The Big Shortfall in Auto Fuel Economy

By 1985 EPA ratings may overstate savings by a million barrels a day: agency priorities and wording of the law are part of the problem

The biggest savings in consumption of petroleum products over the next decade is expected to come from fuel economy improvements in the automobile. But the Department of Energy (DOE) now estimates that by 1985 the cumulative shortfall between the Environmental Protection Agency (EPA) fuel economy ratings and the number of miles per gallon (mpg) actually obtained on the road may be the equivalent of 1 million barrels of oil a day or even more. The "fleet average" rating of 27.5 mpg which auto manufacturers are required by law to achieve by that year may mean, in real world terms, less than 22 mpg.

According to Barry McNutt, a DOE analyst, studies by DOE, General Motors, and the Ford Motor Company which compare EPA ratings to actual on-road performance of 1978 models show that the shortfall ranges from about 2.5 mpg for vehicles rated by EPA at 15 mpg to 5.5 mpg for those rated at 25 mpg. This means that the potential fuel economy has been overstated by 20 to 28 percent, with the higher mileage (and usually smaller) cars showing up the worst.

Douglas Costle

A daily shortfall of 1 million barrels would be equal to at least half the maximum daily production expected from the giant Alaskan North Slope oil field or to the total daily production from 20 big synthetic fuel plants. Important as the fuel economy program obviously is, it might be supposed that the Carter Administration and Congress would be making an all-out effort to bring it up to maximum effectiveness.

Yet, the fact is, the program has suffered major personnel reductions within the past year and now has only half the number of people that EPA and the Department of Transportation (DOT) say are needed. According to officials at the two agencies, the addition of only 22 engineers and analysts would double the size of the program staff, allowing more confirmatory testing by EPA of the auto manufacturers' prototype vehicles and the staffing of a strong analytical effort that might show the way to major reductions in the shortfall.

In February of this year, after the fiscal 1980 budget had already been submitted to Congress, Douglas Costle, administrator of EPA, and Secretary of Transportation Brock Adams wrote a joint letter to the Office of Management and Budget (OMB). What they wanted was permission to go to Congress for the supplemental funds that would allow EPA to hire the 22 additional people right away.

The annual cost was to be only about $750,000, and, viewed simply in terms of cost effectiveness, there was no question but what the request could be justified. Every .1 mpg gained in fuel economy represents a savings of about 280 million gallons of gasoline over the 100,000-mile life of the 11 million cars produced in a particular model year. At today's gasoline prices, each such gain would represent a savings to consumers of $280 million.

But W. Bowman Cutter, executive associate director of OMB for budget, denied the agencies' request, telling them to bring it up again this fall when their budgets for fiscal 1981 are submitted. In an interview with *Science*, Cutter said that the request, taken alone, seemed modest and justifiable, but that over the past year he must have received a thousand such requests from various agencies and that the government could not be run responsibly if OMB went along with them.

In Cutter's view, EPA, with 12,000 employees, and DOT, with 75,000, have to be forced to look to their priorities. "When they can't budget 22 goddam people, we can't believe the world will rise or fall because of it," he said.

The fuel economy program was mandated by the Energy Policy and Conservation Act of 1975. Passed in the wake of the Arab oil embargo of 1973–1974, the act is one of the most important actions ever taken by Congress to reduce oil imports. Under the act, DOT establishes the mileage standards but EPA collects the data on which the standards and their enforcement are based; EPA is also responsible for informing the public on how various makes and models of cars compare with respect to fuel economy. Until now, DOE, which advises EPA and DOT on testing and standards setting, has done most of the research on the shortfall between the EPA ratings and the on-road experience.

Half or more of the shortfall occurs because of the way the Energy Policy and Conservation Act was written. To provide a consistent way of measuring progress from one model year to the next, Congress prescribed that the fuel econo-

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my testing procedures should continue to be those used by EPA for the 1975 model year or "procedures which yield comparable results." This locked into the fuel economy program certain fixed assumptions for driving conditions and habits that are quite artificial and unrealistic. The assumptions include, for example, that the driving is done on a warm clear day (rain and cold reduce mileage), on a straight, level, well-surfaced road, and in a properly maintained car driven at an average speed (for rural and highway driving) of 48 miles per hour. (The fuel economy standards assume that 55 percent of all driving is in the city and 45 percent is in the country.)

