicles (ATV) operations in Troy has developed the sophisticated TDV into a vehicle that provides a good balance between performance, driveability, fuel economy and emissions. Bob Purcell, Executive Director of ATV, will release the impressive results of this design and development effort at the Society of Environmental Journalists, meeting this week in East Lansing, Michigan.

We are tremendously pleased to be able to report these results. The GM Precept achieved an incredible stretch goal that few in the automobile industry felt was possible. The success should be credited to the innovation and commitment of the engineers, scientists, stylists, technicians and mechanics that worked on the Precept at GM, its suppliers and many valued colleagues in the federal government and laboratories.

While the Precept demonstrated the technical feasibility of achieving 80 mpg (gasoline equivalent) in a family sedan, there is an even greater challenge still ahead to make these technology innovations commercially viable. We look forward to continued efforts together to address these challenges.

General Motors strongly believes that government-industry cooperation to develop commercially viable, environmentally sensitive transportation technology is in the best interests of the government, the consumer and our stockholders. We believe that these accomplishments validate that underlying premise of PNGV and other programs that we participate in such as the Ethanol Challenge, the Future Truck competition and the California Fuel Cell Partnership.

May I close by also thanking you for your personal support for this program.

10/19/2000 15:08 FAX

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Dr. Cheryl L. Shavers  
Under Secretary  
Technology Administration  
Department of Commerce  
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The Honorable Thomas J. Gross  
Deputy Assistant Secretary for  
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Duncan T. Moore, Ph.D.  
Assistant Director, Technology  
Science and Technology Policy Office  
The White House  
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Please be advised that Ron York sent the revised attached letter to Jim Blanchard today,  
Thursday, October 19, 2000.

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## IS GORE TO BLAME FOR THE OIL CRISIS?

## Political Mileage

by Gregg Easterbrook

Post date 09.28.00 | Issue date 10.09.00

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Al Gore last week said America faces a national "energy crisis," and he blamed OPEC and big oil. He may be right, but here are some additional culprits: Gore and the administration he serves. The main reason petroleum prices are high is that American cars and trucks--which account for two-thirds of U.S. oil demand--keep using more gasoline. And, in a little-noticed move in 1993, President Clinton and Gore created a project that essentially guaranteed vehicle fuel efficiency would not improve during their time in office. If the Clintonites are compiling a list of villains on whom to blame the energy "crisis" that imperils Gore's presidential run, they should put themselves near the top.

Seven years ago, at a White House ceremony with the heads of the Big Three automakers, Clinton and Gore announced the awkwardly named "Partnership for a New Generation of Vehicles" (PNGV). Chrysler (now DaimlerChrysler), Ford, and General Motors would receive antitrust exemptions to conduct joint research on fuel efficiency. The federal government would fund most of the work, with the goal being a full-sized car capable of getting a spectacular 80 miles per gallon. Gore compared the project to the Apollo moon program, saying American know-how would save the day.

Seven years later, the PNGV has spent \$1.6 billion of the government's money and produced nothing. Not only has it not fielded a breakthrough vehicle, it hasn't even spawned a fuel-saving idea to incorporate into existing cars. The Big Three now say the PNGV won't have something on the road until 2004--if ever.

The main thing the supercar initiative has produced is pretexts for avoiding the tough political choices that would really increase fuel efficiency. "The reason the project exists is to create headlines and spend large amounts of government money, not to accomplish much that is useful," says Tom Gage, a former Chrysler executive. "It serves as an excuse for not making hard choices on energy policy." Since the project's founding, the mpg rate of vehicles sold in the United States has

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steadily declined. Meanwhile, two Japanese automakers, Honda and Toyota, have put into production the first advanced-efficiency vehicles--"hybrid" propulsion cars that employ a combination of piston and electric motors to achieve big jumps in fuel economy, but operate exactly like existing cars. Honda and Toyota did it without government subsidies or special legal exemptions, and, by getting to hybrid propulsion first, they may have positioned themselves for a market-share grab that could echo the Japanese auto expansion of the 1970s.

That individual Japanese companies beat an entire U.S. government "moon program" ought to shame the White House. It hasn't. Clinton has proposed increasing the partnership's funding. Gore, for his part, recently held a campaign event at which Big Three executives again stood by his side as he announced that the supercar research program would be expanded to cover light trucks. And, of course, he bashed OPEC and big oil.

**A**s James Johnston, a former General Motors lobbyist, laid out in his 1997 book, *Driving America*, the Clinton administration conceived the Partnership for a New Generation of Vehicles to avoid a bruising legislative fight over the fuel-economy standard known as CAFE (Corporate Average Fuel Economy). Enacted following the 1973 oil shock, the standard required annual improvement in the "fleet average" efficiency of cars and light trucks (SUVs and minivans count as the latter). CAFE rules helped compel automakers to improve the overall mileage of new vehicles from 16 mpg in 1975 to 25 mpg in 1988. That not only saved drivers money, it moderated U.S. oil demand, which weakened OPEC and contributed to low gas prices from the mid-'80s through the late '90s.

But the Big Three hated CAFE, and during the Bush administration they convinced Congress to suspend it. Beginning in 1989, the fleet requirement was fixed at 27.5 mpg for cars and 20.7 mpg for light trucks--where it remains today.

The automakers weren't entirely wrong. Johnston (now with the American Enterprise Institute), economist Robert Crandall of the Brookings Institution, and other analysts have persuasively argued that CAFE is an inefficient way to pursue efficiency. Because of wording quirks, it sometimes rewards automakers for moving production out of the country or actually encourages them to make vehicles into gas guzzlers. (Bigger vehicles are rewarded by being bumped up into the light-truck category, whose efficiency requirements are lower; absurdly, automakers originally began

thinking about SUVs in part to evade CAFE.)

The problem is that the efficient way to increase efficiency--endorsed by numerous economists, from Kenneth Arrow on the left to Martin Feldstein on the right--is through higher energy taxes. Raise pump prices (while cutting other taxes so the outcome is "revenue neutral") and the market would sort out the details more efficiently than any government program ever could. Manufacturers would have a profit incentive to improve mpg rates, while buyers could decide for themselves whether they wanted to save at the pump or bear the cost of guzzler-style transportation. But significantly raising gas taxes is a big political loser, which is why no prominent national politician since John Anderson has proposed it.

When the Clintonites took office, they faced pressure from Democrats in Congress to raise CAFE standards--and equally fierce pressure from the automakers and the United Auto Workers to leave them alone. Nevada Senator Richard Bryan assembled a bloc of votes for a phased increase to 40 mpg, combined with the removal of the loopholes causing CAFE's unintended consequences. Bryan's bill wasn't perfect, but at least it tried to reduce America's demand for petroleum. Had it passed, SUV mania would not have swept the auto market, increasing traffic congestion, sprawl, and road danger. U.S. oil consumption would not have risen to 19 million barrels a day, and today there would likely be no oil "crisis."

But, rather than pick a tough fight, the Clinton administration looked for a painless third way, which it found it in the supercar project. Politically, the project has served its purpose well. Since 1993, every congressional push for higher mpg standards has been defeated--not only because of fierce Republican opposition but because the White House has tacitly aided that opposition by suggesting that the supercar project means new standards are unnecessary.

**Y**et the project has been cursed from its inception. For one thing, its 80-mpg goal is an impossible one. The number appealed to Clinton and Gore because it let them claim they would triple gas mileage. But no one in the engineering field believed then--or believes today--that a full-size 80-mpg vehicle is possible at an affordable price. The National Research Council, an arm of the National Academy of Sciences, recently said that while 80 mpg may be "technically feasible ... the cost requirement is clearly unattainable" for mass production. The reason is that 80-mpg cars would require space-program technology: materials allowing

valve chambers to withstand temperatures of up to 2,600 degrees, exotic lightweight structural components, low-friction tires, and even the replacement of side-view mirrors with miniature TV cameras to reduce aerodynamic drag. Such features may exist one day, but today they are blue-sky--and this was well-known when the project began.

The implementation was almost as bad as the concept. Most of the funding--which averaged \$250 million annually--was channeled through the Department of Energy, not exactly the Einstein of government agencies. And, sure enough, the supercar project became a bureaucratic swamp: Money was processed mainly through the DOE (which gave some to the automakers and some to national laboratories such as Los Alamos, which have no experience in commercial auto engineering), but also through the Environmental Protection Agency, the Department of Commerce, the Department of Transportation, the National Science Foundation-- you name it. The labyrinthine structure meant no one was in charge and no one was accountable: There were "neither carrots nor sticks," as Daniel Spurling, director of the Institute of Transportation Studies at the University of California at Davis, noted at a congressional hearing. In the business world, nothing gets done unless someone will be penalized if a project fails and rewarded if it succeeds. The supercar consortium did neither.

The program's information-sharing provision also gave automakers a disincentive to invent anything under the PNGV aegis, since it would just go to their rivals. (Since Chrysler merged with Daimler-Benz, Ford and General Motors have worried that any useful supercar technology would end up in the hands of not only competitors in Detroit but those overseas as well.) So, to avoid giving away ideas, the Big Three have kept the good stuff--such as the details of "fuel cells," a promising form of propulsion that uses methane or pure hydrogen to make horsepower with minimal greenhouse emissions--close to the vest. The supercar consortium, by contrast, tends to work on technologies--such as diesel engines, which the PNGV insists on calling "direct-combustion devices" to make them sound like something else--that car companies figure will never be worth the investment anyway. (In another disturbing sign of bureaucratic detachment from reality, PNGV officials say "energy-conversion device" when they mean "engine.")

Not only does the requirement to share information offer no incentive to come up with marketable breakthroughs, it actually does the reverse. The supercar consortium appears to allow the Big Three--which normally would be prohibited by antitrust rules from

cooperative planning--to signal to one another what they will and will not build. Acting in isolation, DaimlerChrysler, Ford, and General Motors, each worried that one of the others would jump into the market with a 30-mpg SUV, might improve their own gas mileage as a preemptive strike. Through the PNGV, however, the Big Three can assure one another that none of them will strike first with improved mileage. The motive is not conspiracy but short-term profit: The high-mileage full-sized vehicles Detroit is certain someday to build will make money, but why sink billions into tooling up to make advanced vehicles now if that capital cost can be indefinitely postponed?

**N**ot surprisingly, then, the PNGV has distinguished itself mainly in holding conferences and awarding medals to its officials. Supercar researchers wasted several years investigating advanced forms of diesels, though analysts warned that the diesel engine, which is inherently sooty, had little chance of meeting future smogcontrol rules. The PNGV was slow to focus on hybrid propulsion, though anyone who read the automotive press knew Honda and Toyota had already figured out this would be the first practical advanced-propulsion idea.

With its focus on the improbables, the supercar project became a reason for not putting into use the fuel-efficiency steps that are practical right now--mainly weight and horsepower reduction. By far the most significant factor in mpg is the mass being moved. Between 1975 and 1988, the average weight of new cars and trucks declined by 800 pounds. This was caused not by a shift to dangerous minicars, which have never represented more than a tiny fraction of the U.S. market, but by trimming excess off full-sized cars and trucks. The result was that during this period the fuel efficiency of U.S. vehicles steadily improved. But beginning around 1990--when CAFE increases were suspended--the typical weight of U.S. vehicles began to rise. Today, with the SUV glut, average new-car weight is almost back to what it was in 1975, when enormous Ford Galaxies and Chevrolet Impalas clogged American driveways.

To move this ever-increasing weight, engineers have focused on improving power, with the result that today's typical new car boasts 180 horsepower, versus 140 in 1975. In a sense, the internal-combustion engine has grown steadily more efficient; the problem is that the progress has gone toward making vehicles bigger and faster rather than easier on gas. Give up a little weight and horsepower, and a 35-mpg full-sized car or minivan is possible right now, many analysts believe, at market prices. Were such cars widespread, today's oil prices

would not be as high. But that's not what Detroit wanted to build--and the supercar project provided the perfect excuse.

**S**purred by oil-price trends and the breakthroughs in Japan, the Big Three are finally taking real steps to improve gas mileage. DaimlerChrysler expects to have a hybrid-propelled version of its gargantuan Durango SUV on the market in 2003; Ford plans a hybrid SUV the same year, and General Motors is preparing a hybrid-powered pickup truck. These hybrid heavy vehicles should deliver up to a 25 percent improvement in fuel economy. That may not be flashy--a 25 percent improvement in the Durango will only boost it from 12 mpg to 15 mpg in city driving--but the results will be substantial. A 25 percent more efficient SUV, in a typical year, would burn 175 fewer gallons of gas and emit more than a ton less greenhouse gas. American automakers are even working seriously on fuel cells, which have the potential to set us free from OPEC forever.

Automakers are turning their focus toward mpg because of market pressure, but they would probably be further along had each member of the Big Three worked alone to produce a practical advanced-mileage car rather than all of them working together under a top-heavy federal program. You'd think New Democrats like Clinton and Gore would have realized that while government can shape the market via taxes or standards, getting federal agencies involved in commercial product development is a formula for waste and delay. But they didn't, which is why Gore should not now point fingers at others for an oil "crisis" his administration helped create.

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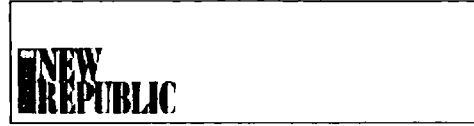
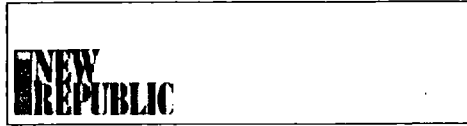
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**Debra Reed**

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"Mr. Ford accepted that the automobile had had a serious negative impact on the environment, and that his industry had wrongly played down the threat from global warming. ...Detroit-born Mr Ford, who has been chairman since the start of last year, proclaimed that climate change was the most challenging issue facing the world and that anyone who disagreed was "in denial".

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#### FORD PREDICTS END OF CAR POLLUTION

The Independent (UK)

6 October 2000

Internet:

<http://www.independent.co.uk/news/UK/Environment/2000-10/ford061000.shtml>

The 100-year reign of the polluting internal combustion engine is coming to an end, Bill Ford, chairman of the Ford Motor Company, said yesterday. It will soon be replaced in motor vehicles by the hydrogen fuel cell, which emits no pollution whatsoever and so can reduce the build-up of greenhouse gases causing climate change, Mr Ford, great-grandson of the company's founder, Henry Ford, told the Greenpeace Business Conference in London. In a remarkable speech from a motor manufacturer, in which he proclaimed his own environmental credentials, Mr Ford, 43, accepted

that the automobile had had a serious negative impact on the environment, and that his industry had wrongly played down the threat from global warming. And the head of the world's second biggest car company raised eyebrows even further when he said that he could foresee the day when people would not want to own cars, but merely have access to mobility.

Detroit-born Mr Ford, who has been chairman since the start of last year, proclaimed that climate change was the most challenging issue facing the world and that anyone who disagreed was "in denial". Ford itself had moved on from that position, he said. But he felt the Kyoto protocol, the 1997 pact in which the industrialised nations agreed to try to limit their emission of greenhouse gases, would not provide deep enough cuts to halt global warming. Only the marketplace, making new technology widely available, could tackle the problem.

A fuel cell creates energy by an electrochemical process similar to that in a battery: it lets hydrogen and oxygen react together to produce electricity and water vapour. It does not run down or need recharging, working as long as the hydrogen fuel is available, but most importantly, it does not produce any CO<sub>2</sub>, the basic by-product of any carbon-based fuel such as oil, gas or coal.

Every major car company in the world is throwing huge sums into developing the technology: Ford is spending \$1bn (£690m) between now and 2004, while Daimler-Chrysler, regarded as the leader in the field, has spent \$700m. All the main manufacturers have prototype fuel-cell cars running and there is a race to bring them to market. Honda and Toyota expect to do so in 2003, while Ford and Daimler-Chrysler are aiming at 2004.

"I believe fuel cells will finally end the 100-year reign of the internal combustion engine," Mr Ford said, adding that the technology was "the holy grail" of the motor industry. Prophesying the demise of car ownership, he said: "The day will come when the whole notion of car ownership is antiquated," he said. Mr Ford was reflecting advanced motor industry thinking, which suggests many people might not want to pay for a car of their own if they could be guaranteed mobility on demand from a local hire network.

Autos/cars

## Increased Diesel Penetration in LDV Fleet

If the auto industry takes advantage of clean-burning diesel technologies to increase market share within SUVs and light trucks, and if the fuel efficiency advantages of diesel are actually applied to mileage increases instead of being used to offset additional power, then it could:

- \* Reduce GHG emissions by about 2-5 mmtce in 2010 (0.3-0.8% of transportation emissions)
- \* Conserve about 1-2 billion gallons of oil in 2010 (between 2-5 days of forecasted petroleum consumption by U.S. light duty vehicles).

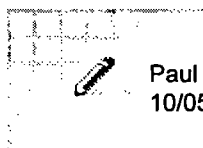
If, because of fleet averaging, auto manufacturers use these efficiency gains to reduce the fuel economy of the rest of their vehicle sales, then vehicle greenhouse gas emissions could actually increase (diesel has a higher carbon content per gallon than gasoline).

On the other hand, if fleet averaging isn't a factor, then the increased use of diesel would contribute to an overall improvement in the efficiency of the light vehicle fleet, which can deliver a number of benefits. For example, if the entire US light vehicle fleet were 5 mpg higher (about a 25% increase over the current average of 20 mpg), it would, over a period of 4-7 years, save as much oil as can be economically recovered from ANWR (134-252 billion gallons, according to USGS and depending on oil prices).

These numbers are ballpark estimates based on an Arthur D. Little report on potential diesel penetration of the Light Duty Vehicle fleet (the report was conducted prior to the Tier 2 rulemaking). The above results represent a range between ADL's forecast (which EPA views as aggressive), and 50% of those estimates. At the high end of the range, diesel penetration of the light duty fleet is 3.5% by 2005 and 11.5% by 2010.

Some major drivers of ADL's assumptions include:

- \* Assumes trucks capture 60% of the light duty market by 2015.
- \* Diesel technology is such that diesels comply with EPA but not CARB requirements.
- \* No federal toxics regulations specifically targetting diesel.
- \* Clean diesel fuel is available at no more than 10-15 cents/gal more than regular gas.



Paul Bledsoe  
10/05/2000 10:43:48 AM

Record Type: Record

To: See the distribution list at the bottom of this message

cc:

Subject: AP:Auto Mileage Ratings Are Issued

Monday October 2, 7:46 pm Eastern Time

### **Auto Mileage Ratings Are Issued**

By H. JOSEF HEBERT  
Associated Press Writer

WASHINGTON (AP) -- While a handful of small cars are getting 40-plus miles per gallon, the vast majority of new vehicles coming into showrooms get about half that, the government's latest automobile fuel economy statistics show.

For the second year, a hybrid gas- and electric-powered vehicle -- the two-seater Honda Insight -- topped the list of biggest fuel misers with 64 mpg combined city and highway driving among 2001-model vehicles. It was followed by another hybrid, the Toyota Prius, and three Volkswagen diesel cars.

The huge popularity of sport utility vehicles again drove down the overall numbers of the more than 800 cars, trucks and vans listed in the annual fuel economy statistics released Monday by the Environmental Protection Agency.

Average fuel economy for 358 models or variations of SUVs, vans and pickup trucks was just over 18 mpg, compared with 23.6 mpg for nearly 500 cars on the EPA list.

King-size SUVs such as the Ford Expedition, Lincoln Navigator and Dodge Durango and their twin pickups accounted for 12 of the 36 vehicles on the list with the worst gas mileage, all with 12 mpg or less in city driving and 17 mpg or less on the highway.

The luxury sport import Ferrari 500 Maranello was the biggest guzzler (8 city and 13 highway) followed by the Lamborghini Diablo (10 city, 13 highway).

With the growing popularity -- even with high fuel costs -- of minivans and SUVs, the overall fuel economy for all vehicles continued a steady decline that has been under way since the late 1980s, when average fuel economy for all vehicles was nearly 26 mpg.

In the latest statistics, mileage ranged widely even within various size classes, and in some cases even within like groups of cars made by the same manufacturer. Among compacts, for example, the Volkswagen Passat average 20 mpg, compared with the Volkswagen Jetta and Golf diesels' 45 mpg average.

Among midsize cars, the Mazda 626 and Honda Accord reported the best combined city-highway mileage of 29 mpg, while the worst in that category were the luxury Rolls Royce Silver Seraph and Bentley Arnage, both at 13 mpg. Most cars in the category came in the low- to mid-20s mpg.

"Choosing the most fuel-efficient vehicles in a class can save the owner at least \$1,500 in fuel costs," said EPA Administrator Carol Browner, and reduce carbon dioxide emissions which contribute to global warming.

But automakers and groups such as the Coalition for Vehicle Choice, which lobbies against government fuel-economy rules, have long argued that consumers want larger vehicles and not small minicompacts and compacts that consume less gasoline.

The electric-gas hybrids are new and not much of a factor in the current market, although automakers say they are likely to be the next technology that will spur significant breakthroughs in fuel economy.

The Japanese-made Insight, which Honda introduced earlier this year and was on last year's list, gets 61 mpg in city driving and 68 mpg on the open highway. The Toyota Prius, which is a compact sedan with the same technology, gets a combined mileage of 48 mpg.

The hybrids run on conventional gasoline with an assist under certain driving conditions using power from an electric motor and self-charging generator and battery pack.

Three similar minivans from General Motors -- the Oldsmobile Silhouette, Chevrolet Ventura and Pontiac Montana -- had the best mileage (19 city and 26 highway) in the passenger van category. Chrysler's all-wheel-drive Town & Country van had the worst (17 city, 22 highway).

Mileage among SUVs also ranged widely with small models, led by the Toyota RAV4 (25 city, 31 highway) doing well. However, most SUVs were under 20 mpg in combined city-highway driving, with the worst fuel economy recorded by Land Rover's Range Rover (12 mpg city, 15 highway).

Slightly better were the king-size SUVs -- the Ford Expedition, GMC Yukon and Chevrolet Suburban -- which all got 15 mpg in combined city-highway driving.

Message Sent To:

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### **How Do The Ford and GM Fuel Economy Commitments Compare to the Voluntary Commitments in the European Union?**

- The voluntary commitment by the European-based automakers (including Ford of Europe and GM of Europe) in 1998 was to reduce new car CO<sub>2</sub> emissions to 140 grams per kilometer by 2008; this commitment represents a 25% reduction in CO<sub>2</sub> and about a 30% increase in fuel economy; this commitment yields fuel economy targets of about 40 mpg for gasoline cars and about 45 mpg for diesel cars in 2008
- The Ford and GM commitments in the US represent a higher rate of improvement (25% over 5 years, or 5% per year) than the EU (30% over 10 years, or 3% per year)
- The Ford and GM commitments in the US only address the SUV portions of their fleets (15-20% of their personal vehicle sales), while the EU commitment includes all personal vehicle sales
- The GM and Ford commitments in the US will save far more carbon per vehicle, both because of the lower starting fuel economy and the higher % improvement, but the EU commitment will lead to a much lower average personal vehicle carbon dioxide emission level
- A very preliminary calculation based on incomplete EU vehicle data suggests that the overall annual carbon benefits of the EU voluntary commitment might be about 30-35 MMTCe once the fleet is turned over, higher than the 13 MMTCe annual carbon reductions estimated for the Ford and GM commitments on SUVs

## Recent Commitments by Ford and General Motors to Increase SUV Fuel Economy

### Ford's Commitment

- July 27, 2000 press release: "will increase the fuel economy of its Sport Utility Vehicle fleet in the United States by 25 percent by the 2005 calendar year" (from a CAFE average of about 18 to 23 mpg or in-use from about 15.3 to 19.6 mpg); covers all SUVs including Explorer/Mountaineer, Expedition/Navigator, Excursion (currently not counted in CAFE), Land Rover, and the new Escape (Ford sold about 800,000 this year and expects to sell about 1 million next year); about 70% of the gains will be through technology (such as more efficient engines and transmissions, weight reductions, and aerodynamics) and about 30% through sales of smaller SUVs like the new Escape
- pledged to not use loopholes such as CAFE credits for E85 flexible fuel vehicles and the fact that the largest SUVs are excluded from CAFE calculations (Keith Bradsher, New York Times, July 27, 2000)
- did not explicitly address non-SUVs; "first step" in longer term strategy
- Ford had previously committed to bring a hybrid Escape SUV to market in 2003 with a target city fuel economy of 40 mpg (compared to 20-28 mpg for the non-hybrid)

### General Motors' Commitment

- August 2 press release: "It's simple. We lead in truck fuel economy today and General Motors intends to remain the leader in five years," Vice Chairman Harry Pearce; pledged to bring a hybrid Chevrolet Silverado/GMC Sierra full-size pickup to market in 2004 with 15% better fuel economy
- "I want to set the record straight. GM leads Ford in truck fuel economy. GM will still be in the lead five years from now and 10 years from now. End of story." Harry Pearce quoted in Detroit News on August 4, 2000
- GM specifically cited cylinder deactivation and continuously variable transmissions as two of its innovative technologies and also pledged not to use the CAFE loopholes (Keith Bradsher, New York Times, August 3, 2000)

DaimlerChrysler declined to make any commitments, but stated that it "supports fuel economy improvements across the board in light trucks"

### Overall Reaction

- These commitments, if met in the future, will be the first meaningful efforts to improve overall fuel economy since average personal vehicle fuel economy peaked in 1987 and 1988 at an average CAFE level of 25.9 mpg; since then, average personal vehicle fuel economy has dropped about 2 mpg, most of which is due to the explosive popularity of sport utility vehicles, pickup trucks, and minivans, all of which have lower average fuel economies than the average car
- Ford's commitment, both because of its more explicit nature and because it is clearly backed by Chairman Bill Ford, seems firmer than GM's (e.g., after Ford's commitment

but before GM's response, a top GM official was quoted as saying "I don't think we're going to be making any commitments, but we're going to make progress")

### **Projected Carbon Impact of the Ford and GM Commitments to Increase Fuel Economy**

| Year | Ford-annual<br>(MMTCe) | GM-annual<br>(MMTCe) | Ford+GM-annual<br>(MMTCe) | Ford+GM-cumulative<br>(MMTCe) |
|------|------------------------|----------------------|---------------------------|-------------------------------|
| 2005 | 1                      | 1                    | 2                         | 4                             |
| 2010 | 3                      | 3                    | 6                         | 19                            |
| 2015 | 4                      | 4                    | 8                         | 53                            |
| 2020 | 5                      | 5                    | 10                        | 102                           |
| 2025 | 6                      | 6                    | 12                        | 158                           |
| 2030 | 7                      | 6                    | 13                        | 220                           |

#### **Key Points**

- Assumes that today's status quo continues--VMT grows by 2-2.5% per year and fuel economy of individual categories remains stagnant--except that Ford and GM SUV fuel economy grows by 25% by 2005 (phased in beginning in 2003)
- The values above would be 25-30% larger if expressed on a total fuel life-cycle basis, i.e., using less fuel in the vehicle also means less carbon lost in drilling, refining, distribution, etc
- The carbon reductions could be much larger if:
  - the market share of Ford and GM SUVs grows faster than assumed and if the buyers of these higher fuel economy SUVs would have otherwise bought lower fuel economy vehicles
  - the technologies used by Ford and GM in SUVs are also used by Ford and GM to improve average fuel economy in pickups, minivans, or cars
  - the fuel economy improvements by Ford and GM promote average fuel economy improvements by other automakers
- The carbon reductions could be much smaller if:
  - Ford and GM offset some or all of the overall light truck CAFÉ fuel economy gains from these SUVs by shifting model mix to sell more high profit, low fuel economy full-size pickups
  - if higher SUV sales result in more people shifting from cars to SUVs (even with these commitments, the average SUV will still have lower fuel economy than the average car)
  - if Ford and GM use the CAFÉ loopholes such as E85 flexible fuel vehicle credits or GVWR ratings so high as to be excluded from CAFÉ (though they have pledged not to do so)

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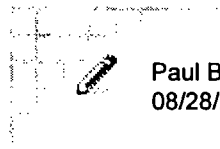
| Year | Ford-annual<br>(MMTCe) | GM-annual<br>(MMTCe) | Ford+GM-annual<br>(MMTCe) | Ford+GM-cumulative<br>(MMTCe) |
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Paul Bledsoe  
08/28/2000 05:54:22 PM

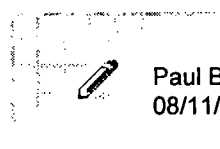
Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP, Janet Anderson/WHCCTF/EOP@EOP, Samuel F. Baldwin/OSTP/EOP@EOP, Shelley N. Fidler/WHCCTF/EOP@EOP

cc:

Subject: GM Exxon Fuel Cell Breakthrough: Greenwire; LATimes, FT

----- Forwarded by Paul Bledsoe/WHCCTF/EOP on 08/28/2000 05:53 PM -----



Paul Bledsoe  
08/11/2000 05:21:14 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP, David Gardiner/WHCCTF/EOP@EOP, Janet Anderson/WHCCTF/EOP@EOP

cc:

Subject: GM Exxon Fuel Cell Breakthrough: Greenwire; LATimes, FT

#### FUEL CELLS: GM, Exxon Mobil Announce Breakthrough

General Motors Corp. and Exxon Mobil Corp. announced yesterday they had developed a highly efficient fuel processor for fuel-cell vehicles that could serve as a bridge between current automobiles and zero-emissions vehicles (Hillary Durgin, Financial Times).

**The companies say the breakthrough could lead to widespread use of fuel cells in cars, trucks and buses within 10 years (AP/Houston Chronicle). The companies claim their technology is twice as efficient as conventional engines "and a clear advance over the announced systems of key rivals" (Terril Yue Jones, Los Angeles Times). GM says it plans a vehicle demonstration in 18 months (Wall Street Journal).**

The fuel cell would convert low-sulfur gasoline to cleaner-burning hydrogen, allowing consumers to make "best use of today's gas stations." Larry Burns, GM vice president of research and development: "This technology is a bridge between today's conventional gasoline-powered vehicles and where we believe we are eventually headed, which is hydrogen-powered vehicles fueled by hydrogen refilling stations" (David Kiley, USA Today). (All cites Aug. 11.) -- MB

## Fuel-cell vehicles move closer

By Hillary Durgin in Houston

Published: August 11 2000 01:35GMT | Last Updated: August 11 2000 03:36GMT

General Motors and Exxon Mobil said on Thursday that they had developed a highly efficient gasoline fuel processor for fuel-cell vehicles that would lead to greatly reduced emissions and improved fuel economy.

The announcement is the result of a three-year collaborative effort. GM said the new processor would serve as an interim application between today's cars and the ultimate goal of developing a zero-emissions vehicle.

"It's part of an industry-wide effort to find the best way to power automobiles," said Steven Taub, associate director with Cambridge Energy Research Associates of Massachusetts. "If it works and does what they say it will do, it would be a pretty significant development."

The new processor uses gasoline to create a high-quality stream of hydrogen that powers a fuel cell. That means that consumers can fuel the new vehicles the same way they fuel their current cars. GM said it planned a vehicle demonstration using this technology in 18 months.

"The gasoline processor could be the bridge between today's conventional vehicles and tomorrow's hydrogen fuel-cell vehicles," said Harry Pearce, vice-chairman of GM. "While we view hydrogen as the future fuel for automotive applications, we have significant commercial challenges, such as designing and building a large number of hydrogen refuelling stations, developing feasible on-board fuel tanks and agreeing to industry-wide specifications."

Mr Taub said Thursday's announcement answered the question as to where the hydrogen was going to come from - a big challenge for fuel cells, which are battery-like, yet depend on an outside fuel source.

He estimates a fuel-cell engine costs about 100 times what a typical engine would cost in a car today.

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Business Editors

### **GM and ExxonMobil Collaboration Develops Gasoline Processor for Fuel Cell Vehicles**

TRAVERSE CITY, Mich.--(BUSINESS WIRE)--Aug. 10, 2000--General Motors Corporation and Exxon Mobil Corporation (NYSE:XOM) announced today that they have developed a highly-efficient gasoline fuel processor for fuel cell vehicles. The companies said that the processor is a major breakthrough that will lead to greatly reduced emissions and improved fuel economy. GM plans a vehicle demonstration using this technology within 18 months.

The processor uses gasoline as a fuel to create a high-quality stream of hydrogen that powers a fuel cell. For consumers this means they will be able to fuel these new vehicles the same way they fuel their present cars. GM researchers and engineers believe that the gasoline processor is a key to fuel cell production this decade.

"The gasoline processor could be the bridge between today's conventional vehicles and tomorrow's hydrogen fuel cell vehicles," said Harry J. Pearce, GM Vice Chairman. "While we view hydrogen as the future fuel for automotive applications, we have significant commercial challenges, such as designing and building a large number of hydrogen refueling stations, developing feasible on-board fuel tanks and agreeing to industry-wide specifications."

GM and ExxonMobil said that the results of a three-year collaborative research program has allowed GM and ExxonMobil engineers to design, develop, build and run a gasoline processor that exceeds 80 percent efficiency. By the end of this year, GM will demonstrate in a laboratory an integrated system with an advanced version of this processor and a GM fuel cell stack producing 25 kW.

GM selected the 25 kW system as a learning platform. The 25 kW system begins to approach the overall efficiency requirements for automotive use and will foster development of future automotive and stationary fuel cell systems. Peak fuel cell system efficiency is expected to achieve nearly 40 percent in this early generation design. The system will





**THE WHITE HOUSE**

**Office of the Vice President**

**For Immediate Release**  
**Wednesday, August 2, 2000**

**Contact: James E. Kennedy**  
**(202) 456-7035**

**STATEMENT BY THE VICE PRESIDENT**

I commend General Motors Corporation on its pledge today to improve the fuel efficiency of its full-size pickup trucks and buses. This effort provides further evidence that we can protect our environment even as we create jobs and spur economic growth.

The key hybrid technologies which helped make this breakthrough possible were developed in part under the Partnership for a New Generation of Vehicles (PNGV) program, a public-private partnership we forged with Daimler-Chrysler, General Motors, and Ford to achieve just the sort of progress announced today.

Today's important announcement is the second recent pledge by a major automaker to increase fuel economy partly through technologies developed under PNGV. These technologies will improve gas mileage, reduce our dependence on foreign oil, and create a cleaner environment.

In addition to PNGV, I announced earlier this year a similar effort with major truck manufacturers -- the 21st Century Trucks Initiative -- to improve fuel economy and environmental standards for heavier commercial vehicles. We will work closely with industry leaders to make even more progress.

And we can do more. Unfortunately, Congress has refused to act on our package of consumer tax incentives -- including credits of up to \$4,000 for consumers to purchase the next generation of fuel efficient vehicles. Today, I once again call on Congress to pass these tax incentives and to fully fund a PNGV program that is clearly delivering real benefits for the American people.

###

52342

TO: Peter B.  
FROM: Debbie D.

Per our conversation. Harry Pearce  
would very much like a statement.  
Awaiting your call. D+ trans 313-665-  
3053



GENERAL MOTORS CORPORATION  
300 Renaissance Center, Detroit, Michigan, 48265-3000



**For Release** Wednesday, August 2, 2000, 9:30 a.m.

Contact: Jeff Kuhlman  
(248) 680-5999

## GM to introduce full-size pickup truck with hybrid electric propulsion in 2004

PONTIAC, Mich. – General Motors Corp. will produce a full-size pickup truck featuring a hybrid powertrain beginning in 2004, underscoring GM's intent to remain the nation's fuel-economy leader.

GM's light truck fuel efficiency today is 4 percent better than Ford's.

"It's simple: We lead in truck fuel economy today and General Motors intends to remain the leader in five years," Vice Chairman Harry J. Pearce told reporters at a briefing Wednesday.

Pearce also announced that GM and its Allison Transmission Division will begin delivery this year of a "hybrid" powertrain for transit buses.

"Buses might be the single most important step to reduce transportation emissions for the U.S. or any other country," Pearce said. "There are about 13,000 transit buses in service in the nine largest U.S. cities. If we could replace those buses with ones featuring the GM hybrid system, this country would use nearly 40 million fewer gallons of diesel fuel every year. To put that in context, that is the equivalent fuel savings of 584,000 small cars with hybrid propulsion systems."

The two hybrid powertrains unveiled by GM will meet or exceed the power performance of a conventional powertrain. GM full-size hybrid pickup trucks, versions of the popular Chevrolet Silverado and GMC Sierra, will deliver top performance with nearly 15 percent better fuel economy.

Later this year, GM will begin testing its hybrid pickups in demonstration fleets in several U.S. cities. The demonstration will help GM engineers understand what hybrid vehicle features and performance features are important to pickup truck customers.

**General Motors**  
**Page 2**

The hybrid bus powertrain was designed and developed by GM Allison Transmission Division based in Indianapolis. The GM Allison system will offer 50 percent better fuel economy compared with a conventional diesel-engine transit bus. The system also will cut nitrous oxide emissions by 50 percent, while cutting particulate, hydrocarbon and carbon monoxide emissions by 90 percent, when fueled with low-sulfur fuel.

GM Allison works with transit bus manufacturers who then sell the buses to public and private transit systems. GM Allison also is developing hybrid systems for other commercial vehicles.

"As a manufacturer of motor vehicles, we have a special responsibility," Pearce said. "GM has the global reach, innovative capability and market motivation to develop the technologies that will allow us to minimize our impact on the environment and meet customer demands."

"Hybrid propulsion is just one of the technologies that we can introduce to meet the performance expectations of our customers, yet protect this planet that we all count on to sustain us," Pearce said.

General Motors (NYSE: GM), the world's largest vehicle manufacturer, designs, builds and markets cars and trucks worldwide.

GM is investing aggressively in high technology and e-business within its global automotive operations and through such initiatives as e-GM, GM BuyPower, OnStar and its Hughes Electronics Corp. (NYSE: GMH) subsidiary.

More information on General Motors can be found at [www.gm.com](http://www.gm.com).

# # #

**GOOD MORNING AND THANKS FOR COMING OUT  
HERE.**

**AFTER LAST THURSDAY'S ANNOUNCEMENT AND  
RESULTING COVERAGE OF FORD'S PLANNED  
INCREASE IN ITS SUV FUEL ECONOMY, I ASKED OUR  
COMMUNICATIONS PEOPLE TO GET US TOGETHER  
TO ADD SOME PERSPECTIVE TO THE ISSUE. WHILE  
WE ARE NOT PRONE TO MAKING BOLD CLAIMS,  
CLARIFICATION SEEMS CLEARLY IN ORDER.**

**WHILE I CONGRATULATE FORD ON THEIR  
CONTINUED EFFORTS TO IMPROVE FUEL  
EFFICIENCY, I WANT TO SET THE RECORD STRAIGHT  
AND BE VERY CLEAR:**

- GM LEADS FORD TODAY IN TRUCK FUEL  
ECONOMY— BOTH ON AN AVERAGE AND MODEL-  
BY-MODEL BASIS. INCLUDING SUVS.**

- **GENERAL MOTORS WILL *STILL* BE THE LEADER IN FIVE YEARS. PERIOD.**

**END OF STORY.**

**A FEW SUV MODEL-BY-MODEL COMPARISONS FOR YOUR BENEFIT TODAY:**

- **OUR HEAVY DUTY SUBURBAN IS TWO MILES PER GALLON BETTER THAN EXCURSION. AND OUR HIGHEST VOLUME SUBURBAN IS FOUR MILES PER GALLON BETTER.**
- **OUR YUKON AND TAHOE MODELS ARE A FULL MILE PER GALLON BETTER THAN THE EXPEDITION AND NAVIGATOR.**
- **OUR 4X4 BLAZER IS A HALF-MILE PER GALLON BETTER THAN THE 4X4 FORD EXPLORER/MOUNTAINEER.**
- **OUR CHEVROLET TRACKER DELIVERS 28.6 MPG.**

- **OVERALL, GM LEADS FORD IN SUV FUEL ECONOMY BY OVER 6 PERCENT.**

**WE GOT 'EM BEAT IN SUVS AND THEY KNOW IT. BUT THE STORY IS BIGGER THAN SIMPLY SUVS. YOU REALLY NEED TO ADD IN FULL-SIZE TRUCKS, AS WELL.**

**GENERAL MOTORS IS, ON AVERAGE, 4% BETTER THAN FORD IN LIGHT TRUCK FUEL EFFICIENCY TODAY. THAT INCLUDES FULL-SIZE AND COMPACT LIGHT TRUCKS, MINIVANS, AND ALL SUVS.**

**LOOKING AT IT ANOTHER WAY: IF EVERY OWNER OF A 2000 FORD LIGHT TRUCK WAS DRIVING THE COMPARABLE GM TRUCK (A DELIGHTFUL THOUGHT), AMERICA WOULD SAVE 38 MILLION GALLONS OF FUEL PER YEAR.**

**SO WE LEAD TODAY. WHAT ABOUT TOMORROW?**

**LET ME AGAIN BE VERY CLEAR: GM WILL BE AHEAD  
OF FORD IN FIVE YEARS -- NOT ONLY SUVS, BUT ALL  
LIGHT TRUCKS.**

**YOU CAN TAKE THAT TO THE BANK!**

**WE HAVE TECHNOLOGY DEMONSTRATION VEHICLES  
HERE TODAY THAT WILL BE ON THE ROAD WITHIN  
FIVE YEARS WITH TECHNOLOGIES LIKE**

- **DISPLACEMENT ON DEMAND, WHICH HAS THE  
POTENTIAL TO PROVIDE 6 TO 8 PERCENT  
IMPROVED FUEL ECONOMY ON V-8 VEHICLES,**
- **LIGHTER WEIGHT AND MORE AERODYNAMIC  
MATERIALS AND DESIGNS,**
- **AS WELL AS HYBRID PROPULSION SYSTEMS.**

**THIS IS ONLY A GLIMPSE UNDER THE TENT – IT'S  
CLEARLY NOT EVERYTHING WE HAVE IN THE  
WORKS. THE POINT IS THIS: THESE PROGRAMS ARE  
REAL.**

**TO SHOW YOU HOW SERIOUS WE ARE, TODAY I'M  
ANNOUNCING THAT WE WILL HAVE A HYBRID  
PROPULSION SYSTEM AVAILABLE IN VOLUME  
WITHIN THE NEXT FIVE YEARS IN OUR CHEVROLET  
SILVERADO AND GMC SIERRA FULL-SIZE PICK UP  
TRUCKS. IT'S NOT A GIMMICK. IT'S A PARALLEL  
HYBRID THAT WILL PROVIDE THE SAME CUSTOMER  
PERFORMANCE AS TODAY'S V-8, BUT WILL IMPROVE  
OVERALL EPA FUEL ECONOMY BY 15%.**

**THINK ABOUT THE LOGIC OF THIS FOR A MINUTE:  
WE ARE INTRODUCING THE HYBRID IN THE  
SEGMENT THAT WILL HAVE THE GREATEST IMPACT  
-- BOTH FROM A VOLUME AND A FUEL CONSUMPTION  
STANDPOINT. IT'S A SIGNIFICANT MOVE AND ONE  
THAT WILL PROVIDE CONTINUING BENEFITS TO OUR  
CUSTOMERS AND TO THE ENVIRONMENT.**

**AND BEYOND OUR CORE AUTOMOTIVE BUSINESS, WE  
HAVE A HYBRID BUS THAT DELIVERS SIGNIFICANT  
REDUCTIONS IN EMISSIONS AND FUEL  
CONSUMPTION. THIS BUS WILL GENERATE A 50  
PERCENT FUEL ECONOMY IMPROVEMENT OVER  
TRADITIONAL DIESEL BUSES. IT WILL FURTHER  
REDUCE PARTICULATES, HYDROCARBONS, CO BY 90  
PERCENT AND NOX BY 50 PERCENT. WE WILL  
DELIVER THE FIRST OF THESE SERIES HYBRIDS IN  
THE U.S. IN OCTOBER OF THIS YEAR. WE ARE  
TALKING TO MANY OTHER LOCAL GOVERNMENTS  
GLOBALLY.**

**WHAT I'M TALKING ABOUT TODAY IS A  
COMMITMENT BY GENERAL MOTORS TO  
MAINTAINING ITS LEADERSHIP POSITION IN  
ENVIRONMENTALLY RESPONSIBLE FUEL  
EFFICIENCY.**

**THIS IS NOT ABOUT PR CAMPAIGNS – IT'S ABOUT  
PROVIDING REAL CUSTOMER BENEFIT AND REAL  
REDUCTION IN FOSSIL FUEL CONSUMPTION.  
GM PRODUCTS ARE COMPATIBLE WITH  
ENVIRONMENTAL RESPONSIBILITY IN EVERY  
REGION OF THE WORLD WHERE THEY ARE USED.**

**AND IT'S ABOUT BEING THE LEADER IN DELIVERING  
THAT COMMITMENT.**

**WE ALL KNOW CAFE IS A FLAWED POLICY. WE ARE  
AGGRESSIVELY PURSUING THESE FUEL EFFICIENCY  
GAINS ... AND GM WILL LEAD THE INDUSTRY IN THIS  
EFFORT.**

**NOW, LET'S GO DRIVE SOME VEHICLES. I'LL BE  
AROUND TO ANSWER YOUR QUESTIONS OUT HERE  
AND TOM STEPHENS AND SEVERAL TECHNOLOGY  
EXPERTS WILL BE WITH US, AS WELL.**

**THANK YOU.**

\* \* \*

*Rev. 8/2/00, 7:30 a.m.*

*"speeches/fuel economy remarks.doc"*



David Gardiner

07/28/2000 04:46:15 PM



Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP

cc:

Subject: Re: PNGV 

Good memo. I hadn't realized that the PNGV goal was set at the default level for Tier 2, which is a lot higher than Tier 2 (10 times worse than Bin 2). That means that the research program is not keeping pace with its goal of meeting clean air regulatory requirements. It's also interesting that the DOE-only research goal is already at Bin 3 for the future. I'm surprised that Reicher didn't mention the importance of setting a deadline for establishing a goal. When I talked to him last, he thought that was very important. By the way, I spoke to Shirley Neff about this and I would say that she wouldn't rule out something in conference either.

- Can we/DOE unilaterally announce something? what?
- Get Debbie into this loop.
- What conference language could we live with?

Note for: Roger Ballentine  
From: Dan W. Reicher  
Subj: PNGV Emissions Goals

Roger: Here are a few thoughts about actions which can be/are being taken regarding PNGV emissions goals and how to engage the environmental community more effectively.

- 1) The PNGV research goal for particulate emissions is currently set at the most stringent (Bin 2, equivalent to California SULEV) requirement other than zero emissions. The NOx research target remains at the default Tier 2 level. The "default" level was agreed on shortly after the PNGV was created; the level was defined by Clean Air Act legislation, pending publication of a rule by EPA. EPA's final rule on vehicle emissions was published on December 21, 1999. The different NOx standards, for example, are as follows:
  - A. Default Tier 2: 0.2 grams per mile (g/m)
  - B. Bin 5 of EPA rule: 0.07 g/m
  - C. Bin 3 of EPA rule: 0.03 g/m
  - D. Bin 2 of EPA rule: 0.02 g/m
- 2) In accordance with the decision reached at the June 23 Operational Steering Group (OSG) meeting, a study group has been formed to address the issue of revising PNGV emissions research goals; this group met for the first time on July 20, 2000. Prior to the next OSG meeting (November 29, 2000) this government/industry group will recommend revisions to the PNGV emissions research target and a technical strategy from now until 2004, and beyond.
- 3) In contrast with the PNGV emissions goals which have been agreed to by the PNGV partners, the research targets for our Department of Energy technology program (the major contributor to PNGV research funding) are already set at the middle bin of Tier 2 emissions standards (Bin 5) for 2004, and Bin 3 for 2007. Bin 3 happens to be the level recommended by the environmental community's representatives in their proposed language for addition to the House/Senate Conference on Interior and Related Agencies Appropriations.
- 4) We believe we could address our issues with some of the environmental organizations (e.g., Union of Concerned Scientists and Natural Resources Defense Council) by

supporting its proposed Conference language, including the specific Bin 3 emissions goal for PNGV research. Ideally, we could convince our partners in the automotive industry to join us in that support (which could take some high-level arm-twisting), but whether they do or not, it would be the right thing to do. We can't speak for the entire Partnership, but as a minimum, the Administration could send a signal that it will not resist such "common-sense" language. Frankly, the Partnership should have publicly embraced more aggressive emissions targets long ago, and we wouldn't be in this pickle with the environmental community.

*ride*

- 5) We are in the early stages of planning a dialogue with the auto manufacturers, government representatives and representatives of the environmental and consumer advocate community. We intend this to take place during September, and are designing it to improve understanding of PNGV – what it is and what it isn't – and to provide a forum to hear and candidly discuss the concerns of stakeholders, particularly the environmental community. We have identified a professional facilitator who is accepted as a neutral party by all involved.

**DAIMLERCHRYSLER**

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**INTRANET****Market launch of First Fuel Cell Vehicles from DaimlerChrysler in Two Years****NEWS**

- Jürgen Schrempp calls engineers to action worldwide
- Securing future energy supplies is a pressing problem for mankind

**Hanover/Stuttgart, June 19, 2000**

In just two years, DaimlerChrysler will become the world's first automaker to launch fuel cell vehicles on the market. That is the scheduled delivery date for new city buses equipped with fuel cell drives. In the same year, DaimlerChrysler's plant in Tuscaloosa, Alabama will start drawing power from a stationary fuel cell manufactured by the company's subsidiary MTU Friedrichshafen. And the first fuel cell passenger cars will be ready to roll another two years after that. These announcements were made by Jürgen E. Schrempp, chairman of the DaimlerChrysler Board of Management, at World Engineers Day in Hanover on June 19, 2000.

Schrempp views the fuel cell as the most promising of all alternative drive systems. "The fuel cell boasts efficiency levels greater than those offered by the combustion engine. It can be used in both mobile and stationary applications, can run on regenerative fuels and has the potential to become the drive of the future," he said. The company intends to invest around one billion dollars in the development of this drive between now and 2004.

In Schrempp's opinion, the energy issue is one of the central challenges facing humanity, for the simple reason that energy offers the chance of simultaneously providing the solution to other problems. As examples, he cited water, adequate quantities of which can be produced by desalination of sea water (but only through the input of energy), as well as hunger and protection of the environment and the climate.

Schrempp quoted neutral observers, who have predicted a growing demand for fossil fuels in the coming years, leading to continued increases in the price of oil. This would give rise to the danger that energy could become a luxury item for the prosperous, deepening the division between rich and poor in the world.

Schrempp called on the roughly 3,300 participants at World Engineers Day in Hanover and on engineers around the globe to organize themselves using the Internet. In this way, he said, they would be able to work on securing future supplies of energy without regard to national boundaries. In his speech, Schrempp also dealt extensively with the current discussion, particularly in the U.S., on the dangers inherent in technological progress. One of the leading promoters of this discussion is Bill Joy, chief engineer of the U.S. software company Sun Microsystems.