To eliminate the part of the shortfall attributable to such fixed assumptions, the law would have to be rewritten to authorize testing that approximates real world conditions. But, according to EPA, the rest of the shortfall, estimated by DOE analysts at one-third to one-half of the total, comes about from—

- Differences in fuel economy achieved by "hand built" prototypes and by the cars that later come off the assembly line. EPA is striving to have the prototypes more clearly match the production-line cars, but this is not always easy.
- Differences in a vehicle's fuel economy performance on a dynamometer and that same vehicle's performance on the road. For example, one type of tire may exhibit less rolling resistance on the dynamometer than other types, only later to be found inferior in this respect when tested on the road.

Also, manufacturers are found to take advantage of "loopholes" in the test procedures. A year or so ago, EPA blew the whistle on the manufacturers' practice of improving fuel economy—in the tests—by assuming that the owners of cars with manual gearshifts would change gears in a way no real motorist would ever do.

Although DOE's performance in energy conservation has drawn more criticism than praise, the department has been out front in trying to improve the fuel economy program and has goaded EPA and DOT to this end. In March, Deputy Secretary John F. O'Leary wrote to a New England congressman who was worried that shortfalls in the auto fuel economy program might affect the availability of home heating oil. O'Leary acknowledged that DOE studies show a "large and growing discrepancy" between EPA and on-road performance and that "the EPA measured fuel economy level of 27.5 mpg [fleet average] required by the act in 1985 will result in less than 22 mpg on the road." He continued:

> Unless the causes of this shortfall can be corrected, the 100 percent improvement in fuel economy contemplated by Congress will [turn out to be] only a 50 percent improvement in the actual fuel economy of new cars. Where this is combined with the growth in the sales of light trucks which have lower fuel economy performance, and put in the context of the total fleet of automobiles on the road, we expect a 30 percent [improvement] in the fuel economy of all cars and light trucks on the road from the 1974 level of less than 14 mpg to a 1985 level of about 18 mpg on the road. This improvement in fuel economy should result in a reduction in the absolute demand for gasoline by the early 1980's. However, these savings will be over 1 million barrels of oil per day less in 1985 than would have been the case if the EPA measured fuel economy levels were actually achieved on the road.

In their letter to OMB, Costle and Secretary Adams indicated that the requested personnel increase was needed partly to offset the sharp reduction in personnel that EPA made last year at its Ann Arbor Laboratory. At this lab, prototype cars are tested on dynamometers to confirm the accuracy of the manufacturers' own tests of fuel economy and exhaust emissions. More than 100 employees had been assigned to confirmatory testing; but, with the cut, the testing staff was down by more than a third.

The reduction, the letter said, was made for the sake of "regulatory reform . . . and management improvements." This was EPA's euphemistic way of acknowledging that, to gain personnel billets that it could use elsewhere in the agency, it was going to rely more than in the past on unverified data from the auto manufacturers. The House Appropriations Committee, in its 1978 and 1979 reports, had urged essentially that this be done.

But now Costle and Adams were cautioning OMB that the reduction in fuel economy data that resulted from the personnel cuts must be overcome and testing procedures improved lest the standards be defeated "through clever, but currently legal, subterfuges." They added:

> In view of the significant changes the fuel economy program is requiring of manufacturers, it is most important that the enforcement activity be accurate and on target. It would be most inappropriate not to enforce the requirements, for this would afford the least responsible companies a significant competitive advantage. . . .
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> Allocation of the 22 additional [positions] will restore EPA's confirmatory test capability and restore any data which would otherwise be lost in cases where the manufacturers' data are not believed to be valid for fuel economy purposes. It should be noted that the EPA actions to reduce certification process confirmatory testing will [lead to] more dependence on manufacturers' data. However, the restoration of the EPA fuel economy confirmatory ability will maximize confidence in the manufacturers' data.

EPA chief Costle: "Have we changed the rules of the game, or have the manufacturers tried to take advantage of the rules and we have caught them at it?"

Some of the new employees were to be assigned to the confirmatory testing program, while others were to work on developing a better understanding of why there is such a gap between the EPA ratings and on-road performance. Why, for example, does colder weather cause a greater fuel penalty in smaller cars than in larger ones and cause a similar disparity between recent model and earlier model cars? These are just a few of the questions that perplex investigators of the fuel economy shortfall.

In an interview with *Science*, Costle said EPA would again be trying in the next budget cycle to obtain more resources for the fuel economy program. Among some officials at DOE and EPA there is a strong feeling that the program would not have been allowed to suffer from personnel cuts had it not been an "orphan" that came into EPA's custody back in the early 1970's largely because data gathered for emissions control work can also be used in testing fuel economy. But Costle disputes this, suggesting that fuel economy fits in well with EPA's overall environmental protection mission if that mission is construed as broadly as he thinks it should be. If the cuts have hurt the quality of the program, this was not intended, he says, rather lamely.