Schrempp pointed out that the estimation of future developments should not be conducted on the basis of what will happen, but on the basis of what can happen. "The decisive factor is that one is well prepared and able to react quickly to events," he said. He

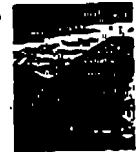
- Full Version Speech by Jürgen E.



First Fuel Cell Customers dbb and She Processor



NECAR 4 in Munich Airport Innovation 1999



Award for NE

- California Fu Partnership
- DaimlerChry: NECAR 4 in

- News
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World Engine Convention

|                   |                    |           |              |
|-------------------|--------------------|-----------|--------------|
| Post-it® Fax Note | 7671               | Date 6/20 | # of pages 2 |
| To                | Murphy Manning and | From      | Tim A. Bruch |
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| Fax #             | 456-2830           | Fax #     |              |

Weekly

distanced himself from the "two-camp theory" as represented by the dispute between euphoric optimists and apocalyptic pessimists. Schrempp categorically pointed to the ability of human beings and the ethically guided will of engineers to tackle the problems of the coming decades in a manner that benefits human beings and the environment.



Provided by DCIntranet Team last update: June 19, 2000

**White House Climate Change Task Force**

734 Jackson Place, N.W. • Washington, DC 20503

**FACSIMILE TRANSMISSION SHEET**

|                      |       |                      |          |
|----------------------|-------|----------------------|----------|
| <b>To</b>            | ROGER | <b>From</b>          | DAVID    |
| <b>Office</b>        |       | <b>Date</b>          |          |
| <b>Fax Number</b>    |       | <b>Fax Number</b>    | 395-2311 |
| <b>Office Number</b> |       | <b>Office Number</b> | 395-2310 |

**Comments:**

PNGV \$ BY STATE  
FROM DOE

**Pages:** \_\_\_\_\_, including this cover sheet.**IF TRANSMITTAL IS INCOMPLETE, PLEASE PHONE**

## FY 2000 CAAT PNGV Projects by State

Note: N/A indicates that exact subcontractor values are not available at this time. Most of these are subcontractors to the USAMP. Funds are provided to USAMP and then subcontracted throughout the country.

| State | Project Description                                                 | Company                                | Prime<br>Sub | FY1999<br>Funding | FY1999<br>Funding | FY2000<br>Funding     | City              | District    |
|-------|---------------------------------------------------------------------|----------------------------------------|--------------|-------------------|-------------------|-----------------------|-------------------|-------------|
| AL    | C-1 Research                                                        | Auburn University                      | Sub          |                   | \$0               | \$0 N/A               | Auburn University |             |
|       | Lightweight Vehicle Materials USAMP Cooperative Agreement           | Johnson Industries                     | Sub          | \$0               |                   | \$0 N/A               | Vadley            |             |
|       | Total Funds for AL                                                  |                                        |              | \$0               |                   | \$0 N/A               |                   |             |
| CA    | GATE DOE Fuel Cell Vehicle                                          | University of California - Davis       | Prime        | \$0               | \$0               | \$80,000 Davis        | CA-03             |             |
|       | GATE Hybrid Electric Power Train and Control Strategies             | University of California - Davis       | Prime        | \$0               | \$0               | \$80,000 Davis        | CA-03             |             |
|       | Lightweight Vehicle Materials USAMP Cooperative Agreement           | University of California - Davis       | Sub          | \$0               | \$0 N/A           |                       | Davis             | CA-03       |
|       |                                                                     |                                        |              | \$0               | \$0               | \$180,000             |                   | CA-03 Total |
|       | Electrode Kinetics & Electroanalysis                                | Lawrence Berkeley National Laboratory  | Prime        | \$490,000         | \$600,000         | \$500,000 Berkeley    | CA-09             |             |
|       | Electrochemistry Diagnostic Support Advanced Technology Development | Lawrence Berkeley National Laboratory  | Prime        | \$0               | \$250,000         | \$850,000 Berkeley    | CA-09             |             |
|       | Gen 3 Electrochemistry Improvement Advanced Technology Development  | Lawrence Berkeley National Laboratory  | Prime        | \$0               | \$0               | \$180,000 Berkeley    | CA-09             |             |
|       | NDE Techniques for Adhesive Joints                                  | Lawrence Berkeley National Laboratory  | Prime        | \$200,000         | \$280,000         | \$400,000 Berkeley    | CA-09             |             |
|       | Single Cylinder Diesel Fuel Testing                                 | Sandia National Laboratory (CA)        | Prime        | \$650,000         | \$1,110,000       | \$1,510,000           |                   | CA-09 Total |
|       | Modeling of Diesel Fuels and Blends                                 | Lawrence Livermore National Laboratory | Prime        | \$0               | \$200,000         | \$300,000 Livermore   | CA-10             |             |
|       | Oxygenate Assessment                                                | Lawrence Livermore National Laboratory | Prime        | \$0               | \$0               | \$250,000 Livermore   | CA-10             |             |
|       | Advanced Combustion Engine R&D                                      | Sandia National Laboratory (CA)        | Prime        | \$2,130,000       | \$7,325,000       | \$1,321,000 Livermore | CA-10             |             |
|       | High Power Battery Development                                      | PayStar, Inc                           | Sub          | \$324,000         | \$975,000         | \$1,181,000 Dublin    | CA-10             |             |
|       | Nanotechnology Multilayer Materials for Coatings                    | Lawrence Livermore National Laboratory | Prime        | \$120,000         | \$1,000,000       | \$50,000 Livermore    | CA-10             |             |
|       | Design and Product Optimization for Cast Light Metals               | Lawrence Livermore National Laboratory | Sub          | \$0               | \$0 N/A           |                       | Livermore         | CA-10       |
|       | Intelligent Induction Hardening                                     | Sandia National Laboratory (CA)        | Prime        | \$400,000         | \$360,000         | \$450,000 Livermore   | CA-10             |             |
|       | Composite Master of Crash Modeling                                  | Lawrence Livermore National Laboratory | Prime        | \$800,000         | \$800,000         | \$520,000 Livermore   | CA-10             |             |
|       | SIDI Combustion R&D                                                 | Sandia National Laboratory (CA)        | Prime        | \$0               | \$425,000         | \$150,000 Livermore   | CA-10             |             |
|       | Exhaust Gas Sensors CRADA                                           | Lawrence Livermore National Laboratory | Prime        | \$400,000         | \$100,000         | \$100,000 Livermore   | CA-10             |             |
|       | University Combustion R&D                                           | Sandia National Laboratory (CA)        | Prime        | \$0               | \$0               | \$0 Livermore         | CA-10             |             |
|       | SIDI Injector Deposit Study                                         | Sandia National Laboratory (CA)        | Prime        | \$0               | \$400,000         | \$400,000 Livermore   | CA-10             |             |
|       | NOx Sensor Development                                              | Lawrence Livermore National Laboratory | Prime        | \$0               | \$200,000         | \$400,000 Livermore   | CA-10             |             |
|       | PM Diagnostic Development                                           | Sandia National Laboratory (CA)        | Prime        | \$0               | \$0               | \$125,000 Livermore   | CA-10             |             |
|       | Flash Reinforced Composites                                         | Electric Power Research Institute      | Prime        | \$4,382,000       | \$8,625,000       | \$6,147,000           |                   | CA-10 Total |
|       |                                                                     |                                        |              | \$100,000         | \$100,000         | \$120,000 Palo Alto   | CA-14             |             |
|       |                                                                     |                                        |              | \$100,000         | \$100,000         | \$120,000             |                   | CA-14 Total |
|       | Boosted Turbo Compressor (w/ Gas Bearings)                          | Merul                                  | Prime        | \$228,000         | \$21,000          | \$25,000 Santa Monica | CA-29             |             |
|       |                                                                     |                                        |              | \$228,000         | \$21,000          | \$25,000              |                   | CA-29 Total |

787 Torrance CA-36

731 Torrance CA-38

877 Torrance CA-38

100 Torrance CA-36

100 Torrance CA-36

900 CA-36 Total

00 Mountain View

Glendale

Santa Clara

Stockton

10 San Diego

10

10 Aurora CO-01

10 CO-01 Total

0 Boulder CO-02

0 CO-02 Total

0 Golden CO-08

1 Golden CO-08

1 Golden CO-08

1 Golden CO-08

1 Golden CO-08

Golden CO-05

Golden CO-08

Golden CO-08

Golden CO-08

Golden CO-08

Golden CO-05

Golden CO-05

Golden CO-05

Golden CO-08

Golden CO-08

|                                                                                 |                                      |       |                    |                    |                    |                  |               |
|---------------------------------------------------------------------------------|--------------------------------------|-------|--------------------|--------------------|--------------------|------------------|---------------|
| Advanced Vehicle Modeling/Evaluation: PNGV Support/ Optimization                | National Renewable Energy Laboratory | Prime | \$0                | \$0                | \$75,000           | Golden           | CO-06         |
| Advanced Vehicle Modeling/Evaluation: PNGV Support/ Integration of Other Models | National Renewable Energy Laboratory | Prime | \$0                | \$0                | \$150,000          | Golden           | CO-06         |
| Advanced Vehicle Modeling/Evaluation: PNGV Support/ Customer                    | National Renewable Energy Laboratory | Prime | \$0                | \$0                | \$100,000          | Golden           | CO-06         |
| Hybrid Propulsion Systems Program: Technical Management Program                 | National Renewable Energy Laboratory | Prime | \$0                | \$424,000          | \$361,000          | Golden           | CO-06         |
| Conversion Options and VHS Development                                          | National Renewable Energy Laboratory | Prime | \$0                | \$123,000          | \$58,000           | Golden           | CO-06         |
| Low Cost Carbon Fiber - Cornerstone Technologies/MSU                            | Cornerstone Technologies, Inc.       | Prime | \$500,000          | \$2,070,000        | \$537,000          |                  | CO-06 Total   |
| Virtual Tool for Hybrid and Fuel Cell Configurations                            | Vandegriff Research and Development  | Sub   | \$0                | \$300,000          | \$300,000          | Littleton        |               |
| Systems Development                                                             | Unique Mobility                      | Sub   | \$0                | \$0                | \$150,000          | Colorado Springs |               |
| <b>Total Funds for CO</b>                                                       |                                      |       | <b>17,000</b>      | <b>\$0</b>         | <b>\$0</b>         | <b>\$0</b>       | <b>Golden</b> |
| <b>CT</b>                                                                       |                                      |       | <b>\$2,099,100</b> | <b>\$3,199,000</b> | <b>\$4,800,000</b> |                  |               |

|                                            |                               |       |            |                    |                    |               |                    |
|--------------------------------------------|-------------------------------|-------|------------|--------------------|--------------------|---------------|--------------------|
| Integrated Power System for Transportation | International Fuel Cells /UTC | Prime | \$0        | \$1,000,000        | \$1,200,000        | South Windsor | CT-01              |
| Integrated Power System for Transportation | International Fuel Cells /UTC | Prime | \$0        | \$0                | \$1,870,000        | South Windsor | CT-01              |
| Integrated Power System for Transportation | International Fuel Cells /UTC | Prime | \$0        | \$0                | \$1,800,000        | South Windsor | CT-01              |
| <b>Total Funds for CT</b>                  |                               |       | <b>\$0</b> | <b>\$1,070,000</b> | <b>\$4,800,000</b> |               | <b>CT-01 Total</b> |
| <b>DC</b>                                  |                               |       | <b>\$0</b> | <b>\$1,000,000</b> | <b>\$4,800,000</b> |               |                    |

|                                 |                                  |       |                  |                  |                 |                 |             |
|---------------------------------|----------------------------------|-------|------------------|------------------|-----------------|-----------------|-------------|
| C-1 Research                    | US DOE - Office of Fossil Energy | Prime | \$0              | \$100,000        | \$0             | Washington      | DC-01       |
| Assessment of Development Needs | US Army                          | Prime | \$0              | \$100,000        | \$0             |                 | DC-01 Total |
| <b>Total Funds for DC</b>       |                                  |       | <b>\$100,000</b> | <b>\$175,000</b> | <b>\$80,000</b> | <b>\$80,000</b> |             |

|                                                                                                 |                       |       |                    |                    |                  |                 |             |
|-------------------------------------------------------------------------------------------------|-----------------------|-------|--------------------|--------------------|------------------|-----------------|-------------|
| <b>FL</b>                                                                                       |                       |       |                    |                    |                  |                 |             |
| Development of Composite Bipolar Plates & Advanced Reformate Fuel Cell Stack Design             | Energy Partners, Inc. | Prime | \$0                | \$0                | \$90,311         | West Palm Beach | FL-23       |
| Development of Composite Bipolar Plates & Advanced Reformate Fuel Cell Stack Design             | Energy Partners, Inc. | Prime | \$2,320,000        | \$1,755,000        | \$402,177        | West Palm Beach | FL-23       |
| Dev. of Adv. Low-cost PEM Fuel Cell Stack & System                                              | Energy Partners, Inc. | Prime | \$0                | \$0                | \$93,311         | West Palm Beach | FL-23       |
| New Millennium Fuel Processor for Transportation Fuel Cell Power System                         | Energy Partners, Inc. | Sub   | \$0                | \$0                | N/A              | West Palm Beach | FL-23       |
| Next Millennium Fuel Processor for Transportation Fuel Cell Power System                        | Energy Partners, Inc. | Sub   | \$0                | \$0                | N/A              | West Palm Beach | FL-23       |
| High Performance Matching PEM Fuel Cell Components and Integrated Pilot Manufacturing Processes | Energy Partners, Inc. | Sub   | \$0                | \$0                | N/A              | West Palm Beach | FL-23       |
| Integrated Vehicles Materials USA/Up Cooperative Agreement                                      | Envek, Inc.           | Sub   | \$2,320,000        | \$1,755,000        | \$500,799        |                 | FL-23 Total |
| <b>Total Funds for FL</b>                                                                       |                       |       | <b>\$2,320,000</b> | <b>\$1,755,000</b> | <b>\$500,799</b> | <b>\$0</b>      |             |

GA

|                                                             |                      |     |     |     |     |            |  |
|-------------------------------------------------------------|----------------------|-----|-----|-----|-----|------------|--|
| Lightweight Vehicles Materials USA/Up Cooperative Agreement | Amoco Polymers, Inc. | Sub | \$0 | \$0 | N/A | Alpharetta |  |
|-------------------------------------------------------------|----------------------|-----|-----|-----|-----|------------|--|

FX 2000

|                                                                                   |                                                            |       |             |             |                       |             |
|-----------------------------------------------------------------------------------|------------------------------------------------------------|-------|-------------|-------------|-----------------------|-------------|
| Lightweight Vehicles Materials USAM <sup>2</sup><br>Cooperative Agreement         | Tension Automotive                                         | Sub   | \$0         | \$0 N/A     | Americus              |             |
| NOx Treatment System Evaluation                                                   | The Coordinating Research Council                          | Prime | \$0         | \$0         | 1238 000 Atlanta      |             |
| <b>Total Funds for GA</b>                                                         |                                                            |       | \$0         | \$0         | \$168,000             |             |
| <b>IA</b>                                                                         |                                                            |       |             |             |                       |             |
| Powder Metallurgy Particulate Reinforced<br>Aluminum                              | Ames National Laboratory                                   | Sub   | \$0         | \$0 N/A     | Ames                  | IA-03       |
| Semi-solid Aluminum Forming                                                       | North Iowa Die Casting                                     | Sub   | \$0         | \$0         | \$0                   | IA-03 Total |
| <b>Total Funds for IA</b>                                                         |                                                            |       | \$0         | \$0 N/A     | Lake Park             |             |
| <b>ID</b>                                                                         |                                                            |       |             |             |                       |             |
| High Power Battery Development                                                    | Idaho National Engineering and<br>Environmental Laboratory | Sub   | \$124,000   | \$180,000   | \$124,000 Idaho Falls | ID-02       |
| Gen 2 Cell Development and Evaluation<br>Advanced Technology Development          | Idaho National Engineering and<br>Environmental Laboratory | Prime | \$0         | \$670,000   | \$640,000 Idaho Falls | ID-02       |
| High Power Test Procedures, Testing<br>Evaluation, and O&M Support                | Idaho National Engineering and<br>Environmental Laboratory | Prime | \$400,000   | \$590,000   | \$580,000 Idaho Falls | ID-02       |
| Active Testing of High Power Cells and Modules                                    | Idaho National Engineering and<br>Environmental Laboratory | Prime | \$0         | \$120,000   | \$100,000 Idaho Falls | ID-02       |
| PMGV Systems Analysis Program: Battery Test<br>and Modeling                       | Idaho National Engineering and<br>Environmental Laboratory | Prime | \$0         | \$290,000   | \$270,000 Idaho Falls | ID-02       |
| PMGV Systems Analysis Program: PSAT<br>Optimization                               | Idaho National Engineering and<br>Environmental Laboratory | Prime | \$0         | \$0         | \$40,000 Idaho Falls  | ID-02       |
| <b>Total Funds for ID</b>                                                         |                                                            |       | \$524,000   | \$1,190,000 | \$1,514,000           | ID-02 Total |
|                                                                                   |                                                            |       | \$524,000   | \$1,190,000 | \$1,514,000           |             |
| <b>IL</b>                                                                         |                                                            |       |             |             |                       |             |
| Development of 110kW Bipolar Separator Plate                                      | Institute of Gas Technology                                | Prime | \$630,000   | \$1,820,000 | \$460,000 Oak Park    | IL-06       |
| CARAT: Development of Low Cost CO & H <sub>2</sub><br>Sensors                     | Institute of Gas Technology                                | Prime | \$830,000   | \$1,820,000 | \$460,000             | IL-06 Total |
|                                                                                   |                                                            |       | \$100,000   | \$48,998    | \$30,000 Chicago      | IL-07       |
| Effects of Fuel Constituents on Catalytic Low<br>Temperature Fuel Process         | Argonne National Laboratory                                | Prime | \$0         | \$24,000    | \$200,000 Argonne     | IL-13       |
| CO & Sulfur Removal from Reformate                                                | Argonne National Laboratory                                | Prime | \$0         | \$450,000   | \$200,000 Argonne     | IL-13       |
| Low-Cost, High-Energy-Product Permanent<br>Magnets                                | Argonne National Laboratory                                | Prime | \$0         | \$375,000   | \$200,000 Argonne     | IL-13       |
| Ultra-low Friction Coatings for CVDs                                              | Argonne National Laboratory                                | Prime | \$0         | \$150,000   | \$150,000 Argonne     | IL-13       |
| Ultra-Low Friction Coatings for Fuel Cell<br>Compressors                          | Argonne National Laboratory                                | Prime | \$0         | \$175,000   | \$175,000 Argonne     | IL-13       |
| Application of Nanomaterials to Advanced<br>Automotive Thermal Management Systems | Argonne National Laboratory                                | Prime | \$0         | \$30,000    | \$75,000 Argonne      | IL-13       |
| Engine Combustion and Emission R&D                                                | Argonne National Laboratory                                | Prime | \$978,000   | \$2,220,000 | \$400,000 Argonne     | IL-13       |
| Engine Combustion and Emission R&D                                                | Argonne National Laboratory                                | Prime | \$0         | \$0         | \$150,000 Argonne     | IL-13       |
| Fuel Cells for Transportation Program - Systems                                   | Argonne National Laboratory                                | Prime | \$3,815,000 | \$4,635,000 | \$825,000 Argonne     | IL-13       |
| Fuel Cells for Transportation Program - Stack<br>Subsystem Components             | Argonne National Laboratory                                | Prime | \$0         | \$0         | \$162,688 Argonne     | IL-13       |
| Fuel Cells for Transportation - Fuel Processor/<br>Storage                        | Argonne National Laboratory                                | Prime | \$0         | \$0         | \$2,775,000 Argonne   | IL-13       |
| Gen 2 Cell Development and Evaluation<br>Advanced Technology Development          | Argonne National Laboratory                                | Prime | \$1,170,000 | \$600,000   | \$789,000 Argonne     | IL-13       |
| Electrochemistry Diagnostic Support Advanced<br>Technology Development            | Argonne National Laboratory                                | Prime | \$0         | \$150,000   | \$650,000 Argonne     | IL-13       |

|                                                                                                                    |                                    |       |             |              |              |             |       |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------|-------|-------------|--------------|--------------|-------------|-------|
| Gen 3 Electrochemistry Improvement Advanced Technology Development                                                 | Argonne National Laboratory        | Prime | \$250,000   | \$752,000    | \$522,000    | Argonne     | IL-13 |
| Low-Cost Packaging Advanced Technology Development                                                                 | Argonne National Laboratory        | Prime | \$0         | \$280,000    | \$700,000    | Argonne     | IL-13 |
| Advanced Process Research Advanced Technology Development                                                          | Argonne National Laboratory        | Prime | \$0         | \$0          | \$482,000    | Argonne     | IL-13 |
| Technical Program Management                                                                                       | Argonne National Laboratory        | Prime | \$0         | \$183,000    | \$183,000    | Argonne     | IL-13 |
| High Power Test Procedures Testing Evaluation and PNGV Support                                                     | Argonne National Laboratory        | Prime | \$45,000    | \$175,000    | \$400,000    | Argonne     | IL-13 |
| Energy Research Summer Fellowship                                                                                  | US DOE - Chicago Operations Office | Prime | \$10,000    | \$15,000     | \$15,000     | Argonne     | IL-13 |
| High Power Capacitor for Electronic Packaging                                                                      | Argonne National Laboratory        | Prime | \$300,000   | \$300,000    | \$350,000    | Argonne     | IL-13 |
| Semi-solid Aluminum Forming                                                                                        | Kalghat & Packer, Co               | Sub   | \$0         | \$0          | N/A          | Naperville  | IL-13 |
| Die Casting Die Life Extension                                                                                     | Argonne National Laboratory        | Sub   | \$0         | \$0          | N/A          | Argonne     | IL-13 |
| Automotive Materials Recycling                                                                                     | Argonne National Laboratory        | Prime | \$0         | \$175,000    | \$150,000    | Argonne     | IL-13 |
| Recycling of Polymer Matrix Composites                                                                             | Argonne National Laboratory        | Prime | \$0         | \$375,000    | \$225,000    | Argonne     | IL-13 |
| Recycling Program Field Technical Management                                                                       | Argonne National Laboratory        | Prime | \$0         | \$0          | \$150,000    | Argonne     | IL-13 |
| Exhaust Gas Sensors CRADA                                                                                          | Argonne National Laboratory        | Prime | \$350,000   | \$350,000    | \$350,000    | Argonne     | IL-13 |
| Wear Frictionless Coatings                                                                                         | Argonne National Laboratory        | Prime | \$0         | \$150,000    | \$200,000    | Argonne     | IL-13 |
| Fuel Spray Study                                                                                                   | Argonne National Laboratory        | Prime | \$0         | \$200,000    | \$200,000    | Argonne     | IL-13 |
| VCR Engine Assessment                                                                                              | Argonne National Laboratory        | Prime | \$0         | \$541,000    | \$80,000     | Argonne     | IL-13 |
| PNGV Systems Analysis DOE/USCAR: Modeling of Exhaust Emissions Control Devices                                     | Argonne National Laboratory        | Prime | \$0         | \$0          | \$0          | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: New Equipment Installation                                                      | Argonne National Laboratory        | Prime | \$0         | \$0          | \$1,100,000  | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Engine Mapping                                                                  | Argonne National Laboratory        | Prime | \$0         | \$0          | \$450,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Other Component Testing                                                         | Argonne National Laboratory        | Prime | \$0         | \$0          | \$320,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Vehicle Testing                                                                 | Argonne National Laboratory        | Prime | \$0         | \$0          | \$175,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Advanced Controls Testing and Modeling/Model Development & Support              | Argonne National Laboratory        | Prime | \$0         | \$0          | \$500,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Advanced Controls Testing and Modeling/Model Development & Support              | Argonne National Laboratory        | Prime | \$0         | \$0          | \$240,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Advanced Controls Testing and Modeling/Hardware-In-the-Loop Testing             | Argonne National Laboratory        | Prime | \$0         | \$0          | \$300,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Advanced Controls Testing and Modeling/SAT Model Maintenance & Customer Support | Argonne National Laboratory        | Prime | \$0         | \$0          | \$585,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Advanced Controls Testing and Modeling/Assistance to NREL                       | Argonne National Laboratory        | Prime | \$0         | \$0          | \$175,000    | Argonne     | IL-13 |
| Advanced Powertrain Test Facility: Focus Project                                                                   | Argonne National Laboratory        | Prime | \$0         | \$0          | \$150,000    | Argonne     | IL-13 |
| Design and Product Optimization for Cast Light Metals                                                              | American Foundrymen's Society      | Sub   | \$8,808,600 | \$12,894,000 | \$14,823,888 | IL-13 Total |       |
| Total Funds for IL                                                                                                 |                                    |       | \$0         | \$0          | N/A          | Des Plaines |       |
|                                                                                                                    |                                    |       | \$7,898,400 | \$14,893,000 | \$13,733,888 |             |       |
| R&D for CID Engines & Aftertreatment Subsystems                                                                    | Cummins Engine Company             | Prime | \$0         | \$1,200,000  | \$2,350,000  | Columbus    | IN-02 |
|                                                                                                                    |                                    |       | \$0         | \$1,200,000  | \$2,350,000  | IN-02 Total |       |

IN

|                                                                          |                                       |       |             |             |             |              |             |       |
|--------------------------------------------------------------------------|---------------------------------------|-------|-------------|-------------|-------------|--------------|-------------|-------|
| Direct Injection System Development                                      | Delphi Electronics                    | Prime | \$0         | \$1,700,000 | \$800,000   | Kokomo       | IN-05       | Total |
| Virtual Tool for Hybrid and Fuel Cell Configurations                     | Delphi Electronics                    | Sub   | \$0         | \$0         | \$200,000   | Kokomo       | IN-05       |       |
| Automotive Electric Motor Drive (AEMD)                                   | Delphi Electronics                    | Sub   | \$0         | \$0 N/A     |             | Kokomo       | IN-05       |       |
| Automotive Electric Motor Drive (AEMD)                                   | Visual Computing Systems              | Sub   | \$0         | \$1,200,000 | \$7,100,000 |              | IN-06 Total |       |
| Motor Development                                                        | Delphi Automotive Systems             | Prime | \$0         | \$0         | \$0         | Greenville   | IN-09       |       |
| Motor Development                                                        | Delphi Automotive Systems             | Prime | \$0         | \$500,000   | \$625,000   | Indianapolis | IN-09 Total |       |
| Automotive Electric Motor Drive (AEMD)                                   | Lynx Motor Technologies               | Prime | \$0         | \$500,000   | \$625,000   | New Albany   | IN-10       |       |
| Automotive Electric Motor Drive (AEMD)                                   | Electricore                           | Prime | \$0         | \$0         | \$500,000   | Indianapolis | IN-10 Total |       |
| Automotive Electric Motor Drive (AEMD)                                   | Lynx Motor Technologies               | Sub   | \$0         | \$0 N/A     |             | New Albany   |             |       |
| Automotive Electric Motor Drive (AEMD)                                   | Delco Army International              | Sub   | \$0         | \$0 N/A     |             | Anderson     |             |       |
| Total Funds for IN                                                       |                                       |       | \$0         | \$1,400,000 | \$8,325,000 |              |             |       |
| KY                                                                       |                                       |       |             |             |             |              |             |       |
| Low Cost Aluminum Alloy Sheet                                            | Commonwealth Aluminum Company         | Sub   | \$0         | \$0 N/A     |             | Louisville   | KY-03       | Total |
| Cell Research                                                            | University of Kentucky                | Sub   | \$0         | \$0         | \$0         |              | KY-03 Total |       |
| Total Funds for KY                                                       |                                       |       | \$0         | \$0 N/A     |             | Louisville   |             |       |
| LA                                                                       |                                       |       |             |             |             |              |             |       |
| Multi-Fuel Processor for Fuel Cell Electric Vehicle Applications         | McDermott Technologies, Inc.          | Prime | \$0         | \$400,000   | \$750,000   | New Orleans  |             | Total |
| Total Funds for LA                                                       |                                       |       | \$0         | \$400,000   | \$750,000   |              |             |       |
| MA                                                                       |                                       |       |             |             |             |              |             |       |
| Layered Bipolar Plant for PEM Stacks                                     | Electrochem, Inc.                     | Prime | \$0         | \$0         | \$100,000   | Woburn       | MA-07       | Total |
| Integrated Power System for Transportation                               | EPYX                                  | Sub   | \$1,540,000 | \$2,500,000 | \$550,249   | Cambridge    | MA-08       |       |
| Integrated Power System for Transportation                               | EPYX                                  | Sub   | \$0         | \$0         | \$329,715   | Cambridge    | MA-09       |       |
| Integrated Power System for Transportation                               | EPYX                                  | Sub   | \$0         | \$0         | \$278,878   | Cambridge    | MA-09       | Total |
| Development of Second Generation Solid Compressor/Expander               | Arthur D. Little                      | Prime | \$511,000   | \$0         | \$40,300    | Cambridge    | MA-09       |       |
| Next Millennium Fuel Processor for Transportation Fuel Cell Power System | EPYX                                  | Prime | \$0         | \$800,000   | \$1,700,000 | Cambridge    | MA-09       |       |
| Next Millennium Fuel Processor for Transportation Fuel Cell Power System | EPYX                                  | Prime | \$0         | \$0         | \$300,000   | Cambridge    | MA-09       | Total |
| Cost Analysis of Fuel Cell Stack Systems                                 | Arthur D. Little                      | Prime | \$0         | \$219,000   | \$209,000   | Cambridge    | MA-09       |       |
| APEM Development / Station                                               | SatCon Technology Corporation         | Prime | \$0         | \$1,165,000 | \$1,265,000 | Cambridge    | MA-09       |       |
| APEM Development                                                         | SatCon Technology Corporation         | Prime | \$0         | \$0         | \$47,000    | Cambridge    | MA-09       | Total |
| Virtual Tool for Hybrid and Fuel Cell Configurations                     | Parametric Technology Corporation     | Prime | \$2,051,000 | \$4,895,000 | \$4,672,000 |              | MA-09 Total |       |
| Total Funds for MA                                                       |                                       |       | \$2,051,000 | \$4,895,000 | \$6,621,000 |              |             |       |
| MD                                                                       |                                       |       |             |             |             |              |             |       |
| High Power Battery Development                                           | SAFT America, Inc.                    | Sub   | \$1,584,000 | \$257,000   | \$1,217,000 | Cockeysville | MD-07       | Total |
| GATE Hybrid Electric Drive Train and Control Strategies                  | University of Maryland - College Park | Prime | \$0         | \$0         | \$1,217,000 |              | MD-07 Total |       |
| CARATIGATE                                                               | University of Maryland - College Park | Prime | \$180,000   | \$30,000    | \$50,000    | College Park | MD-05       |       |
| GATE                                                                     | University of Maryland - College Park | Prime | \$80,000    | \$40,000    | \$100,000   | College Park | MD-05       | Total |

|                                                                                                 |                                 |       |              |             |                      |
|-------------------------------------------------------------------------------------------------|---------------------------------|-------|--------------|-------------|----------------------|
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | ATI Systems Inc.                | Sub   | \$0          | \$0 N/A     | Madison Heights      |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | Excel Patterns Works, Inc.      | Sub   | \$0          | \$0 N/A     | Dearborn             |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | Guodiere & Associates           | Sub   | \$0          | \$0 N/A     | Troy                 |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | MSX International               | Sub   | \$0          | \$0 N/A     | Auburn Hills         |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | H.S. Die & Engineering, Inc.    | Sub   | \$0          | \$0 N/A     | Orion Rapids         |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | Beyer Corporation               | Sub   | \$0          | \$0 N/A     | Auburn Hills         |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | Troy Tooling                    | Sub   | \$0          | \$0 N/A     | Rochester Hills      |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | Automated Analysis Corporation  | Sub   | \$0          | \$0 N/A     | Ann Arbor            |
| Design and Product Optimization for Cast Light Metals                                           | EKK Inc.                        | Sub   | \$0          | \$0 N/A     | Warren               |
| Powder Metallurgy Particulate Reinforced Aluminum                                               | Matco Tech                      | Sub   | \$0          | \$0 N/A     | Auburn Hills         |
| Powder Metallurgy Particulate Reinforced Aluminum                                               | Technologies Research Corp      | Sub   | \$0          | \$0 N/A     | Ann Arbor            |
| Advanced Forming of Aluminum                                                                    | Troy Design                     | Sub   | \$0          | \$0 N/A     | Troy                 |
| Thermoplastic Composite Sheet Manufacturing                                                     | Delphi Chassis Systems          | Prime | \$0          | \$225,000   | \$150,000 Saginaw    |
| <b>Total Funds for MI</b>                                                                       |                                 |       | \$24,775,000 | \$1,272,000 | \$6,261,000          |
| <b>MI</b>                                                                                       |                                 |       |              |             |                      |
| High Performance, Low Cost Membrane Electrode Assemblies (MEAs) for PEM Fuel Cell Stacks        | 3M                              | Prime | \$861,000    | \$461,000   | \$0 St. Paul         |
| High Performance Matching PEM Fuel Cell Components and Integrated Pilot Manufacturing Processes | 3M                              | Prime | \$0          | \$900,000   | \$1,600,000 St. Paul |
| <b>Total Funds for MI</b>                                                                       |                                 |       | \$861,000    | \$1,361,000 | \$1,600,000          |
| <b>MO</b>                                                                                       |                                 |       | \$861,000    | \$1,361,000 | \$1,600,000          |
| Modeling Methods for Predictability of Adhesive Bonding                                         | University of Missouri          | Sub   | \$0          | \$0 N/A     | Kansas City          |
| <b>Total Funds for MO</b>                                                                       |                                 |       | \$0          | \$0 N/A     |                      |
| <b>NC</b>                                                                                       |                                 |       | \$0          | \$0 N/A     |                      |
| Low Cost Carbon Fiber - ORNL                                                                    | North Carolina State University | Sub   | \$0          | \$0 N/A     | Raleigh              |
| <b>Total Funds for NC</b>                                                                       |                                 |       | \$0          | \$0 N/A     |                      |
| <b>NH</b>                                                                                       |                                 |       | \$0          | \$0 N/A     |                      |
| APM Development / Sankran                                                                       | Sankran                         | Sub   | \$0          | \$0 N/A     | Hudson               |
| APM Development / Sankran                                                                       | Sankran                         | Prime | \$0          | \$1,185,000 | \$1,265,000 Hudson   |
| Design and Product Optimization for Cast Light Metals                                           | Entek, Inc.                     | Sub   | \$0          | \$0 N/A     | Merrimack            |
| APM Development                                                                                 | Sankran                         | Sub   | \$0          | \$0         | \$67,000 Hudson      |
| <b>Total Funds for NH</b>                                                                       |                                 |       | \$0          | \$1,185,000 | \$1,332,000          |
| <b>NJ</b>                                                                                       |                                 |       | \$0          | \$0 N/A     |                      |
| Lightweight Vehicles Materials USAMP Cooperative Agreement                                      | Hydro, Inc.                     | Sub   | \$0          | \$0 N/A     | Asbury               |
| <b>Total Funds for NJ</b>                                                                       |                                 |       | \$0          | \$0 N/A     |                      |

NM

|                                                                       |                                |       |             |             |             |             |             |
|-----------------------------------------------------------------------|--------------------------------|-------|-------------|-------------|-------------|-------------|-------------|
| High Temperature Capacitors for PNV Power Electronics                 | Sandia National Laboratory(NM) | Prime | \$0         | \$300,000   | \$220,000   | Albuquerque | NM-01       |
| Hydrogen Metal Oxide Catalyst Development                             | Sandia National Laboratory(NM) | Prime | \$250,000   | \$150,000   | \$350,000   | Albuquerque | NM-01       |
| Gen 2 Cell Development and Evaluation Advanced Technology Development | Sandia National Laboratory(NM) | Prime | \$0         | \$360,000   | \$140,000   | Albuquerque | NM-01       |
| Gen 2 Cell Development and Evaluation Advanced Technology Development | Sandia National Laboratory(NM) | Prime | \$0         | \$560,000   | \$325,000   | Albuquerque | NM-01       |
| Electrochemistry Diagnostic Support Advanced Technology Development   | Sandia National Laboratory(NM) | Prime | \$0         | \$250,000   | \$320,000   | Albuquerque | NM-01       |
| Abuse Testing of High Power Cells and Modules                         | Sandia National Laboratory(NM) | Sub   | \$0         | \$0         | \$0         | Albuquerque | NM-01       |
| Abuse Testing of High Power Cells and Modules                         | Sandia National Laboratory(NM) | Prime | \$0         | \$730,000   | \$100,000   | Albuquerque | NM-01       |
| System Analytical Support                                             | Sandia National Laboratory(NM) | Prime | \$100,000   | \$100,000   | \$100,000   | Albuquerque | NM-01       |
| Packaging for APM                                                     | Sandia National Laboratory(NM) | Prime | \$300,000   | \$260,000   | \$200,000   | Albuquerque | NM-01       |
| Design and Product Optimization for Cost Light Vehicle                | Sandia National Laboratory(NM) | Sub   | \$0         | \$0         | N/A         | Albuquerque | NM-01       |
| Exhaust Gas Sensors CRADA                                             | Sandia National Laboratory(NM) | Prime | \$0         | \$275,000   | \$225,000   | Albuquerque | NM-01       |
| Fuel Contaminants Pass Shell                                          | Los Alamos National Laboratory | Prime | \$600,000   | \$2,665,000 | \$2,660,000 | Los Alamos  | NM-01 Total |
| Fuel Cell Composite Bipolar Plates (Compression Molding)              | Los Alamos National Laboratory | Prime | \$200,000   | \$200,000   | \$0         | Los Alamos  | NM-03       |
| ZnO Treatment of Hydrogen Metal Oxide Catalysts                       | Los Alamos National Laboratory | Prime | \$400,000   | \$560,000   | \$650,000   | Los Alamos  | NM-03       |
| Fuel Cells for Transportation Program                                 | Los Alamos National Laboratory | Prime | \$4,308,000 | \$4,213,000 | \$3,310,000 | Los Alamos  | NM-03       |
| Exhaust Gas Sensors CRADA                                             | Los Alamos National Laboratory | Prime | \$425,000   | \$400,000   | \$425,000   | Los Alamos  | NM-03       |
| SIM Modeling                                                          | Los Alamos National Laboratory | Prime | \$0         | \$200,000   | \$325,000   | Los Alamos  | NM-03       |
| O2 Sensor Development                                                 | Los Alamos National Laboratory | Prime | \$0         | \$0         | \$100,000   | Los Alamos  | NM-03       |
| Total Funds for NM                                                    |                                |       | \$5,700,000 | \$6,213,000 | \$6,090,000 |             | NM-03 Total |
|                                                                       |                                |       | \$1,610,000 | \$6,090,000 | \$7,800,000 |             | PA-05       |

NY

|                                                                     |                                  |       |             |             |             |          |             |
|---------------------------------------------------------------------|----------------------------------|-------|-------------|-------------|-------------|----------|-------------|
| Electrochemistry Diagnostic Support Advanced Technology Development | Brookhaven National Laboratory   | Prime | \$0         | \$250,000   | \$280,000   | Upton    | NY-01       |
| Toroidal Compressor/Expander                                        | Mechanical Technology Inc.       | Sub   | \$0         | \$250,000   | \$280,000   | Upton    | NY-01 Total |
|                                                                     |                                  |       | \$0         | \$0         | \$200,000   | Upton    | NY-2        |
|                                                                     |                                  |       |             |             | \$200,000   | Upton    | NY-21 Total |
| Integrated Power System for Transportation                          | Plug Power                       | Prime | \$1,980,000 | \$3,145,000 | \$1,024,483 | Latham   | NY-23       |
| Integrated Power System for Transportation                          | Plug Power                       | Prime | \$0         | \$0         | \$612,981   | Latham   | NY-23       |
| Integrated Power System for Transportation                          | Plug Power                       | Prime | \$0         | \$0         | \$409,536   | Latham   | NY-23       |
| Development of Automotive PEM Fuel Cell Power System Prototypes     | Plug Power                       | Prime | \$0         | \$150,000   | \$400,000   | Latham   | NY-23       |
| Development of Automotive PEM Fuel Cell Power System Prototypes     | Plug Power                       | Prime | \$0         | \$0         | \$1,200,000 | Latham   | NY-23       |
| Development of Automotive PEM Fuel Cell Power System Prototypes     | Plug Power                       | Prime | \$0         | \$0         | \$400,000   | Latham   | NY-23       |
| APM Development / Silicon                                           | Silicon Power Corporation        | Sub   | \$1,980,000 | \$3,295,000 | \$4,068,000 | Latham   | NY-23 Total |
| APM Development / Semicon                                           | Silicon Power Corporation        | Sub   | \$0         | \$0         | N/A         | Latham   |             |
| Advanced Integrated Power Module / Silicon Power                    | Silicon Power Corporation        | Sub   | \$0         | \$0         | N/A         | Latham   |             |
| Lightweight Vehicle Materials USA/UK Cooperative Agreement          | Global Equi Prime, Network, Inc. | Sub   | \$0         | \$0         | N/A         | Billevet |             |
| Total Funds for NY                                                  |                                  |       | \$1,980,000 | \$4,730,000 | \$5,704,000 |          | NY-02 Total |

OH-11  
OH-14 Total

OH-15

OH-16

OH-19 Total

OR-04

PA-04

PA-04

PA-04

PA-04

PA-04

PA-04 Total

PA-05

PA-06

PA-06

PA-06 Total

PA-12

PA-12 Total

TN-02

TN-02

TN-02 Total

TN-03

|                                                                                               |                               |       |             |              |                       |             |
|-----------------------------------------------------------------------------------------------|-------------------------------|-------|-------------|--------------|-----------------------|-------------|
| Refinery Modeling (MAG Client Study with OTT as Dave Rogers)                                  | Oak Ridge National Laboratory | Prime | \$0         | \$100,000    | \$50,000 Oak Ridge    | TN-03       |
| Advanced Fuels Testing                                                                        | Oak Ridge National Laboratory | Prime | \$0         | \$450,000    | \$227,000 Oak Ridge   | TN-03       |
| Advanced Fuels Testing                                                                        | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$113,000 Oak Ridge   | TN-03       |
| CIDI Fuels Testing                                                                            | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$185,000 Oak Ridge   | TN-03       |
| Carbon Foam Thermal Management Materials for Electronic Packaging                             | Oak Ridge National Laboratory | Prime | \$0         | \$175,000    | \$175,000 Oak Ridge   | TN-03       |
| Chemicalization for Intelligent Processing of Permanent Magnets                               | Oak Ridge National Laboratory | Prime | \$0         | \$75,000     | \$50,000 Oak Ridge    | TN-03       |
| Mechanical Reliability of Electronic Ceramics and Electronic Ceramic Components               | Oak Ridge National Laboratory | Prime | \$75,000    | \$0          | \$125,000 Oak Ridge   | TN-03       |
| Microwave Regenerated PM Trap                                                                 | Industrial Ceramic Solutions  | Sub   | \$0         | \$0          | \$100,000 Oak Ridge   | TN-03       |
| Microwave Regenerated PM Trap                                                                 | Industrial Ceramic Solutions  | Prime | \$0         | \$0          | \$100,000 Oak Ridge   | TN-03       |
| Materials Support for Nonthermal Plasma Development                                           | Oak Ridge National Laboratory | Prime | \$100,000   | \$200,000    | \$200,000 Oak Ridge   | TN-03       |
| Reed Surface Modifications of Aluminum Engine Block Joints by a High-Density Infrared Process | Oak Ridge National Laboratory | Prime | \$0         | \$75,000     | \$150,000 Oak Ridge   | TN-03       |
| Inorganic Proton Exchange Membrane Electrode/Separator Development                            | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$120,000 Oak Ridge   | TN-03       |
| Carbon Foam Heat Exchangers (Radiators) for Fuel Cells                                        | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$75,000 Oak Ridge    | TN-03       |
| Membrane Electrode Assembly Characterization                                                  | Oak Ridge National Laboratory | Prime | \$0         | \$58,000     | \$150,000 Oak Ridge   | TN-03       |
| Advanced Combustion R&D                                                                       | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$150,000 Oak Ridge   | TN-03       |
| Advanced Combustion R&D                                                                       | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$200,000 Oak Ridge   | TN-03       |
| Advanced Combustion R&D                                                                       | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$200,000 Oak Ridge   | TN-03       |
| Advanced Combustion R&D                                                                       | Oak Ridge National Laboratory | Prime | \$1,480,000 | \$2,480,000  | \$1,075,000 Oak Ridge | TN-03       |
| Power Electronics Motor Program Development                                                   | Oak Ridge National Laboratory | Prime | \$2,000,000 | \$2,000,000  | \$855,000 Oak Ridge   | TN-03       |
| Design and Product Optimization for Gas Light Metals                                          | Oak Ridge National Laboratory | Prime | \$675,000   | \$875,000    | \$300,000 Oak Ridge   | TN-03       |
| Powder Metallurgy Particulate Reinforced Aluminum                                             | Oak Ridge National Laboratory | Prime | \$140,000   | \$215,000    | \$75,000 Oak Ridge    | TN-03       |
| Coat Modeling                                                                                 | Oak Ridge National Laboratory | Prime | \$150,000   | \$200,000    | \$175,000 Oak Ridge   | TN-03       |
| Adhesive Bonding Structure Composites                                                         | Oak Ridge National Laboratory | Prime | \$650,000   | \$650,000    | \$600,000 Oak Ridge   | TN-03       |
| Durability of Lightweight Composite Structures                                                | Oak Ridge National Laboratory | Prime | \$1,200,000 | \$900,000    | \$1,200,000 Oak Ridge | TN-03       |
| Composites Material Creep Modeling                                                            | Oak Ridge National Laboratory | Sub   | \$0         | \$0          | \$0 Oak Ridge         | TN-03       |
| Low Cost Carbon Fiber Using Microwave Energy                                                  | Oak Ridge National Laboratory | Prime | \$200,000   | \$500,000    | \$700,000 Oak Ridge   | TN-03       |
| HTML Fellowships                                                                              | Oak Ridge National Laboratory | Prime | \$100,000   | \$125,000    | \$100,000 Oak Ridge   | TN-03       |
| Technical Program Management                                                                  | Oak Ridge National Laboratory | Prime | \$640,000   | \$800,000    | \$550,000 Oak Ridge   | TN-03       |
| Creep Resistant Mg Alloys for Die Casting                                                     | Oak Ridge National Laboratory | Prime | \$0         | \$325,000    | \$325,000 Oak Ridge   | TN-03       |
| FPS - Design Development: Offside - PCB                                                       | Oak Ridge National Laboratory | Prime | \$0         | \$200,000    | \$150,000 Oak Ridge   | TN-03       |
| Low Cost LMC                                                                                  | Oak Ridge National Laboratory | Sub   | \$0         | \$0          | \$0 Oak Ridge         | TN-03       |
| Low Cost Carbon Fiber - ORNL                                                                  | Oak Ridge National Laboratory | Prime | \$0         | \$300,000    | \$500,000 Oak Ridge   | TN-03       |
| American Plastics Council Roadmap                                                             | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$45,000 Oak Ridge    | TN-03       |
| SIDI Injector Support Study                                                                   | Oak Ridge National Laboratory | Prime | \$0         | \$300,000    | \$300,000 Oak Ridge   | TN-03       |
| SIDI EGR Optimization                                                                         | Oak Ridge National Laboratory | Prime | \$0         | \$300,000    | \$300,000 Oak Ridge   | TN-03       |
| Coat Model Development                                                                        | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$250,000 Oak Ridge   | TN-03       |
| PNGV Systems Analysis DOE-USCAR Engine Mapping - Alternative Feedstock Fuels                  | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$35,000 Oak Ridge    | TN-03       |
| PNGV Systems Analysis DOE-USCAR Alternative Engine and Vehicle Testing                        | Oak Ridge National Laboratory | Prime | \$0         | \$0          | \$200,000 Oak Ridge   | TN-03       |
|                                                                                               |                               |       | \$7,340,000 | \$10,965,000 | \$10,114,000          | TN-03 Total |

## Total Funds for TN

\$7,140,000      \$10,680,000      \$10,194,000

## TX

|                                                                             |                              |       |           |             |                         |             |
|-----------------------------------------------------------------------------|------------------------------|-------|-----------|-------------|-------------------------|-------------|
| Modeling Methods for Predictability of Adhesive Bonding                     | University of Texas - Austin | Prime | \$120,000 | \$700,000   | \$30,000 Austin         | TX-10       |
| University Consortium R&D                                                   | University of Texas - Austin | Sub   | \$0       | \$0         | \$94,000 Austin         | TX-10       |
| Oxygensensors                                                               | Southwest Research Institute | Prime | \$170,000 | \$200,000   | \$144,000               | TX-10 Total |
| Light Oil                                                                   | Southwest Research Institute | Prime | \$0       | \$220,000   | \$100,000 San Antonio   | TX-20       |
| Toothly                                                                     | Southwest Research Institute | Prime | \$0       | \$220,000   | \$100,000 San Antonio   | TX-20       |
| Fuel Testing/Engine Testing                                                 | Southwest Research Institute | Prime | \$0       | \$230,000   | \$100,000 San Antonio   | TX-20       |
| Fuel/Vehicle Testing                                                        | Southwest Research Institute | Prime | \$400,000 | \$420,000   | \$600,000 San Antonio   | TX-20       |
| Design & Installation of a Power Plant for High-Volume Electrode Production | Southwest Research Institute | Prime | \$0       | \$42,000    | \$200,000 San Antonio   | TX-20       |
|                                                                             |                              |       | \$0       | \$750,000   | \$1,300,000 San Antonio | TX-20       |
| Total Funds for TX                                                          |                              |       | \$440,000 | \$2,282,000 | \$2,500,000             | TX-20 Total |
|                                                                             |                              |       | \$600,000 | \$2,082,000 | \$2,644,000             |             |

## UT

|                                |                    |       |     |           |                          |             |
|--------------------------------|--------------------|-------|-----|-----------|--------------------------|-------------|
| C- Research                    | University of Utah | Sub   | \$0 | \$0 N/A   | \$0 Salt Lake City       | UT-02       |
| Low Cost Carbon Fiber - Hexcel | Hexcel Corporation | Prime | \$0 | \$800,000 | \$800,000 Salt Lake City | UT-02       |
| Total Funds for UT             |                    |       | \$0 | \$800,000 | \$800,000                | UT-02 Total |
|                                |                    |       | \$0 | \$800,000 | \$800,000                |             |

## VA

|                                          |                                  |       |           |           |                      |       |
|------------------------------------------|----------------------------------|-------|-----------|-----------|----------------------|-------|
| Low Cost Carbon Fiber - VA Tech Clarkson | Virginia Power Technologies      | Prime | \$0       | \$400,000 | \$400,000 Richmond   | VA-03 |
| Low Cost Aluminum Alloy Sheet            | Reynolds Metal Company           | Sub   | \$0       | \$0 N/A   | \$0 Chester          | VA-07 |
| Characteristics of Al. Tailored Blanks   | Reynolds Metal Company           | Sub   | \$0       | \$0 N/A   | \$0 Chester          | VA-07 |
| Technical Support Services               | Computer Systems Management Inc. | Prime | \$0       | \$0       | \$58,000 Alexandria  | VA-08 |
| VCR Engine Assessment                    | Computer Systems Management Inc. | Sub   | \$0       | \$0       | \$410,000 Alexandria | VA-08 |
| Technical Support                        | Computer Systems Management Inc. | Prime | \$250,000 | \$300,000 | \$135,000 Alexandria | VA-08 |
| Advanced CO2 A/C                         | US Army - CERDA                  | Prime | \$0       | \$150,000 | \$80,000 Ft. Belvoir | VA-09 |
| GATE: Automotive Fuel Cell Systems       | Virginia Polytechnic Institute   | Prime | \$0       | \$0       | \$17,000 Blacksburg  | VA-09 |
| Total Funds for VA                       |                                  |       | \$250,000 | \$850,000 | \$1,087,000          |       |

## WA

|                                                           |                                       |       |             |             |                      |             |
|-----------------------------------------------------------|---------------------------------------|-------|-------------|-------------|----------------------|-------------|
| New Tech (Plasma) Emission Reduction                      | Pacific Northwest National Laboratory | Prime | \$167,000   | \$800,000   | \$700,000 Richland   | WA-04       |
| Microtechnology Development for Fuel Processor Components | Pacific Northwest National Laboratory | Prime | \$750,000   | \$1,220,000 | \$1,100,000 Richland | WA-04       |
| Die Casting Die Life Extension                            | Pacific Northwest National Laboratory | Prime | \$265,000   | \$890,000   | \$800,000 Richland   | WA-04       |
| Optimization of Extrusion Shaping                         | Pacific Northwest National Laboratory | Prime | \$350,000   | \$350,000   | \$375,000 Richland   | WA-04       |
| Characteristics of Al. Tailored Blanks                    | Pacific Northwest National Laboratory | Prime | \$400,000   | \$400,000   | \$350,000 Richland   | WA-04       |
| Structural Reliability of LWC Glazing Alternatives        | Pacific Northwest National Laboratory | Prime | \$200,000   | \$400,000   | \$380,000 Richland   | WA-04       |
| Thermoplastic Composite Sheet Manufacturing               | Pacific Northwest National Laboratory | Sub   | \$0         | \$0 N/A     | \$0 Richland         | WA-04       |
| Low Cost MMC                                              | Pacific Northwest National Laboratory | Sub   | \$0         | \$0 N/A     | \$0 Richland         | WA-04       |
| NATT Management                                           | Pacific Northwest National Laboratory | Prime | \$0         | \$750,000   | \$275,000 Richland   | WA-04       |
| Total Funds for WA                                        |                                       |       | \$2,722,000 | \$4,270,000 | \$3,930,000          | WA-04 Total |
|                                                           |                                       |       | \$1,722,000 | \$4,270,000 | \$3,930,000          |             |

## WI

|                                                   |                         |       |     |           |                   |  |
|---------------------------------------------------|-------------------------|-------|-----|-----------|-------------------|--|
| Inorganic Membrane Electrode Assembly Development | University of Wisconsin | Prime | \$0 | \$110,000 | \$218,000 Madison |  |
| University Consortium R&D                         | University of Wisconsin | Sub   | \$0 | \$0       | \$65,000 Madison  |  |
| Total Funds for WI                                |                         |       | \$0 | \$110,000 | \$283,000         |  |

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WV  
- C-1 Research West Virginia University  
QATE: Advanced Hybrid Vehicle Technology West Virginia University  
Total Funds for WV

|       |     |         |                     |       |
|-------|-----|---------|---------------------|-------|
| Sub   | \$0 | \$0 N/A | Morgantown          | WV-01 |
| Prime | \$0 | \$0     | \$80,000 Morgantown | WV-01 |
|       | \$0 | \$0     | \$80,000            |       |

|                                                      |                           |       |     |             |             |              |             |
|------------------------------------------------------|---------------------------|-------|-----|-------------|-------------|--------------|-------------|
| Direct Injection System Development                  | Delphi Electronics        | Prime | \$0 | \$1,200,000 | \$900,000   | Kokomo       | IN-05       |
| Virtual Tool for Hybrid and Fuel Cell Configurations | Delphi Electronics        | Sub   | \$0 | \$0         | \$200,000   | Kokomo       | IN-05       |
| Automotive Electric Motor Drive (AEMD)               | Delphi Electronics        | Sub   | \$0 | \$0 N/A     |             | Kokomo       | IN-05       |
| Automotive Electric Motor Drive (AEMD)               | Visual Computing Systems  | Sub   | \$0 | \$1,200,000 | \$1,100,000 | Greenville   | IN-08       |
| Motor Development                                    | Delphi Automotive Systems | Prime | \$0 | \$0         | \$0         |              | IN-08 Total |
| Motor Development                                    | Lynx Motor Technologies   | Prime | \$0 | \$500,000   | \$625,000   | Indianapolis | IN-10       |
| Automotive Electric Motor Drive (AEMD)               | Electricore               | Prime | \$0 | \$500,000   | \$625,000   | Indianapolis | IN-10       |
| Automotive Electric Motor Drive (AEMD)               | Lynx Motor Technologies   | Sub   | \$0 | \$300,000   | \$625,000   | New Albany   | IN-10       |
| Automotive Electric Motor Drive (AEMD)               | Delco Remay International | Sub   | \$0 | \$0 N/A     | \$500,000   | Indianapolis | IN-10       |
|                                                      |                           |       | \$0 | \$0 N/A     |             | New Albany   |             |
|                                                      |                           |       | \$0 | \$0 N/A     |             | Anderson     |             |
| Total Funds for IN                                   |                           |       | \$0 | \$1,400,000 | \$6,380,000 |              |             |

|                               |                               |     |     |         |     |            |             |
|-------------------------------|-------------------------------|-----|-----|---------|-----|------------|-------------|
| KY                            |                               |     |     |         |     |            |             |
| Low Cost Aluminum Alloy Steel | Commonwealth Aluminum Company | Sub | \$0 | \$0 N/A |     | Louisville | KY-01       |
| CR Research                   | University of Kentucky        | Sub | \$0 | \$0     | \$0 |            | KY-03 Total |
| Total Funds for KY            |                               |     | \$0 | \$0 N/A |     | Lexington  |             |
|                               |                               |     | \$0 | \$0 N/A |     |            |             |

|                                                                  |                             |       |     |           |           |             |  |
|------------------------------------------------------------------|-----------------------------|-------|-----|-----------|-----------|-------------|--|
| LA                                                               |                             |       |     |           |           |             |  |
| Multi-Fuel Processor for Fuel Cell Electric Vehicle Applications | McDermott Technologies, Inc | Prime | \$0 | \$600,000 | \$750,000 | New Orleans |  |
| Total Funds for LA                                               |                             |       | \$0 | \$600,000 | \$750,000 |             |  |

|                                                                          |                                   |       |             |             |             |           |             |
|--------------------------------------------------------------------------|-----------------------------------|-------|-------------|-------------|-------------|-----------|-------------|
| MA                                                                       |                                   |       |             |             |             |           |             |
| Layered Bipolar Plant for PEM Stacks                                     | Electrochem, Inc.                 | Prime | \$0         | \$0         | \$100,000   | Woburn    | MA-07       |
|                                                                          |                                   |       | \$0         | \$0         | \$100,000   |           | MA-07 Total |
| Integrated Power System for Transportation                               | EPVX                              | Sub   | \$1,640,000 | \$2,600,000 | \$550,215   | Cambridge | MA-08       |
| Integrated Power System for Transportation                               | EPVX                              | Sub   | \$0         | \$0         | \$329,775   | Cambridge | MA-08       |
| Integrated Power System for Transportation                               | EPVX                              | Sub   | \$0         | \$0         | \$719,978   | Cambridge | MA-08       |
| Development of Second Generation Scroll Compressor/Expander              | Arthur D. Little                  | Prime | \$510,000   | \$0         | \$40,000    | Cambridge | MA-09       |
| Next Millennium Fuel Processor for Transportation Fuel Cell Power System | EPVX                              | Prime | \$0         | \$900,000   | \$1,700,000 | Cambridge | MA-09       |
| Next Millennium Fuel Processor for Transportation Fuel Cell Power System | EPVX                              | Prime | \$0         | \$0         | \$300,000   | Cambridge | MA-09       |
| Cost Analysis of Fuel Cell Stack/Systems                                 | Arthur D. Little                  | Prime | \$0         | \$219,000   | \$250,000   | Cambridge | MA-09       |
| APM Development / Silicon                                                | SatCon Technology Corporation     | Prime | \$0         | \$1,143,000 | \$1,285,000 | Cambridge | MA-09       |
| APM Development                                                          | SatCon Technology Corporation     | Prime | \$0         | \$0         | \$87,000    | Cambridge | MA-09       |
|                                                                          |                                   |       | \$2,051,000 | \$4,895,000 | \$4,672,000 |           | MA-09 Total |
| Virtual Tool for Hybrid and Fuel Cell Configurations                     | Parametric Technology Corporation | Prime | \$0         | \$0         | \$650,000   | Waltham   |             |
| Total Funds for MA                                                       |                                   |       | \$2,051,000 | \$4,895,000 | \$6,412,000 |           |             |

|                                                         |                                       |       |             |           |             |              |             |
|---------------------------------------------------------|---------------------------------------|-------|-------------|-----------|-------------|--------------|-------------|
| MD                                                      |                                       |       |             |           |             |              |             |
| High Power Battery Development                          | SAFT America, Inc                     | Sub   | \$1,584,000 | \$257,000 | \$1,217,000 | College Park | MD-02       |
|                                                         |                                       |       | \$1,584,000 | \$257,000 | \$1,217,000 |              | MD-02 Total |
| GATE Hybrid Electric Drive Train and Control Strategies | University of Maryland - College Park | Prime | \$0         | \$0       | \$80,000    | College Park | MD-05       |
| CARATIGATE                                              | University of Maryland - College Park | Prime | \$180,000   | \$30,000  | \$50,000    | College Park | MD-05       |
| GATE                                                    | University of Maryland - College Park | Prime | \$80,000    | \$40,000  | \$100,000   | College Park | MD-05       |

|                                                                              |                              |       | \$270,000          | \$70,000         | \$270,000          | MD-43 Total   |
|------------------------------------------------------------------------------|------------------------------|-------|--------------------|------------------|--------------------|---------------|
| Advanced Propulsion Systems Analysis Support                                 | Energetics, Inc.             | Sub   | \$0                | \$0              | \$20,000           | Columbia      |
| Design & Installation of a Power Plant for High-Voltage Electrode Production | W. L. Gore & Associates      | Sub   | \$0                | \$0 N/A          |                    | Edison        |
| Gen 3 Electronics Assembly Improvement Advanced Technology Development       | US Army Research Laboratory  | Prime | \$0                | \$128,000        | \$128,000          | Adelphi       |
| Technical Program Management                                                 | Naval Surface Warfare Center | Sub   | \$0                | \$0              | \$200,000          | West Bethesda |
| Program Support                                                              | Abacus Technologies          | Prime | \$25,000           | \$125,000        | \$150,000          | Cherry Chase  |
| Technical and Support Services                                               | Abacus Technologies          | Prime | \$0                | \$0              | \$75,000           | Cherry Chase  |
| <b>Total Funds for MD</b>                                                    |                              |       | <b>\$1,868,000</b> | <b>\$490,000</b> | <b>\$2,358,000</b> |               |

NE

|                                                                      |                                    |       |              |             |             |              |             |
|----------------------------------------------------------------------|------------------------------------|-------|--------------|-------------|-------------|--------------|-------------|
| GATE: Diesel Injection Compression Ignition Diesel Engines           | Michigan Tech University           | Prime | \$0          | \$0         | \$80,000    | Houghton     | MI-01       |
| Advanced Forming of Aluminum                                         | Michigan Tech University           | Sub   | \$0          | \$0 N/A     |             | Houghton     | MI-01       |
|                                                                      |                                    |       | \$0          | \$0         | \$80,000    |              | MI-01 Total |
| Lightweight Vehicles Materials USAAMP Cooperative Agreement          | Michigan State University          | Sub   | \$0          | \$0 N/A     |             | East Lansing | MI-08       |
| Low Cost Carbon Fiber - Cornerstone Technologies/MSU                 | Michigan State University          | Sub   | \$0          | \$0 N/A     |             | East Lansing | MI-08       |
| Active Fiber Control Systems Development                             | Michigan State University          | Prime | \$0          | \$433,000   | \$200,000   | East Lansing | MI-08       |
|                                                                      |                                    |       | \$0          | \$433,000   | \$300,000   |              | MI-08 Total |
| High Power Battery Development                                       | US Advanced Battery Consortium     | Prime | \$5,848,000  | \$1,188,000 | \$1,181,000 | Southfield   | MI-11       |
| Lightweight Vehicles Materials USAAMP Cooperative Agreement          | US Advanced Materials Partnership  | Prime | \$1,100,000  | \$3,225,000 | \$3,490,000 | Dearborn     | MI-11       |
| Design and Product Optimization for Cast Light Metals                | US Advanced Materials Partnership  | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-11       |
| Powder Metallurgy Particulate Reinforced Aluminum                    | US Advanced Materials Partnership  | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-11       |
| Low Cost Aluminum Alloy Sheet                                        | US Advanced Materials Partnership  | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-11       |
| Advanced Forming of Aluminum                                         | US Advanced Materials Partnership  | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-11       |
|                                                                      |                                    |       | \$6,788,000  | \$4,581,000 | \$4,671,000 |              | MI-11 Total |
| R&D for CIDI Engines & Aftertreatment Subsystems                     | Detroit Diesel Corporation         | Prime | \$0          | \$1,824,000 | \$2,452,000 | Detroit      | MI-12       |
|                                                                      |                                    |       | \$0          | \$1,825,000 | \$2,452,000 |              | MI-12 Total |
| CARAT: Bimetallic Transition Metal Carbide Water Gas Shift Catalysts | University of Michigan - Ann Arbor | Prime | \$117,000    | \$33,000    | \$50,000    | Ann Arbor    | MI-13       |
| GATE: Lightweight and Propulsion Materials                           | University of Michigan - Ann Arbor | Prime | \$0          | \$0         | \$80,000    | Ann Arbor    | MI-13       |
| Advanced Forming of Aluminum                                         | University of Michigan - Ann Arbor | Sub   | \$0          | \$0 N/A     |             | Ann Arbor    | MI-13       |
| Semi-solid Aluminum Forming                                          | Thixmat                            | Sub   | \$0          | \$0 N/A     |             | Ann Arbor    | MI-13       |
| Thixomolding - Creep-Resistant Mg Alloy                              | Thixmat                            | Prime | \$118,000    | \$0 N/A     |             | Ann Arbor    | MI-13       |
| Unsteady Combustion R&D                                              | University of Michigan - Ann Arbor | Sub   | \$0          | \$0         | \$129,000   | Ann Arbor    | MI-13       |
|                                                                      |                                    |       | \$236,000    | \$33,000    | \$259,000   |              | MI-13 Total |
| Development of Pressure Reactive Piston for Efficiency & Low NOx     | Ford Motor Company                 | Prime | \$0          | \$75,000    | \$150,000   | Dearborn     | MI-16       |
| Lightweight Vehicles Materials USAAMP Cooperative Agreement          | University of Michigan - Dearborn  | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-16       |
| Powder Metallurgy Particulate Reinforced Aluminum                    | University of Michigan - Dearborn  | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-16       |
| Structural Reliability of LW Glazing Alternatives                    | Visteon Automotive Systems         | Sub   | \$0          | \$0 N/A     |             | Dearborn     | MI-16       |
| System Development                                                   | Ford Motor Company                 | Sub   | \$17,758,000 | \$250,000   | \$200,000   | Dearborn     | MI-16       |
|                                                                      |                                    |       | \$17,758,000 | \$250,000   | \$250,000   |              | MI-16 Total |
| Lightweight Vehicles Materials USAAMP Cooperative Agreement          | Modern Engineering, Inc.           | Sub   | \$0          | \$0 N/A     |             | Ypsilanti    |             |

|                                                              |                                  |       |             |             |                           |             |  |
|--------------------------------------------------------------|----------------------------------|-------|-------------|-------------|---------------------------|-------------|--|
| OH                                                           |                                  |       |             |             |                           |             |  |
| Recycling Mg Die Cast Alloy                                  | Case Western Reserve University  | Prime | \$170,000   | \$0 N/A     | Cleveland                 | OH-11       |  |
|                                                              |                                  |       | \$120,000   | \$0         | \$0                       | OH-14 Total |  |
| CARAT: Nano-Scale Water/Gas Split Catalyst                   | Nextech Materials, Inc.          | Prime | \$100,000   | \$50,000    | \$50,000 Worthington      | OH-15       |  |
| GATE: Modeling, Simulation, Design and Control of HEV Drives | Ohio State University            | Prime | \$0         | \$0         | \$50,000 Columbus         | OH-16       |  |
|                                                              |                                  |       | \$100,000   | \$50,000    | \$130,000                 | OH-15 Total |  |
| Advanced Forming of Aluminum                                 | Seelye Industries, Inc.          | Sub   | \$0         | \$0 N/A     | Salem                     |             |  |
| Recycling Mg Die Cast Alloy                                  | Garfield Alloys, Inc.            | Sub   | \$120,000   | \$0 N/A     | Garfield Heights          |             |  |
| Systems Development                                          | Telechem                         | Sub   | \$219,067   | \$0 N/A     | Toledo                    |             |  |
| Total Funds for OH                                           |                                  |       | \$549,067   | \$50,000    | \$130,000                 |             |  |
| OR                                                           |                                  |       |             |             |                           |             |  |
| Hot Crush Tech. For Separating Wrought & Cast Aluminum       | Albany Research Center LLC       | Prime | \$216,000   | \$225,000   | \$225,000 Albany          | OR-04       |  |
| Total Funds for OR                                           |                                  |       | \$216,000   | \$225,000   | \$225,000                 |             |  |
| PA                                                           |                                  |       |             |             |                           |             |  |
| C-1 Research                                                 | University of Pittsburgh         | Sub   | \$0         | \$0 N/A     | Bradford                  |             |  |
| Advanced Forming of Aluminum                                 | ALCOA Technology Center          | Prime | \$1,185,000 | \$1,300,000 | \$430,000 Alcoa Center    | PA-04       |  |
| Semi-solid Aluminum Forming                                  | ALCOA Technology Center          | Prime | \$1,900,000 | \$600,000   | \$475,000 Alcoa Center    | PA-04       |  |
| Optimization of Extrusion Shaping                            | ALCOA Technology Center          | Sub   | \$0         | \$0 N/A     | Alcoa Center              | PA-04       |  |
| Advanced High-Volume Mfg. Technology Validation              | ALCOA Technology Center          | Sub   | \$0         | \$0 N/A     | Alcoa Center              | PA-04       |  |
| Advanced Magnesium Processes for Mfg. Production             | ALCOA Technology Center          | Prime | \$180,000   | \$650,000   | \$780,000 Alcoa Center    | PA-04       |  |
|                                                              |                                  |       | \$2,555,000 | \$2,650,000 | \$1,685,000               | PA-04 Total |  |
| CARAT: High Temperature Direct Methanol PEM Fuel Cell        | Pennsylvania State University    | Prime | \$150,000   | \$0         | \$50,000 University Park  | PA-05       |  |
| GATE: Modeling, Simulation, Design and Control of HEV Drives | Pennsylvania State University    | Prime | \$0         | \$0         | \$80,000 University Park  | PA-05       |  |
| CARAT/GATE                                                   | Pennsylvania State University    | Prime | \$0         | \$70,000    | \$50,000 University Park  | PA-05       |  |
| University Combustion R&D                                    | Pennsylvania State University    | Sub   | \$0         | \$0         | \$120,000 University Park | PA-05       |  |
|                                                              |                                  |       | \$150,000   | \$70,000    | \$300,000                 | PA-05 Total |  |
| Semi-solid Aluminum Forming                                  | Concurrent Technologies Corp.    | Sub   | \$0         | \$0 N/A     | Johnstown                 | PA-12       |  |
|                                                              |                                  |       | \$0         | \$0         | \$0                       | PA-12 Total |  |
| Powder Metallurgy Particulate Reinforced Aluminum            | Aluminum Consolidate Group, Inc. | Sub   | \$0         | \$0 N/A     | Murrysville               |             |  |
| Advanced Forming of Aluminum                                 | Erle Press Systems               | Sub   | \$0         | \$0 N/A     | Erle                      |             |  |
| AlPM Development                                             | Erle Press Systems               | Sub   | \$0         | \$0         | \$67,000 Frankville       |             |  |
| Total Funds for PA                                           |                                  |       | \$2,705,000 | \$1,620,000 | \$2,632,000               |             |  |
| SC                                                           |                                  |       |             |             |                           |             |  |
| Low Cost Carbon Fiber - VA Tech Clemson                      | Clemson University               | Sub   | \$0         | \$0 N/A     | Clemson                   |             |  |
| Total Funds for SC                                           |                                  |       | \$0         | \$0 N/A     |                           |             |  |
| TN                                                           |                                  |       |             |             |                           |             |  |
| GATE: Hybrid Electric Drive Trains and Control Strategies    | University of Tennessee          | Prime | \$0         | \$0         | \$80,000 Knoxville        | TN-02       |  |
| Low Cost Carbon Fiber Using Microwave Energy                 | University of Tennessee          | Sub   | \$0         | \$0 N/A     | Knoxville                 | TN-02       |  |
|                                                              |                                  |       | \$0         | \$0         | \$80,000                  | TN-02 Total |  |
| CDI Fuel/Vehicle Testing                                     | Oak Ridge National Laboratory    | Prime | \$0         | \$149,000   | \$200,000 Oak Ridge       | TN-03       |  |

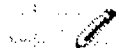
| Concept                                                                                     | Discussion                                                                                                                                 | Pros & cons                                                                                                                                                  |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Modest Commitments</b>                                                                   |                                                                                                                                            |                                                                                                                                                              |
| Commitment to joint public service announcements and marketing for high efficiency vehicles | Help create awareness of links between fuel use and climate change<br>Create awareness of the environmental advantages of high MPG cars    | Pro: modest request<br>Con: modest impact                                                                                                                    |
| Require highly visible energy efficiency (energy-star) labels                               | Major public service advertising creating awareness of the labels. An option is to include energy guzzler labels for poor performers       | Pro: energy star approach has had impact in other areas<br>Con: labels for MPG already exist and don't seem to have much market impact                       |
| Commit to major production runs of high efficiency hybrids                                  | At least 10% of new sales by 2005<br>Optional: separate goals for cars and light trucks                                                    | Pro: no CAFE baggage, Comparatively easy to negotiate<br>Con: only modest impact on MPG, Might allow larger vehicles unless new vehicles not counted in CAFE |
| Parking, car-pool lane, and other benefits for high efficiency vehicles                     | Issue High MPG stickers and encourage states to allow qualifying vehicles to use car pool lanes and employers to provide parking benefits. | Pro: can encourage commuting in highly efficient vehicles<br>Con: state and local decisions govern                                                           |

| <b>Tough Measures with real impact</b>                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pay Insurance and other fees at the Pump<br>[revenue neutral, no net new taxes] | Car owners typically pay about \$500/year for basic insurance and increasing amounts if they are in a high risk group. This proposal would collect the base amount through a tax on gasoline. Insurance companies would receive this amount for each customer and bill separately for risk premium. Net insurance costs would go DOWN about 20% since about 20% of all drivers are not insured and their costs are covered by those paying for insurance. | <p>Pro: good policy since it charges those who drive more higher insurance costs and creates incentives for both efficient vehicles and prudent driving. Forces uninsured drivers to pay.</p> <p>Con: requires national fee collection and distribution bureaucracy (some overhead). Muddy history: it nearly passed California referendum but opposed by insurance companies since it was linked to unrelated insurance reforms.</p> |
| Sipper/Guzzler tax [ <i>revenue neutral: no net new taxes</i> ]                 | Tax vehicles above CAFÉ levels at increasing rates and use to provide rebates for vehicles below CAFÉ levels. Can have separate levels for cars and light trucks or use the car CAFÉ level as baseline                                                                                                                                                                                                                                                    | <p>Pro: could have a significant impact on markets if tax rates were high enough</p> <p>Con: strong resistance from manufacturers seeing CAFÉ-like program. Will be accused of raising taxes – however unfair the charge</p>                                                                                                                                                                                                          |

|                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Horsepower/weight limits                                                                                                                                                                                                                                                             | MPG scales almost exactly with zero to sixty and therefore horsepower/weight                                                                                                                                                                                                                                                             | <p>Pro: could be a reasonable substitute for CAFÉ and would have a significant impact. Could increase safety</p> <p>Con: would impact the performance characteristics undermining our "technology can do it with no harm to amenity"</p>                                |
| <p>Performance standards within a class (like the tax credit).</p> <p><i>instead of per year, maybe given time period that is longer.</i></p>                                                                                                                                        | 2-3% per year improvement for each size class (by interior volume and acceleration for cars, and weight/2-4 wheel classes for trucks). Technologies: gasoline DI engines, deactivate cylinders, camless heads and continuous changes in valve timing, automatic gearshift (vs torque converter) and continuously variable transmissions. | <p>Pro: market for fuel efficient technology within each size class. Using these rules they are actually increasing by about 2% per year already!</p> <p>Con: might not increase fleet fuel economy significantly since producers could</p>                             |
| <p>Change CAFÉ in three ways [could be separated]</p> <p>(1) set fleet average for all cars and light truck sales combined</p> <p>(2) set fleet average for sales from all manufacturers instead of separate limits for each manufacturer</p> <p>(3) eliminate alt fuel benefits</p> | Setting the net fleet average at 2000 levels would keep things from getting worse through shifts to inefficient trucks. Setting it at the car 27.5 mpg in 2010 would have major impact. Trading would allow greater flexibility and permit averaging of foreign and domestics.                                                           | <p>Pro: could limit losses in CAFÉ due to shift to trucks. Would allow more flexibility through trading and avoid gaming through alt fuels</p> <p>Con: would meet resistance from domestic manufacturers making the bulk of their profits from biggest light trucks</p> |
| European-style commitment to introduce low CO2/mile cars and lower CO2/mile of fleet at an agreed rate                                                                                                                                                                               | <p>Major provisions:</p> <ul style="list-style-type: none"> <li>• 25% reduction in mpg by 2008</li> <li>• 33% by 2012</li> <li>• at least one 33% improvement car by 2000</li> </ul>                                                                                                                                                     | <p>Pro: guaranteed impact on fuel use, Ford, GM, and DChrysler Europe all signed the EC agreement</p> <p>Con: Looks and smells like CAFÉ and will be fiercely resisted in US. The EC members could credibly threaten</p>                                                |

|                                                                                                                      |                                                                                                                                                                                                              |                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                      | <ul style="list-style-type: none"> <li>• reductions sales average for ALL vehicles not CAFÉ for each manufacturers, manufacturers could cut their own deals so that the total sales average works</li> </ul> | regulatory action                                                                                                                                                                                      |
| The third way: An internet approach to people-moving (beyond the battle between mass transit and one-passenger cars) | Automakers agree to sponsor major experiments in innovative public transit that would provide dispatchable jitneys, vans, buses, taxis and other services on demand with varying fees for service            | Pro: changes the playing field and could have a major impact in urban areas, would help elderly and handicapped live at home<br>Con: untested concept, works for UPS/FedX but will it work for people? |

02/18/2000



Morley A. Winograd@OVP  
02/18/2000 05:05:40 PM

Record Type: Record

To: George T. Frampton/CEQ/EOP@EOP  
cc: Roger S. Ballentine/WHO/EOP@EOP  
Subject: DaimlerChrysler and Fuel Cells

George:  
What do you think?  
Morley

----- Forwarded by Morley A. Winograd/OVP on 02/18/2000 05:05 PM -----



**"Bachula, Gary"** <Gary\_Bachula@ta.doc.gov>  
02/16/2000 08:05:25 AM

Record Type: Record

To: Morley A. Winograd/OVP@OVP  
cc:  
Subject: DaimlerChrysler and Fuel Cells

---

Note the last paragraph in the article below. This now makes two companies who have publicly said they will be producing vehicles with PNGV technologies by 2004 -- Ford indicated they would be making "hybrid" vehicles by 2003 and DC says they will have fuel cell vehicles by 2004. We know the 3rd company has similar plans, but those plans are less public.

It would seem to me that on 3/30, one of the "announcements" we could make (in addition to tax credits, an auto/fuels initiative, R&D on some light truck technologies) would be something like this:

"It's now time to move PNGV 'out of the laboratory and onto the road.'  
In addition to the 2004 goal of pre-production prototypes of these 80 mpg PNGV cars, each of the automakers today have indicated that they will demonstrate these advanced high-mileage technologies in at least one product line that will be manufactured, sold, and on the road by 2004. Each manufacturer will choose a platform they think has the best chance of consumer success, meaning that we will now likely see these advanced hybrid and fuel cell technologies migrate from passenger sedans to platforms across the auto companies' product mix -- minivans, SUVs, light trucks, etc. Putting clean, high-mileage cars and trucks on the road has always been the goal of PNGV. Today's commitment by the three

auto companies to do so is a big step toward a clean, green, future for this planet."

[Note: I don't think we would have to have the companies tell us specifically what they are going to do yet -- just a commitment to major production, etc, using hybrid or fuel cell technologies and a target date. Let them keep their competition guessing.]

Article from today's wires:

LONDON, Feb 16 (Reuters) - Oil and auto titans Royal Dutch/Shell <RD.AS><SHEL.L> and DaimlerChrysler <DCX.N> <DCXGn.DE> unveiled on Wednesday a research advance they said brought closer the prospect of gasoline-powered fuel cell cars.

Shell subsidiary Shell Hydrogen and DaimlerChrysler unit dbb Fuel Cell Engines GmbH said they had made a prototype gasoline reformer to make hydrogen for fuel cell applications in cars.

A joint statement said the development would allow the use of existing filling stations.

"We have shown that the concept of gasoline-powered fuel cell vehicles is viable," said Don Hubert, chief executive of Shell Hydrogen.

"This exciting technology ... holds great promise for enabling fuel cell vehicles rapidly to enter the market."

The companies will seek ways to commercialise the research, which successfully produced a 50kW multi-fuel system with a compact design for mobile and stationary use of fuel cells.

Ferdinand Panik, head of DaimlerChrysler's fuel cell project, said that despite the advance his first priority was to try to develop methanol as a fuel for fuel cells.

Fuel cells are seen as one of the most viable alternatives to traditional internal combustion engines as concerns mount over the impact of automobile emissions on the environment.

A fuel cell engine works by converting hydrogen into electricity, creating virtually no polluting emissions.

DaimlerChrysler plans to roll out an economically viable car powered by a fuel cell engine, which works by converting hydrogen into electricity, by 2004.



- att1.htm

THE WHITE HOUSE

CarGuys 2/11/00

- want auto specific R&D tax credit.

but this is what consumer tax credit is for.

- ok w/ focusing existing PNEV structure on light trucks and expanding to ~~the~~ truck-specific? (such as tires, transfer cases, etc.) Ford opposes.

- should we refocus PNEV toward market viability and away from prototypes?

- Did cos agree to PNEV for trucks? NO. but did agree that existing PNEV could be expanded applied to trucks.

- Ford thinks too early for PNEV

- for there to be a "bridge" technology (like hybrids) accel. depreciation makes the most sense.

- may need umbrella of govt sponsored forum in order to have fuel discussion.

- Agreement that we should put PNEV proposal together.

| Concept                                                                                     | Discussion                                                                                                                                 | Pros & cons                                                                                                                                                  |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Modest Commitments</b>                                                                   |                                                                                                                                            |                                                                                                                                                              |
| Commitment to joint public service announcements and marketing for high efficiency vehicles | Help create awareness of links between fuel use and climate change<br>Create awareness of the environmental advantages of high MPG cars    | Pro: modest request<br>Con: modest impact                                                                                                                    |
| Require highly visible energy efficiency (energy-star) labels                               | Major public service advertising creating awareness of the labels. An option is to include energy guzzler labels for poor performers       | Pro: energy star approach has had impact in other areas<br>Con: labels for MPG already exist and don't seem to have much market impact                       |
| Commit to major production runs of high efficiency hybrids                                  | At least 10% of new sales by 2005<br>Optional: separate goals for cars and light trucks                                                    | Pro: no CAFÉ baggage, Comparatively easy to negotiate<br>Con: only modest impact on MPG, Might allow larger vehicles unless new vehicles not counted in CAFE |
| Parking, car-pool lane, and other benefits for high efficiency vehicles                     | Issue High MPG stickers and encourage states to allow qualifying vehicles to use car pool lanes and employers to provide parking benefits. | Pro: can encourage commuting in highly efficient vehicles<br>Con: state and local decisions govern                                                           |

Or make  
Voluntary

mask

| <b>Tough Measures with real impact</b>                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pay Insurance and other fees at the Pump<br>[revenue neutral, no net new taxes] | Car owners typically pay about \$500/year for basic insurance and increasing amounts if they are in a high risk group. This proposal would collect the base amount through a tax on gasoline. Insurance companies would receive this amount for each customer and bill separately for risk premium. Net insurance costs would go DOWN about 20% since about 20% of all drivers are not insured and their costs are covered by those paying for insurance. | <p>Pro: good policy since it charges those who drive more higher insurance costs and creates incentives for both efficient vehicles and prudent driving. Forces uninsured drivers to pay.</p> <p>Con: requires national fee collection and distribution bureaucracy (some overhead). Muddy history: it nearly passed California referendum but opposed by insurance companies since it was linked to unrelated insurance reforms.</p> |
| Sipper/Guzzler tax [ <i>revenue neutral: no net new taxes</i> ]                 | Tax vehicles above CAFÉ levels at increasing rates and use to provide rebates for vehicles below CAFÉ levels. Can have separate levels for cars and light trucks or use the car CAFÉ level as baseline                                                                                                                                                                                                                                                    | <p>Pro: could have a significant impact on markets if tax rates were high enough</p> <p>Con: strong resistance from manufacturers seeing CAFÉ-like program. Will be accused of raising taxes – however unfair the charge</p>                                                                                                                                                                                                          |

|                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                         |
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| Performance standards within a class (like the tax credit).                                                                                                                                                                                                                     | 2-3% per year improvement for each size class (by interior volume and acceleration for cars, and weight/2-4 wheel classes for trucks). Technologies: gasoline DI engines, deactivate cylinders, camless heads and continuous changes in valve timing, automatic gearshift (vs torque converter) and continuously variable transmissions. | <p>Pro: market for fuel efficient technology within each size class. Using these rules they are actually increasing by about 2% per year already!</p> <p>Con: might not increase fleet fuel economy significantly since producers could</p>                             |
| <p>Change CAFÉ in three ways [could be separated]</p> <p>(1) set fleet average for all cars and light trucks combined</p> <p>(2) set fleet average for sales from all manufacturers instead of separate limits for each manufacturer</p> <p>(3) eliminate alt fuel benefits</p> | <p>Setting the net fleet average at 2000 levels would keep things from getting worse through shifts to inefficient trucks. Setting it at the car 27.5 mpg in 2010 would have major impact. Trading would allow greater flexibility and permit averaging of foreign and domestics.</p>                                                    | <p>Pro: could limit losses in CAFÉ due to shift to trucks. Would allow more flexibility through trading and avoid gaming through alt fuels</p> <p>Con: would meet resistance from domestic manufacturers making the bulk of their profits from biggest light trucks</p> |

|                                                                                                                      |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| European-style commitment to introduce low CO2/mile cars and lower CO2/mile of fleet at an agreed rate               | <p>Major provisions:</p> <ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul> <p>not CAFÉ for each manufacturers, manufacturers could cut their own deals so that the total sales average works</p> | <p>Pro: guaranteed impact on fuel use, Ford, GM and Chrysler Europe all signed the EC agreement</p> <p>Con: Looks and smells like CAFÉ and at least one 33% improvement car by 2000 will be fiercely resisted in US. The EC members could credibly threaten regulatory action</p> |
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cars  
subcompact  
compact

—  
—  
—  
—

light trucks

# DAIMLERCHRYSLER

Robert G. Liberatore

Senior Vice President  
External Affairs and Public Policy

e-mail: [rgl1@daimlerchrysler.com](mailto:rgl1@daimlerchrysler.com)

*Roger -  
Info  
Rob*

**DaimlerChrysler Corporation**

1401 H Street, NW, Suite 700

Washington DC USA

20005-2110

Phone 202.414.6747

Fax 202.414.6716

FEB 01 '00 11:27 FR DC NEWS CENTER

248 512 2914 TO 88227575268\*1\*03 P.26

Send to Roger  
Bullentine (W.A.)  
with my  
card.  
Info.

ADVERTISING AGE -- January 31, 2000

# Slow sales acceleration foreseen for cleaner cars

## Honda and Toyota ready new breed of autos

By Jean Halliday

The future has arrived, with the introduction of several cleaner cars powered by engines that combine gasoline and battery power. But observers expect initial sales will get off to a slow start.

American Honda Motor Co. is first to the mass consumer market with the Insight, a small, two-seater coupe. Following this spring is Toyota Motor Sales USA's Prius five-seat sedan, and industry-watchers expect similar vehicles from General Motors Corp., Ford Motor Co. and the Chrysler brands of DaimlerChrysler within three years.

State clean-air regulations in a dozen northeastern states and California are the engine driving the so-called hybrid engine vehicles, said Thad Malesh, director of advanced vehicles at consultancy J.D. Power & Associates.

Although initially produced in limited numbers, within five years "the numbers will ramp up pretty quickly," Mr. Malesh predicted, be-

cause even-stricter vehicle emission regulations are due.

Even so, he projected that by 2006, the segment will generate industrywide sales of between 50,000 and 100,000 units annually. That's hardly a watershed figure—the Mercury Cougar, for example, sold 57,000 units last year.

The automakers are producing

ads in mid-December, but the big push, from Rubin Postaer & Associates, Santa Monica, Calif., is starting now.

The TV campaign carries Honda's existing corporate tagline, "Honda thinking." Print ads, started in January magazines for the Honda Division car brand are product-focused, said Joan Egan, account director at the agency. The main magazine blitz continues through the first quarter.

### ADS FROM SAATCHI

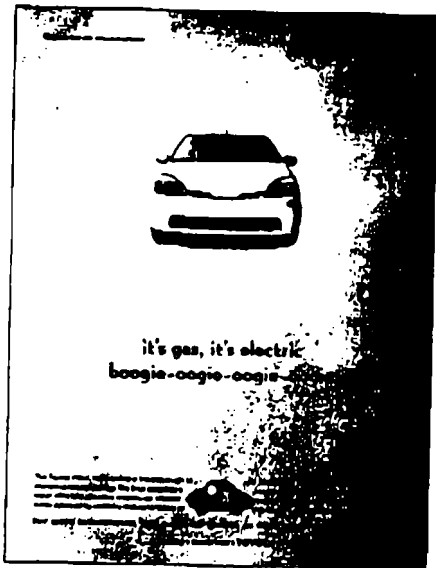
Toyota Motor Sales USA's Toyota Division starts selling Prius in late spring. The carmaker's Web site ([toyota.com](http://toyota.com)) already has an area with Prius information, and Saatchi & Saatchi, Los Angeles, is developing the ad campaign.

Even before the launch, however, Prius is getting a boost in national print ads from Toyota Motor Corporate Services of North America, which next month extends a print campaign begun last summer.

The ad, from Oasis Advertising, New York, touts the company's environmental consciousness, featuring the Prius with the copy, "A car that sometimes runs on gas power and sometimes runs on electric power, from a company that always runs on brain power."

### MORE IN FEBRUARY

The second round of ads arrive in *Discover* and *Life*, which go on sale the second week of February. The buy expands to newsweeklies, *Audubon*, *The New Yorker* and *People*, and will run through March. That effort features Prius as its centerpiece and directs consumers seeking more information to its 1-800-Go-Toyota toll-free phone number, or the environmental area of Toyota's Web site ([toyota.com.ecologic](http://toyota.com.ecologic)).



Ready to go: The Prius will be launched this spring.

only limited numbers of the hybrid vehicles to try and gauge consumer acceptance of the new models. They are also aware of consumer misconceptions about the need for recharging and limited driving ranges—concerns that are being addressed in advertising.

Insight was launched modestly with one TV spot and several print

### 30,000 IN JAPAN

Toyota said it sold 30,000 of the Prius models in Japan since it went on sale there in late 1997. But Toyota is juicing up the Japanese model, which offers 58 horsepower, with more pep to suit American tastes.

Mr. Malesh said that although both Honda and Toyota will have no trouble selling out their projected 6,000 units each this year, the car marketers will have to advertise heavily to explain the so-called hybrid-engine cars to consumers.

He said J.D. Power's June 1999 survey of 500 consumers in states with strict emissions laws revealed 75% were unaware the batteries of hybrid engines don't need to be charged.

The cars run either on the battery or gas engine, or on both. Prius, for example, Mr. Malesh said, uses both engines, except when the car starts from a dead stop. Then, it uses only the battery engine, causing minimal emissions.

In that, the new hybrids differ from General Motors' industry-first, all-electric EV1 car, which needed a battery recharge after traveling about 70 miles. GM launched EV1 with much fanfare in late 1996 in four western states, but sales of the lease-only model never took off. GM earlier this year pulled the plug on EV1.

Mr. Malesh said consumers found the EV1 too costly (in the \$35,000 price range) and its driving range before recharging too limited.

### 70 MILES TO GALLON

Toyota hasn't announced a price range for Prius, but the Honda Insight will start at \$18,800. Insight gets 70 miles to the gallon, with horsepower up to 73. Honda expects three different types of consumers to buy its car.

The first: married, college-educated males with an average age of 48 and average household income of \$75,000. Another group consists of single, urban drivers between the ages of 18 and 25 with an average household income of \$45,000. The last group of Insight buyers are expected to be families, with one or two vehicles and household incomes around \$55,000. They are likely to be retired.

Jack Trout, president of marketing consultancy Trout & Partners, doesn't believe hybrid cars will have wide consumer appeal. "The general public wants other things from cars besides 70 miles a gallon," he said. □

25

**Sophia P. Jackson@OVP**

  
 **02/10/2000 04:14:39 PM**

Record Type: Record

To: Morley A. Winograd/OVP@OVP  
cc: See the distribution list at the bottom of this message  
Subject: Friday's PNGV

Morley,  
Andrew Card, Jr., Vice President of GM, D.C., will attend tomorrow's PNGV meeting. I will conference  
Dennis Minano in.

Sophia

----- Forwarded by Sophia P. Jackson/OVP on 02/10/2000 04:12 PM -----

**Sophia P. Jackson**

  
 **02/09/2000 04:32:30 PM**

Record Type: Record

To: See the distribution list at the bottom of this message  
cc: See the distribution list at the bottom of this message  
Subject: Friday's PNGV

It is confirmed...the PNGV meeting will take this Friday, 2/11/00 from 2:30 - 4:00 PM in the Vice  
President's Ceremonial Office (Old Executive Office Building, room 276).

If you have any questions, please call me on 202-456-2816. Below is a list of invited attendees  
(\* = confirmed).

Thank you,  
Sophia

Attendees:  
Gary Bachula, U.S. Dept. of Commerce\*  
Roger Ballentine, Office of Environmental Issues\*  
George Frampton, Council on Environmental Quality (CEQ)  
Henry Kelly, OSTP\*  
Linda Lance, CEQ  
Rob Liberatore, Daimler Chrysler\*  
Dennis Minano, General Motors  
Duncan Moore, Office of Science Technology Policy  
Jennifer Muller, OVP\*  
Janet Mullins, Ford\*  
Bill Powers, Ford

Morley Winograd, Office of the Vice President (OVP)\*  
Marty Zimmerman, Ford\*

Message Sent To:

---

Morley A. Winograd/OVP@OVP  
dennis.r.minano@gm.com @ inet  
Henry C. Kelly/OSTP/EOP@EOP  
Jennifer R. Muller/OVP@OVP  
Roger S. Ballentine/WHO/EOP@EOP  
gbachula@ta.doc.gov @ inet  
Linda Lance/CEQ/EOP@EOP

Message Copied To:

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Taryn\_Thraillkill@ta.doc.gov @ inet  
kfs1@daimlerchrysler.com @ inet  
lbonner@ford.com @ inet  
Angela C. Mizeur/WHO/EOP@EOP  
Nancy A. George/OSTP/EOP@EOP  
Nancy Marlow/CEQ/EOP@EOP

Message Copied To:

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Henry C. Kelly/OSTP/EOP@EOP  
gbachula@ta.doc.gov @ inet  
Jennifer R. Muller/OVP@OVP  
Roger S. Ballentine/WHO/EOP@EOP  
Linda Lance/CEQ/EOP@EOP

## CURRENT ALTERNATIVE FUEL CREDIT IN CORPORATE AVERAGE FUEL ECONOMY LAW

There are currently two forms of CAFÉ credit available to automobile manufacturers – one for vehicles that are dedicated to alternative fuels and one for flexible or dual use vehicles. In all cases, credit is calculated for the vehicle, but only awarded when the vehicle is sold. The credits are available in four classes that CAFÉ regulates – domestic cars, imported cars, domestic trucks, and imported trucks.

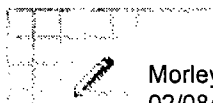
For vehicles that are dedicated to the use of an alternative fuel, the car is tested on that fuel and a miles per gallon figure is determined. The formula for the credit assumes that dedicated vehicles will use the alternative fuels 100% of the time. The credit available is that mpg divided by .15. If the car gets 20 mpg, then 20 divided by .15 equals 133 1/3 miles per gallon, and any sales are credited at that amount in terms of calculating the average fuel economy for the fleet. There is no limit on how much an auto manufacturer may take in the form of credit for sales of dedicated vehicles.

For dual use or flexible-fueled vehicles, the formula assumes that the car will use the alternative fuel 50% of the time and gasoline 50% of the time. The car is tested using both fuels, and a miles per gallon rating determined for each fuel. The alternative fuel rating is divided by .15, and the alternative fuel rating and the gasoline rating are harmonically averaged \*. If a car gets 20 mpg with alternative fuels and 25 mpg with gasoline, the computed average fuel economy is 42.1 mpg.

The problem with this approach is that use of alternative fuels is far less than 50%, and may even be approaching zero for some vehicle groups. If the formula were to be revised to reflect actual fuel use, the credit available to manufacturers would be much less. For example, if the formula assumed that the alternative fuel was used only 10% of the time, a car that gets 20 mpg with alternative fuels and 25 mpg with gas would have an average fuel economy of 27.2 mpg rather than 42.1.

Manufacturers are limited to earning 1.2 mpg against their fleet-wide average fuel economy, or may lower their average for passenger cars from 27.5 mpg to 26.3 mpg. Major manufacturers are all expected to achieve that maximum limit by 2002. Daimler/Chrysler, which is selling flexibly fueled minivans, may meet it this year. The credit expires at the end of 2004, unless DOT extends it for up to four additional years. If extended, it is limited to .9 mpg.

\* The computed average fuel economy for a car is calculated using the following formula:  
$$1/((50\% / (\text{the alternative fuel mpg rating} / .15)) + (50\% / \text{the gasoline mpg rating})).$$
For a car that gets 20 MPG with alternative fuels and 25 mpg with gasoline, the formula is  $1/((50\% / (20 / .15)) + (50\% / 25)) = 42.1$  mpg. If the formula were to be changed to reflect only 10% use of alternative fuels for the same car, the formula would be  $1/((10\% / (20 / .15)) + (90\% / 25)) = 27.2$  mpg.



Morley A. Winograd@OVP  
02/08/2000 01:51:59 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP

cc:

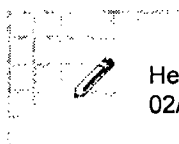
Subject: Re: OK, here's my version

Roger:

Part two of this message is why PNGF should be done.

Morley

----- Forwarded by Morley A. Winograd/OVP on 02/08/2000 01:51 PM -----



Henry C. Kelly@EOP  
02/08/2000 09:29:15 AM

Record Type: Record

To: Morley A. Winograd/OVP@OVP

cc:

Subject: Re: OK, here's my version

Thanks. Took your stuff. Changed the italicized sentence to :

Industry membership will be determined following discussions with key business representatives



fuels strategy feb00.d

I'd prefer to leave this a bit open. We may want to include small alt-fuels people. What's the next move? I sent a preliminary copy to Linda last night (she had to leave quickly -- her father is gravely ill). here's my pitch to her about why this can fly:



Unlike the failed "car talk" negotiations, the goal is not to agree on a prescription for public action (boggled down over CAFE feuds) but to craft a consensus on research AND to define a practical strategy for deploying fuels without mandates.

Also unlike "car talk", the auto and fuels industry actually have an interest in a practical outcome that avoids a lot of wasted investment. The fiasco over MTBE is a cautionary tale.

There are precedents for introducing new fuels and emission control devices through a consensus process -- and we can build on them.

The environmentalists are not likely to see this as some kind of cop-out since it doesn't undermine CAFE arguments (unless you believe that supporting PNGV research undermines CAFE) or any other regulatory action now contemplated. They are likely to agree that the process is needed and understand the consequences of a mistake

Within class mpg  
improvement  
2% improvement  
per year.  
(Europe: 25% by 2010)

"Gloss over"

- The major resistance is likely to come from those with an interest in pushing a favored fuel ("biodiesel is the answer, why are you considering alternatives, "etc. etc. etc.)

## **A Consensus-Based National Fuels Strategy**

The least expensive approach to achieving major reductions the emissions and fuel consumption of highway vehicles will almost certainly require new propulsion system technologies, new emission control devices, and a new fuel. A strategy for getting the best combination of these technologies into national markets quickly must confront two major problems:

1. a large number of fuel and propulsion system/emission control combinations are possible – each with very different implications for the environment, and corporate costs -- and there is no current consensus about which will prove most attractive,
2. if vehicle technologies require a new fuel to achieve environmental and market requirements, a strategy must be developed for introducing both vehicles and a fuel delivery infrastructure simultaneously.

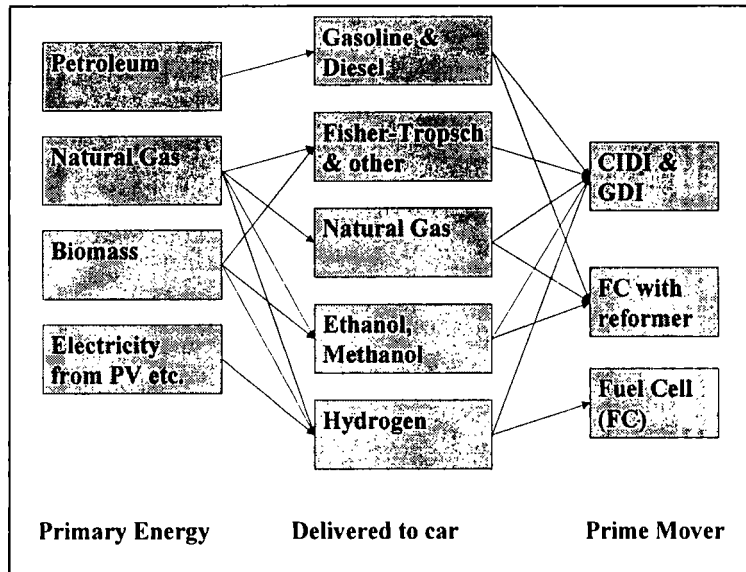
Repeated changes in fuel and automobile markets during the next few decades could be very costly in talent and financial resources. Uncertainty is likely to slow the introduction of new technologies, delay achievement of public environmental and fuel economy objectives, and be costly and disruptive for the firms involved.

This initiative will create a framework for reviewing competitive approaches to fuels and vehicle technologies involving the federal agencies, the Alliance of Automobile Manufacturers, and fuel producers. This group will: (a) provide guidance on research priorities for vehicles and fuels, (b) identify a strategy for deploying both fuels and vehicles, and (c) seek commitments for parallel production and deployment from participating businesses. The goal will be to encourage vigorous competition between different approaches and to move vehicle and fuel technologies into markets quickly and without protracted confrontations in regulatory proceedings or in the courts.

### **Background**

Gasoline and diesel fuels have been the primary energy source for highway vehicles for nearly a century. They have, of course, been modified over the years to improve engine performance and protect the environment. Regulations have lowered lead content, required oxygenates, and the rulings associated with the Tier II Clean Air Act will greatly reduce sulfur levels. Direct injection engines, fuel cells, and other advanced propulsion systems under consideration by the U.S. automobile and truck manufacturers, however, are likely to work best using entirely new fuels. Over the long term, hydrogen may prove to be a superior energy source but many other options are available.

The major alternatives are illustrated in the Figure on the next page. The first column shows the raw material used to manufacture fuel. At present nearly all fuel is manufactured from petroleum. In the future it would be possible to use natural gas (abundantly available for domestic resources), a renewable resource such as biomass (made from farm and forest residues or new crops), or from solar or wind resources, and possibly coal. The second column shows the form the fuel would take in the filling station. The liquid fuels (Fisher-Tropsch, ethanol, methanol, and others) would require



the fewest changes in the distribution infrastructure. Most of these could be manufactured from several fuel sources. The third column shows the major options for propulsion systems in advanced cars and trucks. These include Compression Ignition Direct Injection (CIDI) engines which are advanced diesel cycles, Gasoline Direct Injection (GDI) engines, Fuel Cell (FC) devices using an onboard reformer to

separate hydrogen from fuels such as gasoline or ethanol, and Fuel Cell devices using hydrogen onboard the vehicle as a compressed gas, in a hydride, or in some other form.

At present, of course, no fuel can compete successfully with gasoline and diesel fuel manufactured from gasoline. In the future, however, innovations can reduce the cost of manufacturing alternative fuels from natural gas and renewable sources. The least expensive fuels many not necessarily provide the least expensive transportation if they increase the cost of emission control and other devices in vehicles.

### Management:

The work will be undertaken by a partnership between federal agencies, the Alliance of Automobile Manufacturers, and [petroleum/natural gas/alternative] organizations. Federal participation will be chaired by the Department of Energy with support from the Departments of Commerce, and Transportation and the Environmental Protection Agency. Industry participation will be determined by ...

### Activities:

The management team will assign working groups as needed to undertake the following tasks:

#### 1. Establish selection criteria

- Net consumer costs of driving
- Net environmental impacts of fuel production and use (local, regional, global impacts on air, water and land)
- Net investment costs to fuel and
- Sustainability
- Safety in vehicles, filling stations, production and transport of fuels.
- Reliability of supply (import dependence)

## **2. Research Priorities**

- Determine the fuel/propulsion systems with a reasonable chance of success
- Review research priorities for propulsion and fuels and testing of fuel and propulsion combinations and provide advice for public and private investment

## **3. Develop timelines and strategies for introduction of fuels and new vehicles (including deadlines for production commitments)**

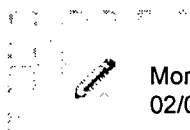
- Target date for determining which fuel should be introduced (an important issue is whether one or two fuel transitions should be considered – e.g. shifting to an intermediate fuel in the relatively near future and hydrogen over a longer period)
- Target date for pilot deployment of new fuels and limited production of vehicles using new propulsion systems (depending on the nature of the infrastructure changes it may be necessary to consider regional demonstrations or pilots using captive fleets)
- Target date for national deployment of vehicles and fuels

## Milestones for Fuel Strategy

| Event                                                                 | Function                                                                                                                                                                                         | Date*       |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| First meeting of Coordinating Council                                 | Provides overall policy guidance and links to decision-makers in industry and government                                                                                                         | T+30 days   |
| Formation of Research Review Team                                     | Reviews government funding for vehicles and fuels and recommends needed additions considering corporate research resources                                                                       | T+60 days   |
| Approve selection criteria for fuel/vehicle combinations              | Criteria such as net cost to consumer, short and long term environmental and fuel consumption impacts, time to implement and other factors that will be used to evaluate options for deployment. | T+ 3 months |
| Formation of team to develop fuel deployment strategy                 | Review options for fuel/vehicle combinations and recommend timing for deployment                                                                                                                 | T+4 months  |
| Approve initial technical selections for fuels and vehicle deployment | Tentative selection of national fuel infrastructure transformation and deployment schedule                                                                                                       | T+18 months |
| Production commitments by fuel and vehicle manufacturers              | Firm targets and timetables for producing vehicles and fuels                                                                                                                                     | T+2 years   |
| Introduce new fuel in test markets                                    |                                                                                                                                                                                                  | TBD         |
| National availability of first new fuel                               |                                                                                                                                                                                                  | TBD         |

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\* T= date agreement is signed



Morley A. Winograd@OVP  
02/09/2000 04:13:00 PM

Record Type: Record

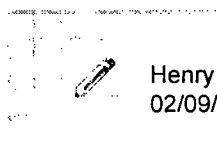
To: George T. Frampton/CEQ/EOP@EOP  
cc: Roger S. Ballentine/WHO/EOP@EOP  
Subject: Your Request

George/Roger:

Just the two of us should probably discuss the entire content of this memo real soon.

Morley

----- Forwarded by Morley A. Winograd/OVP on 02/09/2000 04:12 PM -----



Henry C. Kelly@EOP  
02/09/2000 04:03:45 PM

Record Type: Record

To: Morley A. Winograd/OVP@OVP  
cc:  
Subject: Your Request

----- Forwarded by Henry C. Kelly/OSTP/EOP on 02/09/2000 04:06 PM -----



JEFF ALSON <ALSON.JEFF@epamail.epa.gov>  
02/09/2000 01:53:49 PM

Record Type: Record

To: Henry C. Kelly/OSTP/EOP  
cc:  
Subject: Your Request

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**\*\* High Priority \*\***

Henry,

1. The AMFA CAFE credits for flexible and dual fuel vehicles, which are capped at 1.2 mpg per manufacturer, sunset at the end of 2004, but can

be extended by DOT for 2005-2008 with a new cap of 0.9 mpg. For 1998, Chrysler got a 0.6 mpg boost out of its E85 minivans, while Ford and GM didn't get much. Ford plans on ramping up sales quickly, however, and we have heard that they expect to get 0.7 mpg in 2000 and the maximum 1.2 mpg by 2002. I am sure that GM and DC will also soon ramp up to the maximum. As I mentioned in our conversation, the formula used for these credits assumes 50% use of the AF and 50% use of gasoline in flexible and dual fuel vehicles. An option that is extremely defensible and yet could provide some leverage on the industry would be to propose that the credits be based on actual % of fuel usage calculated from surveys of motor fuel distributors. At this time, based on this option, E85 vehicles would get almost no credit whatsoever, but they would if and when they actually start to use E85. Another benefit of this is, like with seat belt usage, automakers would be motivated to use their great power to promote the use of E85. A reminder that NHTSA is starting a report to Congress on this topic, and EPA and DOE are working with them.

2. Attached is a memo summarizing the details of the voluntary FE agreement in Europe. We have not distributed this publically, but believe it is completely accurate.

3. Here are some thoughts on CAFE, ignore if you are too busy, and excuse me if they are all too obvious to you. I know we don't have the votes, but my feeling is that we have to begin the debate if we ever hope to be able to get the votes. People forget that there were 57 votes on the Senate floor to force a vote on the Bryan Bill in the early 1990s (including McCain!), just not the 60 needed to close the filibuster. Public opinion polls, for whatever they are worth, consistently show majority support for higher CAFE. And some things have changed recently: the 40 votes on the NHTSA rider surprised many (including the industry), the GAO study and possible Spring hearings by McCain (again, I don't know where he will end up here, but his "maverick" nature at minimum introduces additional uncertainty for the industry), the flurry of high-mpg concept cars (which weakens the industry's old "technology isn't there" argument), and higher gasoline prices which are having their usual irrational impact on the public psyche. Still, I agree that all of the above are insufficient to win a vote in Congress today, so the most relevant question becomes "how can we market CAFE to the industry"? And here I think there are two arguments. One, the uncertainty over what domestic automakers ought to be planning to sell in the future is not good for them. Engineers like certainty, they don't have it now, and they are pretty sure (this is borne out by the confidential Delphi studies of industry executives) that they will not be able to keep selling today's CAFE vehicles for much longer. Plus, any "world car" concepts must be higher fuel economy, and the US as a potential FE outlier is a problem there as well. Two, they can help design a Reinvented CAFE that contains elements that they may actually like: lots of leadtime, smaller annual improvements instead of big step changes, combining domestic and import fleets, maybe manufacturer-specific baselines a la the Bryan Bill. I really believe this combination of long-term regulatory certainty plus the ability to design CAFE to have elements more favorable to them has a chance, though I certainly agree that they will want to wait until after the election to assess the lay of the land.

Jeff



- EURVOL.WPD

## Status of European Commission Voluntary Passenger Vehicle CO2 Agreement

### *The Auto Industry Commitment with the European Commission*

- \* On July 27, 1998, the ACEA (the European automobile industry trade group representing BMW, Fiat, Ford of Europe, GM Europe, DaimlerChrysler, Porsche, PSA Peugeot Citroen, Renault, Rolls-Royce, Volkswagen and Volvo) submitted a voluntary CO2 reduction commitment to the European Commission.
- \* **The central commitment by ACEA is to reduce new car CO2 emissions to 140 g/km by 2008, based upon the average *combined* emissions of all ACEA member fleets (not individual manufacturer fleets).<sup>1</sup> This is equivalent to an average fuel economy of about 40 mpg for gasoline-fueled cars and about 45 mpg for diesel-fueled cars.<sup>2</sup> ACEA and the Commission estimate **achieving this goal will reduce new car CO2 emissions by 25%, relative to 1995 levels.****
- \* **The ACEA commitment does not include any compliance enforcement mechanism.** However, the EU Commission stated they may consider binding legislation if ACEA fails to meet its interim target in 2003. There is a provision for joint ACEA-EU monitoring and a 2003 progress review, details to be worked out later in an “exchange of letters.”
- \* **In October, 1999, JAMA and KAMA (industry trade groups representing Japanese and Korean automobile manufacturers) agreed to reduce new car CO2 emissions levels to the same 140 g/km, but by 2009, one year later than the ACEA commitment.**
- \* The EU’s long term (2012) goal is to reduce average new car CO2 emissions to 120 g/km, equivalent to about 47 mpg if gasoline-fueled, and about 52 mpg if diesel-fueled.
- \* The EU Commission estimates that the ACEA commitment would cover about **70% of the gap** between current CO2 car emissions and the EU’s long term car CO2 goal.

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<sup>1</sup> ACEA’s commitment includes an objective that “some” automakers will make 120g/km cars available by 2000. However, cars at or near 50 mpg (roughly equivalent to 120 g/km) are already available in the US, Europe, and Japan. In Europe, these include some of the best-selling cars in the mini, subcompact and compact classes. The commitment also includes an interim 2003 “estimated target range” (not commitment) of 165 - 170 g/km, or about 33 - 34 mpg (if gasoline).

<sup>2</sup> US and EU fuel economy ratings not directly comparable, due to differences between the two test cycles.

## *EU Fuel Economy Policy Context*

- \* **European nations do not have CAFÉ-like fuel economy standards.** A few European automakers (VDA, Volvo, e.g.) have made voluntary fuel economy commitments with individual nations which will be supported by complementary tax policies, but these agreements cannot achieve EU-wide CO<sub>2</sub> reduction goals.
- \* In Europe, **diesels currently comprise about 25% of new light vehicle sales**, largely because of higher fuel prices, weaker diesel emission standards, and, in some countries (e.g., France), favorable tax policies.
- \* Passenger car fuel economy is slightly higher in Europe than in the US, due to smaller car/engine size and to the widespread use of diesel engines. (Including light trucks would widen the fuel economy gap even more). However, the CO<sub>2</sub> benefits of diesel engines are mitigated by the higher carbon content of diesel versus gasoline fuel. The following table compares average fuel economy and CO<sub>2</sub> emissions of new cars (excluding light trucks) in the US and Europe: <sup>3</sup>

**Average new car fuel economy: US and Europe**

|               |             |                               |             |                           |
|---------------|-------------|-------------------------------|-------------|---------------------------|
| United States | *28 mpg     | CAFÉ likely FE “driver”       | <1% diesel  | 196 g CO <sub>2</sub> /km |
| Europe        | 30 - 31 mpg | fuel price likely FE “driver” | *25% diesel | 186 g CO <sub>2</sub> /km |

### *The ACEA Strategy: Direct-Injected Engines Enabled by Low-Sulfur Fuel, Downsizing*

- \* To meet their goal, the ACEA estimates that **upwards of 90% of new car sales will include direct-injected diesel or gasoline engines.** An earlier version of ACEA’s draft stated “no constraints against diesel technology” as a condition. The final version reads, “This commitment is based on the assumption of an unhampered diffusion of car CO<sub>2</sub> efficient technologies into the market...”
- \* **Future EU emission standards continue to allow diesel passenger vehicles to emit higher NO<sub>x</sub> than gasoline vehicles.** Under both Euro-III (2000) and Euro-IV (2005), diesel cars and light trucks can emit from 3 to nearly 4 times as much NO<sub>x</sub> as can gasoline passenger vehicles.

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<sup>3</sup> EU FE derived from CO<sub>2</sub> number cited by EU; US CO<sub>2</sub> derived from FE CAFÉ reporting, each derivation uses same carbon factors; EU mpg assumes 25/75 diesel/gasoline mix, US mpg assumes 100% gasoline.; assumes 19.5 lb CO<sub>2</sub>/gal gasoline and 22.2 lb. CO<sub>2</sub>/gal diesel.

- \* **The ACEA commitment is based on the assumption that low-sulfur fuels required for lean NOx catalysts needed with lean-burn DI engines will be available in sufficient quantity.** The EU recently promulgated fuel specifications that cap sulfur content in gasoline and diesel motor fuel at 50 ppm by 2005. A 50 ppm cap is equivalent to a 30 to 40 ppm average. This compares to the current US average of 330 ppm for gasoline, with no national standard.<sup>4</sup> (EPA recently finalized a 30 ppm gasoline fuel sulfur average, to take effect in 2004 to 2006, with an ultimate national cap of 80 ppm.) Diesel fuel is 340 ppm average sulfur, with a 500 ppm cap already in place.
- \* The ACEA anticipate that they will **need to increase small car market share.** This seems at odds with what appears to be an newly emerging European interest in larger cars and light trucks. However, experts do not foresee a significant market shift to large cars and light trucks in the EU, primarily because of high fuel prices and space constraints.

*Other ACEA Qualifiers: No New Regulation or Fiscal Measures, "Comparable Non-ACEA Member Efforts."*

- \* **ACEA states its commitment provides a "complete and sufficient substitute for all new regulatory measures... and for any additional fiscal measures** in pursuit of the CO2 objectives of this Commitment." Despite this assumption, the Commission reiterated the EU and member states' rights to employ fiscal measures. The Commission also re-emphasized the market-transformation benefits of fiscal measures and vehicle labeling (and plans to propose fuel economy labeling legislation in the near future).
- \* **The ACEA commitment assumes that non-ACEA European car manufacturers will make equivalent CO2 reduction efforts.**

#### *Significance for US Environmental Policy*

- \* *Climate Policy Impact.* The commitment creates a precedent for a similar voluntary agreement in the US. However, the automotive industry is likely to strongly argue that the EU commitment has extremely limited relevance for the US, since the European market is very different in terms of fuel prices, consumer demand, emission standards, etc. Despite the automakers' likely resistance to doing anything new in the US, they would presumably prefer a voluntary approach over new regulatory measures.
- \* *Tier 2 Criteria Emissions Impact.* The EU's decision to maintain a "diesel NOx waiver"

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<sup>4</sup> There are special requirements in place for RFG and CA Phase 2 RFG.

permits the “emissions versus fuel economy” argument that the EPA has tried to preclude through Tier 2. It can also be viewed as an explicit EU endorsement of direct injection diesel engine technologies.

- \* *Fuel Sulfur Impact.* The EU’s decision to cap gasoline and diesel sulfur at 50 ppm supports EPA’s final rule on gasoline sulfur, and EPA’s plans to propose further regulations for lower diesel sulfur, as well.

how to end the internal combustion engine as we know it.  
Draft Remarks for March 30

1. Set the Stage. Auto Industry brought the wonders of the industrial age to the average American. They revolutionized the world by providing low cost, comfortable transportation for the first time in history. They did it with a clear vision and the willingness to introduce new technologies and new ways of thinking at great risk. These new ideas also brought us the first \$5 a day wage rate, the founding of the UAW, and the growth of a prosperous middle class for those working the assembly line. People like Henry Ford, Alfred Sloan, Walter P. Chrysler and Walter Reuther made the industrial age work for America's working families with new freedom and new economic prosperity.
2. Build the Bridge. Today, as the industrial age is ending, another world, filled with even more opportunity, is beginning. The wonders of Information Technology and scientific discovery make it possible for us to dream of new ideas and an even better type of prosperity. Without sacrificing any of the freedoms we now enjoy, we can produce new kinds of cars that will give American consumers the kind of performance they have come to expect without the environmental consequences of increased pollution or global warming. The American automobile industry can once again lead the world in demonstrating how to harness the new technologies to serve the needs of America's working families. We are fortunate that at this critical moment in time, we have leaders in this industry, such as Jack Smith and Harry Pearce at GM, Bill Ford, Jr. and Jacques Nasser at Ford, xx at Chrysler, Steve Yokich at the UAW, who have the same powerful, clear vision and will to make this future happen.
3. State the Goal. I have had the pleasure of working with the automobile companies represented here in one of those partnerships over the last six years. The Partnership for a New Generation of Vehicles set as its goal the prototype production of a full sized passenger car that could get 80 miles to the gallon with the same price and performance as today's cars. I am pleased to say we are on track to achieve that goal, even though when we agreed to it, we had no idea how to accomplish it. The technologies demonstrated at this year's Auto Show and explored in our joint research and development activity were intriguing ideas in a few research labs back in 1993 when we first set out on this journey. Things like lean burn engines, light weight materials, fuel cells, aerodynamic designs and other ideas were promising but mostly untested technologies. Now, those concept cars are here today for all to see. I am pleased that we have made this kind of progress. But we can do more. WITHIN THE NEXT DECADE WE CAN DEMONSTRATE HOW TO PRODUCE A CAR WITH ZERO EMISSIONS, POWERED BY HYDROGEN FUEL CELLS, WHICH MEETS ALL OF THE PERFORMANCE REQUIREMENTS FROM SAFETY TO SIZE THAT THE AMERICAN CONSUMER DEMANDS. AND WE CAN PUT IN PLACE AN ENTIRELY NEW FUEL SYSTEM TO PROVIDE THESE NEW CARS AND TRUCKS WITH THE RENEWABLE ENERGY THEY WILL NEED TO ELIMINATE AIR POLLUTION COMPLETELY.
4. Tell them how. We can do this by creating a Partnership for a New Generation of PERSONAL TRANSPORTATION (PNGPT) that will bring together not just the automobile industry but oil companies, chemical companies and others in a joint

public/private research project to solve the current obstacles to providing the right energy source for the new fuel cell engines. Right now, for instance, hydrogen, one of the promising technologies, presents major challenges in its delivery and distribution. Buses powered by hydrogen fuel cells are on the streets of Chicago. But back at the depot, complex and costly mechanisms need to be in place to convert the stored hydrogen to useful energy on board. Yet at the auto show, one company demonstrated a fuel cell powered by hydrogen in a solid state, or a hydrate, locked into place using the very latest in nanotechnology. The focus of the research project I am announcing here today will be to determine the very best fuel technology that can be brought to the American consumer within this decade to power the new cars and trucks of the 21<sup>st</sup> Century.

5. Sell the sizzle. *It will bring to every American consumer a means of personal transportation not powered by the internal combustion engine of the industrial age, but one powered by fuel cells from the information age.* Hydrogen powered fuel cells produce nothing more than water as emissions, creating the opportunity for changing our prospects for economic growth and environmental protection as dramatically as the Internet has remade our ability to communicate in the last decade. Transitioning from how we run cars and trucks today to a future based on fuel cells powered from renewable energy sources would mean eliminating completely the emissions of both fine particulates that cause 50 to 60 thousand deaths per year and carbon dioxide, the most significant contributor to global warming. These technologies will make our air cleaner and our economic future more secure.
6. Short term air pollution issue. We all recognize that the wonders of these new technologies will not arrive tomorrow. With this new partnership we hope to bring them to market sooner, in fact we want to take an entire decade off the current predictions of how long it will be before we can enjoy them. However, in the interim we still need to address the fundamental question of reconciling America's love of the open road and their car, with the need to clean up the air we breathe and protect the global climate from cataclysmic change. Recently, the administration released its proposal on how to deal with the issue of air pollution and smog over the next decade, until these new technologies can be brought to market. We were very pleased with the cooperation we received from the automobile and oil industry in the development of that proposal. While some may quarrel with the details, the fact that we have a workable proposal that will remove 50 million tons of Noxious material from our atmosphere over the next decade without imposing undue costs on either industry is a tribute to the kind of partnerships we have been able to build between all the parties concerned. I congratulate the leaders of industry assembled here who support that proposal. Shortly we will also release our proposal on how to dramatically reduce the level of sulfur in diesel fuels so that the hybrid engine technologies that PNGV have helped to create can be placed in cars and trucks with lower emissions and increased fuel efficiency.
7. Short term mileage or green house gas issue. We have not reached that kind of consensus on the more contentious issue of how to make sure Americans are driving cars that get the maximum possible gas mileage, minimizing their release of greenhouse gases that contribute to global warming. And I am not here today to announce any new breakthrough in our continuing debate over allowing the Department of Transportation the authority to set overall fleet averages for mileage performance by

company, as specified in the 1978 CAFÉ legislation. I believe its time for the Congress to let the administration administer the CAFÉ laws with the same flexibility and sensitivity that we have brought to the issue of air quality and tailpipe emissions. Our partners in PNGV disagree. But we do agree that one thing the Congress could do tomorrow to bring new more fuel efficient cars and trucks on the road would be to pass the administration's proposal to give each person who buys a vehicle with these advanced technologies a tax credit of up to \$3000.

8. Wrap it up. Visionary leadership combined with a practical plan to make it happen are the hallmarks of our nation's automobile industry. Their success has spread prosperity and freedom throughout this country and the world. The new challenges of the information age from global warming to the new global economy, require us to use those same qualities to maintain and build upon our success. We can do it by partnering together. We have proven we know how to work on complex problems like creating an 80mpg car in a cooperative way. Now we need to take that partnership to a new level. We will replace today's internal combustion engine as we know it with a high tech, hydrogen fuel cell that will provide a quantum leap in performance for the American consumer. And we will do it before the end of the next decade. Thank-you for providing all of us with the freedom to dream big dreams and the practical wisdom to make them happen.



Disney, the company, may be in the doldrums. Last year was one of its worst for decades. But the animated film, with which the creator of Mickey Mouse is still almost synonymous, is thriving. Disney's "Toy Story 2" was the third biggest box-office success of 1999, and films as varied as "The Iron Giant", "Princess Mononoke" (from Japan) and "Stuart Little" have recently shown how the genre at its most inventive can captivate like none other. Disney's latest release is "Fantasia/2000", the first animated feature to be made for IMAX screens. It is also the only update of the 1940 classic "Fantasia", originally designed by Walt Disney to be a continual work-in-progress. This picture is taken from a sequence in which Donald and Daisy Duck star in a Noah's Ark tale set to Elgar's "Pomp and Circumstance" marches. What a delight.

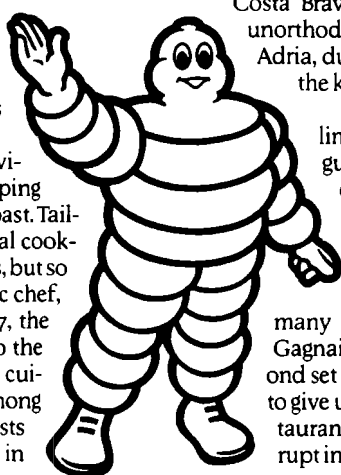
new restaurants and trends; its inspectors are thought to be partial to plush settings, obliging proprietors to spend lavish sums of money on decoration and pushing up prices; and it allegedly saves its highest praise for restaurants turning out classical preparations—"la cuisine de musée" as it is derisively known—discouraging chefs from experimenting and stifling creativity.

Few of these claims, however, stand up to close scrutiny. For a start, given the ingredients that typically adorn a three-star menu—foie gras, caviar, the finest fish and the choicest cuts of meat—eating at a top-rated establishment would empty most wallets regardless of the setting. On the other hand, people who are prepared to fork out hundreds of dollars for lunch or dinner expect their surroundings to be at least as sumptuous as their food.

Nor is there much evidence that the guide is keeping French food tethered to the past. Tail-levent, a temple of traditional cooking in Paris, boasts three stars, but so does the exuberantly eclectic chef, Pierre Gagnaire. And in 1997, the guide awarded three stars to the country bumpkin of haute cuisine, Michel Bras, who among other things encourages guests at his remote restaurant in

south-western France to use the same knife and fork throughout the meal.

Michelin also does an able job keeping tabs on the shifting food scene. Reflecting the growing appetite for ethnic fare, particularly in Paris, it has ladled out stars to Vietnamese, Chinese, and North African restaurants. Moreover, it no longer limits itself to France. It now issues guides to a dozen European countries, and while its annual ratings may not inspire quite the same feverish speculation in Pisa as they do in Paris, Michelin stars, wherever bestowed, shine in food circles like a well-glazed sweetmeat. Were it not for the three stars awarded to El Bulli, for example, would bon vivants be flocking to Spain's Costa Brava to sample the comically unorthodox dishes of chef Ferran Adria, dubbed "the Salvador Dali of the kitchen"? Unlikely.



A high mark from Michelin, however, is no longer the guarantee of commercial success that it once was. Although there are currently 21 three-star restaurants in France, the most that there have ever been, many of them are struggling. Mr Gagnaire, for example, is on his second set of three stars; he was forced to give up the first trio when his restaurant in St Etienne went bankrupt in 1996.

More telling still is the drop in France's overall number of starred eateries. In 1984, there were 642; last year, just 500. Falling standards in the kitchen are partly to blame; but a bigger factor has been France's economic malaise. The clientele is one- and mainly to French dining money no longer pays for fancy meals.

In recent years Michelin's Bib Gourmand, that offer of ways, the shift in

*copied Ballentine Podesta*

## Cleaner cars

# As pure as driven snow?

VANCOUVER is about a thousand miles from Silicon Valley. But as a hotbed of new technology it is a million miles away, not even on the same map. Yet in a garage in the unfashionable north bay area of the city was born a machine that could change the world—the Ballard PEM fuel cell. It promises to be to the car of the 21st century what the internal combustion engine was to the car of the 20th.

The fuel cell takes hydrogen and oxygen and combines them into water vapour, producing electricity in the process. Small and powerful enough to drive a car, it has none of the drawbacks—limited range, slow recharging—that have sunk battery electric vehicles so far. Its evolution features prominently in "Forward Drive", Jim Motavalli's racy account of the race to make cleaner cars. For the fuel-cell vehicle today holds out the best hope of combining a rising demand for cars with a falling tolerance for pollution.

Just over 100 years after the first motor car with a petrol engine was made by Karl Benz in Germany, the man who now runs the Mercedes car business, Jurgen Hubbert, says: "The fuel cell is the most promising option for the future, and we are determined to be the first to bring it to market." In practice, that means it will probably be possible to buy a fuel-cell car by 2004. DaimlerChrysler,

POWERING THE FUTURE—THE BALLARD FUEL CELL AND THE RACE TO CHANGE THE WORLD. By Tom Koppel. John Wiley; 288 pages; \$29.95 and £16.99

FORWARD DRIVE—THE RACE TO BUILD "CLEAN" CARS FOR THE FUTURE. By Jim Motavalli. Sierra Club Books; 288 pages; \$25

the maker of Mercedes, and the Ford Motor Company were so impressed by the Ballard product that they bought roughly half the company and set up joint ventures to develop a whole engine and transmission system based around the Ballard core. Nearly every other car maker in the world subsequently scrambled to get on the bandwagon, using Ballard cells or, in some cases, furiously developing their own.

"Powering the Future" tells the technical and human story of how the Ballard cell was born, thanks to the leadership of an idealistic former geologist Geoffrey Ballard. Bearer of both Canadian and American passports, he at one time ran a US government laboratory and also worked on alternative-energy projects before growing disillusioned with the bureaucratic world. He ended up in Vancouver leading a small team trying to develop lithium batteries to power electric cars while living off what his wife earned from running a pub. He and his associates eventually won a contract to develop proton exchange membrane fuel cells (PEM) for the Canadian military. The soldiers had identified their potential as a lighter source of battlefield power than the batteries that they traditionally hauled into the field to make their communications

equipment work.

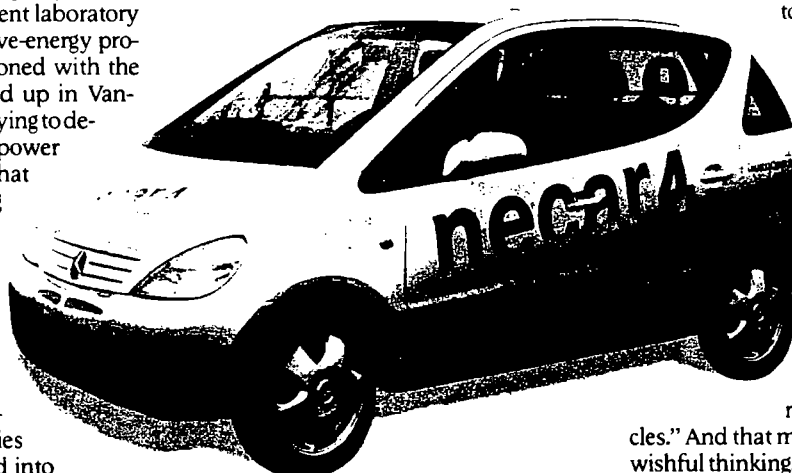
Mr Ballard and his handful of engineers and chemists began with little knowledge of PEM cells. The first versions had been developed by General Electric for moonshots. But the large American company had lost interest and the patents had largely expired. Other forms of fuel cell were then thought to be more promising.

What the Ballard team brought to the story was engineering and passion. Using bits of plastic and sheets of graphite to make their fuel-cell stacks, they steadily increased the power output of the PEM cells. At the

same time they cut costs by reducing the amount of expensive platinum needed in the electro-chemical process.

In early 1986 they showed off their work at a conference in Arizona, and the Americans suddenly woke up to the fact that they had been backing the wrong sort of fuel cell. The Ballard PEM cell made the electric motor car a real possibility, just as the tide of green protests against car smog was causing California to compel car makers to produce zero-emission vehicles.

Fuel-cell vehicles are still ten times as expensive as ordinary cars and there are problems building an infrastructure to supply hydrogen or hydrogen-bearing methanol, which is easier to handle. But mass production will cut costs, and even oil companies have now joined in the infrastructure work. The Ballard company's chief executive, Kenyan-born Firoz Rasul, told Mr Motavalli that, "By 2030 I think that one in three, or even one in two of the cars on the road will be fuel-cell vehicles." And that may well be more than mere wishful thinking.



The car for a cool planet?

## A book at Oscar time



HOLLYWOOD is in literary mood at the moment, and with good reason. The select band of industry insiders who vote for the Oscar nominations,

which are to be announced on February 9th, have recently shown themselves to be partial to a nice bit of literature. Look no further than "The English Patient" and "Shakespeare in Love".

Add to that the fact that, in order to qualify for this year's nominations, a film has to have been screened in Los Angeles during 1999, and it should be no surprise that December saw the release of a spate of movies with literary origins (see table). These included "The Talented Mr Ripley", a visualisation by Anthony Minghella (director of "The English Patient") of Patricia Highsmith's 1955 story of murder by the Mediterranean; "Angela's Ashes", taken from Frank McCourt's grim memories of his 1950s Limerick childhood; and "Snow Falling on Cedars", David Guterson's Japanese-American morality tale, which is also set in the 1950s.

Although the cut-off date for Oscar

2000 has now passed, the run of films-of-the-book shows no signs of ending. Steven Spielberg has put his project to film "Memoirs of a Geisha" on hold and Mr Minghella waited for the release of "The Talented Mr Ripley" before delving into his next film, based on Charles Frazier's moody civil war

saga, "Cold Mountain". But spring will see film versions of Alex Garland's "The Beach", Bret Easton Ellis's "American Psycho", Michael Chabon's "The Wonder Boys", and Cormac McCarthy's "All the Pretty Horses". Book publishers could not be more pleased. Whatever these films' success, reprints of the books almost invariably pop back up on the bestseller lists while the films are on release.

### The film of the book

| Title                  | Author             | Rank on Amazon | Featured actors                  | Opening date, 1999 | Opening weekend |
|------------------------|--------------------|----------------|----------------------------------|--------------------|-----------------|
| The End of the Affair  | Graham Greene      | 449            | Ralph Fiennes, Julianne Moore    | Dec 3rd            | \$199,000       |
| A Map of the World     | Jane Hamilton      | 11             | Sigourney Weaver, Julianne Moore | Dec 5th            | \$14,000        |
| The Cider House Rules  | John Irving        | 222            | Charlize Theron, Michael Caine   | Dec 10th           | \$110,000       |
| The Green Mile         | Stephen King       | 27             | Tom Hanks                        | Dec 10th           | \$18.0m         |
| Stuart Little          | E.B. White         | 1,026          | Michael J. Fox, Nathan Lane      | Dec 17th           | \$15.0m         |
| Girl, Interrupted      | Susanna Kaysen     | 128            | Winona Ryder, Angelina Jolie     | Dec 21st           | \$95,000        |
| Snow Falling on Cedars | David Guterson     | 95             | Ethan Hawke, Sam Shephard        | Dec 22nd           | \$32,000        |
| The Talented Mr Ripley | Patricia Highsmith | 26             | Matt Damon, Gwyneth Paltrow      | Dec 25th           | \$12.7m         |
| Angela's Ashes         | Frank McCourt      | 46             | Emily Watson, Robert Carlyle     | Dec 25th           | \$55,000        |

106th CONGRESS

2d Session  
H. R. 4270

To amend the Internal Revenue Code of 1986 to provide incentives for the production, sale, and use of highly fuel-efficient, advanced-technology motor vehicles and to amend the Energy Policy Act of 1992 to undertake an assessment of the relative effectiveness of current and potential methods to further encourage the development of the most fuel efficient vehicles for use in interstate commerce in the United States.

IN THE HOUSE OF REPRESENTATIVES

April 13, 2000

Mr. KILDEE (for himself, Mr. UPTON, Mr. DINGELL, Mr. LEVIN, Mr. TOWNS, and Mr. KNOLLENBERG) introduced the following bill; which was referred to the Committee on Ways and Means, and in addition to the Committee on Commerce, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To amend the Internal Revenue Code of 1986 to provide incentives for the production, sale, and use of highly fuel-efficient, advanced-technology motor vehicles and to amend the Energy Policy Act of 1992 to undertake an assessment of the relative effectiveness of current and potential methods to further encourage the development of the most fuel efficient vehicles for use in interstate commerce in the United States. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the 'Advanced Technology Motor Vehicle Fuel Economy Act of 2000'.

TITLE I--AMENDMENTS TO THE INTERNAL REVENUE CODE OF 1986

SEC. 101. CREDIT FOR CERTAIN ENERGY EFFICIENT MOTOR VEHICLES.

(a) IN GENERAL- Subpart B of part IV of subchapter A of chapter 1 of the Internal Revenue Code of 1986 is amended by adding at the end the following new section:

'SEC. 30B. CREDIT FOR HYBRID VEHICLES.

'(a) ALLOWANCE OF CREDIT- There shall be allowed as a credit against the tax imposed by this chapter for the taxable year an amount equal to the sum of the credit amounts for each qualified hybrid vehicle placed in service during the taxable year.

'(b) CREDIT AMOUNT- For purposes of this section--

`(1) IN GENERAL- The credit amount for each qualified hybrid vehicle with a rechargeable energy storage system that provides the applicable percentage of the maximum available power shall be the amount specified in the following table:

`Applicable percentage

--Credit amount

Greater than or equal to 5 percent but less than 10 percent --\$500

Greater than or equal to 10 percent but less than 20 percent--- --\$1,000

Greater than or equal to 20 percent but less than 30 percent--- --\$1,500

Greater than or equal to 30 percent --\$2,000.

`(2) INCREASE IN CREDIT AMOUNT FOR REGENERATIVE BRAKING SYSTEM- In the case of a qualified hybrid vehicle that actively employs a regenerative braking system which supplies to the rechargeable energy storage system the applicable percentage of the energy available from braking in a typical 60 miles per hour to 0 miles per hour braking event, the credit amount determined under this section shall be increased by the amount specified in the following table:

`Applicable percentage

--Credit amount

Greater than or equal to 20 percent but less than 40 percent --\$250

Greater than or equal to 40 percent but less than 60 percent --\$500

Greater than or equal to 60 percent --\$1,000.

`(c) DEFINITIONS- For purposes of this section--

`(1) QUALIFIED HYBRID VEHICLE- The term 'qualified hybrid vehicle' means an automobile that meets all applicable regulatory requirements and that can draw propulsion energy from both of the following onboard sources of stored energy:

`(A) A consumable fuel.

`(B) A rechargeable energy storage system.

`(2) MAXIMUM AVAILABLE POWER- The term 'maximum available power' means the maximum value of the sum of the heat engine and electric drive system power or other nonheat energy conversion devices available for a driver's command for maximum acceleration at vehicle speeds under 75 miles per hour.

`(3) AUTOMOBILE- The term 'automobile' has the meaning given such term by section 4064(b)(1) (without regard to subparagraphs (B) and (C) thereof). A vehicle shall not fail to be treated as an automobile solely by reason of weight if such vehicle is rated at 8,500 pounds gross vehicle weight rating or less.

`(d) APPLICATION WITH OTHER CREDITS- The credit allowed by subsection (a) for any taxable year shall not exceed the excess (if any) of--

`(1) the regular tax for the taxable year reduced by the sum of the credits allowable under subpart A and the preceding sections of this subpart, over

`(2) the tentative minimum tax for the taxable year.

`(e) SPECIAL RULES-

`(1) BASIS REDUCTION- The basis of any property for which a credit is allowable under subsection (a) shall be reduced by the amount of such credit (determined without regard to subsection (d)).

`(2) RECAPTURE- The Secretary shall, by regulations, provide for recapturing the

benefit of any credit allowable under subsection (a) with respect to any property which ceases to be property eligible for such credit.

**(3) PROPERTY USED OUTSIDE UNITED STATES, ETC., NOT QUALIFIED-** No credit shall be allowed under this section with respect to--

    (A) any property for which a credit is allowed under section 30,

    (B) any property referred to in section 50(b), or

    (C) any property taken into account under section 179 or 179A.

**(4) ELECTION TO NOT TAKE CREDIT-** No credit shall be allowed under subsection (a) for any vehicle if the taxpayer elects to not have this section apply to such vehicle.

**(f) REGULATIONS-**

**(1) TREASURY-** The Secretary shall prescribe such regulations as may be necessary or appropriate to carry out the purposes of this section.

**(2) ENVIRONMENTAL PROTECTION AGENCY-** The Administrator of the Environmental Protection Agency, in coordination with the Secretary of Transportation and consistent with the laws administered by such agency for automobiles, shall timely prescribe such regulations as may be necessary or appropriate solely for the purpose of specifying the testing and calculation procedures to determine whether a vehicle meets the qualifications for a credit under this section.

**(g) APPLICATION OF SECTION-** This section shall apply to any qualified hybrid vehicles placed in service after December 31, 1999, and before January 1, 2009.'

**(b) CONFORMING AMENDMENTS-**

    (1) Subsection (a) of section 1016 of such Code is amended by striking 'and' at the end of paragraph (26), by striking the period at the end of paragraph (27) and inserting ', and', and by adding at the end the following new paragraph:

    '(28) to the extent provided in section 30B(e)(1).'

    (2) The table of sections for subpart B of part IV of subchapter A of chapter 1 of such Code is amended by adding at the end the following new item:

    'Sec. 30B. Credit for hybrid vehicles.'

**SEC. 102. EXTENSION OF CREDIT FOR CERTAIN QUALIFIED ELECTRIC VEHICLES.**

**(a) EXTENSION OF CREDIT FOR QUALIFIED ELECTRIC VEHICLES-**

Subsection (e) of section 30 of the Internal Revenue Code of 1986 (relating to termination) is amended by striking 'December 31, 2004' and inserting 'December 31, 2008'.

**(b) REPEAL OF PHASEOUT-** Subsection (b) of section 30 of such Code (relating to limitations) is amended by striking paragraph (2) and by redesignating paragraph (3) as paragraph (2).

**SEC. 103. EFFECTIVE DATE.**

The amendments made by this title shall apply to vehicles placed in service after the date of the enactment of this Act.

**TITLE II--AMENDMENTS TO THE ENERGY POLICY ACT OF 1992**

**SEC. 201. STUDY OF CURRENT AND FUTURE ENERGY CONSERVATION REGARDING MOTOR**

**VEHICLE AND RELATED TRANSPORTATION IN INTERSTATE COMMERCE IN**

THE UNITED  
STATES.

(a) IN GENERAL- Subtitle G of title I of the Energy Policy Act of 1992 (42 U.S.C. 13451 note) is amended by adding the following new sections:

SEC. 174. TRANSPORTATION ENERGY CONSERVATION STUDY.

(a) STUDY AGREEMENT- The Secretary of Transportation (with the participation of the Secretary of Energy) shall, within 90 days after the date of enactment of this section, enter into an agreement with the National Academy of Sciences to conduct a comprehensive study of voluntary, mandatory, and other means and measures used by private and public sectors for the purposes of conserving energy in transportation of people and goods in interstate commerce in the United States, and for the provision of services by motor vehicles and other modes of transportation, and identify and examine potential voluntary, mandatory, and other approaches to such conservation. Such study shall also examine the use, acceptance, effectiveness, costs, impact on mobility, and other relevant factors concerning such current and potential means and measures for energy conservation and shall consider the ubiquitous nature of such transportation and its importance in the economy. The study shall also take into consideration such factors as current and future energy supplies available to the United States, the availability in the United States of adequate, reliable, convenient, consumer-friendly transportation locally, regionally, and nationally, the geographic size and population of the United States, and the availability and impact of technologies and fuels that affect energy conservation. The study shall also compare existing and planned energy conservation approaches in other economically developed countries and integrated economic regions, taking into consideration similar factors.

(b) REQUIREMENTS- The study shall be comprised of the following aspects:

(1) An overview of the United States energy supply situation, including an assessment of current and projected fuel supplies.

(2) The impact of current and projected fuel supplies on national security and trade.

(3) An assessment of energy use by the transportation and several other sectors of the economy.

(4) An assessment of the relative effectiveness of past and current motor vehicle energy conservation programs for motor vehicles and other modes of transportation, policies, and proposals in the United States, including consideration of, among others--

- (A) regulatory requirements, direct and indirect;
- (B) corporate average fuel economy mandate;
- (C) dispersal of authority over the provision and regulation of transportation;
- (D) gas guzzler tax;
- (E) alternative fuel vehicles and the availability of alternative fuels;
- (F) tax credits for electric vehicles;
- (G) fiscal measures, including taxation, incentives and subsidies;
- (H) higher fuel taxes;
- (I) fuel economy labeling and reporting;
- (J) integration of transportation and land use planning;
- (K) speed limits;

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- `(L) carpooling requirements;
- `(M) high occupancy vehicle (HOV) restrictions;
- `(N) altering driving behavior;
- `(O) incentives for mass transit;
- `(P) development, use, and adequacy of modeling for energy efficiency of motor vehicle and other transportation modes;
- `(Q) congestion mitigation measures; and
- `(R) strategic and other measures and incentives, including communications and outreach strategies.

`(5) An assessment of the effectiveness of motor vehicle transportation energy conservation efforts in economically developed countries and integrated economic regions other than the United States, including consideration of, among others--

- `(A) regulatory measures and mandates;
- `(B) fiscal measures;
- `(C) higher fuel taxes;
- `(D) vehicle taxation by engine size;
- `(E) tolls;
- `(F) alternative fuel vehicles and the availability of alternative fuels;
- `(G) voluntary commitments in lieu of mandates;
- `(H) gas rationing and mobility restrictions (e.g., no-drive days);
- `(I) monitoring; and
- `(J) other fuel economy programs.

`(6)(A) The identification of potential future approaches to motor vehicle and other transportation energy conservation efforts in the United States, including consideration of, among others--

- `(i) voluntary approaches by industry versus regulatory mandates;
- `(ii) use of incentives to encourage market penetration;
- `(iii) cooperative government/industry arrangements such as Smart Growth, Clean Cities, Energy Star, Partnership for a New Generation of Vehicles, European Automobile Cooperative Research program, and Japanese Cooperative Automobile Research program;
- `(iv) efforts to encourage and accelerate lean burn, clean diesel hybrids, fuel cells and other advanced technologies, and alternative fuels;
- `(v) congestion mitigation measures;
- `(vi) intelligent transportation systems (ITS); and
- `(vii) other potential approaches.

`(B) In making such identification, the study should assess, to the extent applicable, the marketability, risks, benefits, practicability, acceptability, and costs of such approaches as well as any legal or market barriers to the introduction of such approaches, such as cost of energy, public awareness, fueling infrastructure, fuel quality, and other existing regulations (e.g., Environmental Protection Agency Tier 2 regulations, California emissions standards, Federal Motor Vehicle Safety Standards).

`(7) An assessment of the effects on personal mobility and the United States economy that have resulted from the implementation of current conservation policies and measures and that likely would result from the implementation of future approaches.

- `(8) Conclusions that appropriately follow from the foregoing study, including--
- `(A) the effectiveness of prior and existing transportation policies in fostering increased energy conservation;
  - `(B) the need for and timing of energy conservation measures for motor vehicles; and
  - `(C) other potential future approaches and policies that recommend themselves for further consideration.

`(c) REPORT- The Secretary of Transportation shall submit to Congress, not later than 18 months after the date of enactment of this Act, a report describing the results of the study under this section, including any appropriate recommendations, together with the basis for them and their estimated costs and benefits.

#### `SEC. 175. STUDY OF LEAN BURN TECHNOLOGY.

`(a) SCOPE OF STUDY- The Secretary of Transportation (with the participation of the Secretary of Energy) shall, within 60 days after the date of enactment of this Act, commission a study regarding lean burn technology in increasing fuel efficiency, to include consideration of, among other things:

`(1) POTENTIAL BENEFITS- The potential benefits of introducing lean burn technology, including--

- `(A) its impact on fuel consumption; and
- `(B) the cost effectiveness (i.e., value) of implementing lean burn technology as a bridge to longer term advanced technologies for fuel economy improvement.

`(2) POTENTIAL BARRIERS- The potential barriers to introduction of lean burn technology, including--

- `(A) emissions control technology for lean burn technology;
  - `(B) the compatibility of existing fuels to advanced technologies;
  - `(C) the conflict between lean burn technology and stringent emissions limits;
- and

`(D) any legal and market barriers to the introduction of lean burn technologies, such as cost of energy, public awareness, fueling infrastructure, fuel quality, and other existing regulations (e.g., Environmental Protection Agency Tier 2 regulations, California emissions standards, Federal Motor Vehicle Safety Standards);

`(3) RECOMMENDATIONS- Recommendations for removing or addressing any potential barriers, including--

- `(A) the implementation of new technologies with the least disruption to the economy; and
- `(B) the incremental cost of increasing fuel efficiency.

`(4) Overall recommendations on the value of pursuing lean burn technology as a means of improving fuel efficiency.

`(b) REPORT- The Secretary shall submit to Congress, not later than 12 months after the date of enactment of this Act, a report describing the results of the study under this section, including any appropriate recommendations, together with the basis for them and their estimated costs and benefits.'

#### SEC. 202. EXTENSION OF CREDITS FOR FLEXIBLE FUEL VEHICLES.

(a) PURPOSE- The purpose of this section is to extend the manufacturing incentives

for dual fuel vehicles, as set forth in subsections (b) and (d) of section 32905 of title 49, United States Code, from the 2004 model year through the 2008 model year, and to extend in like manner the maximum fuel economy increase, as set forth in subsection (a)(1) of section 32906 of title 49, United States Code.

**(b) AMENDMENTS-**

(1) Section 32905 of title 49, United States Code, is amended as follows:

(A) Subsections (b) and (d) are each amended by striking 'model years 1993-2004' and inserting 'model years 1993-2008'.

(B) Subsection (f) is amended by striking 'Not later than December 31, 2001, the Secretary' and inserting 'Not later than December 31, 2005, the Secretary shall'.

(C) Subsection (f)(1) is amended by striking 'model year 2004' and inserting 'model year 2008'.

(D) Subsection (g) is amended by striking 'Not later than September 30, 2000' and inserting 'Not later than September 30, 2004'.

(2) Subsection (a)(1) of section 32906 of title 49, United States Code, is amended as follows:

(A) Subsection (a)(1)(A) is amended by striking 'the model years 1993-2004' and inserting 'model years 1993-2008'.

(B) Subsection (a)(1)(B) is amended by striking 'the model years 2005-2008' and inserting '2009-2012'.