EPA has been making changes in fuel

economy tests and is hoping that, when data from the on-road experience with 1979 and 1980 model cars are available, the shortfall will be found to have been somewhat reduced. The use by the manufacturers of the unrealistic gear-shifting schedules was only one of a number of loopholes the agency has plugged. For example, in the case of 1979 model cars EPA readjusted its formula for determining the effect on fuel economy from changes in the weight-size relationship in cars; less credit is now given for weight reductions that do not involve a reduction in aerodynamic drag.

Indeed, the Ford Motor Company and General Motors now claim that many of the changes EPA has made are contrary to the 1975 law and impose a .6-mpg loss in fuel economy compared to results obtainable under the 1975 tests. Costle has not yet acted on the manufacturers' petitions to have this loss taken into account when their compliance with the mileage standards is determined, but the staff is expected to recommend denial. "The question I ask," Costle says, "is what was in the mind of Congress when it passed the law? Have we changed the rules of the game [as Congress understood them], or have the manufacturers tried to take advantage of the rules and we have caught them at it?"

What is of most concern to EPA and the other agencies is not to allow the gap between the EPA ratings and on-road fuel economy to widen from one model year to the next, as it has done at least through 1977, and not to exceed tolerable limits. Although a gap of 10 percent or so may be considered bearable, a gap of 20 percent or more certainly is not.

Committed as EPA and the auto manufacturers are to the present program of testing, the Carter Administration may choose not to go back to Congress anytime soon to seek authority to use testing assumptions that are more realistic than the ones in use today. A simpler recourse is for DOT to take existing and prospective shortfalls into account by raising fuel economy standards.

Margaret F. Fels and Frank von Hippel, energy policy analysts at the Center for Energy and Environment at Princeton University, have prepared a paper recommending that DOT next year propose that the 1985 standard of 27.5 mpg be raised. Von Hippel observes that E. M. Estes, president of General Motors, has indicated that GM may well be able to exceed this standard and that, considering the way consumers are shifting toward more fuel-efficient cars, the company now has a clear incentive (profit) to

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Radiation Compensation

The matter of compensation for alleged victims of radiation exposure from atom bomb testing continues to simmer. On 30 August lawyers filed a damage suit in a Utah federal district court on behalf of 442 alleged radiation victims and their survivors. Claims for the suit, which is being conducted by a group of lawyers including former Interior secretary Stewart L. Udall, could total millions of dollars. An additional 278 plaintiffs intend to go to court at the end of the 6-month waiting period required after filing claims against the government.

Meanwhile, a task force appointed by President Carter in July is cautiously nibbling its way around the question of what the government should do about claims for radiation injury. The task force, headed by William G. Schaffer of the Justice Department, is made up of representatives of the Department of Energy, the Defense Department, the Department of Health, Education, and Welfare, (HEW), the Justice Department, and the Veterans Administration. The group is supposed to set criteria for deciding claims, particularly those filed by civilians residing downwind from test sites, who, unlike veterans and workers exposed to radiation, have no other agency to turn to. Although the group is supposed to make recommendations by 1 October, Schaffer has reportedly decided that the matter is just too complicated and is apparently going to play it safe by submitting a list of options rather than tell the government what to do.

On a third front, several members of Congress are trying to finesse the problem of lack of scientific evidence by passing a new law. Representative K. Gunn McKay (D-Utah) introduced a bill precisely tailored to the needs of the Utah plaintiffs, which would compel the government to accept liability for damages resulting from Nevada bomb testing between 1951 and 1958, and on July 1962, when radioactivity was vented from an underground test. The bill covers citizens residing downwind from the test sites in Utah, Nevada, and California. In lieu of medical proof, it assumes that anyone in this area who has had leukemia, thyroid or bone cancer, or any other cancer that occurred more often than might be expected in the affected area (as determined by the secretary of HEW) qualifies for compensation under the Federal Tort Claims Act. A Senate bill to provide relief for the same population is currently being cooked up by Edward M. Kennedy (D-Mass.) and Orrin G. Hatch (R-Utah).

Unearthing New Einsteins

There seems to be a widely held belief that true genius cannot count on being recognized or adequately served through conventional channels of public support, and that institutions of higher learning can as often stifle creativity as nurture it.

One member of a good old American entrepreneurial family has decided to do something about this state of affairs. J Roderick MacArthur, son of the recently deceased billionaire insurance magnate John D. MacArthur, last year found himself in charge of a foundation with assets of some $750 million. Young MacArthur, 58, a millionaire in his own right, intends to use a hefty portion of the foundation's annual income—which will be somewhere between $20 million and $40 million—to support "fellowships" for creative geniuses in any field.

Although MacArthur is taking his cue from institutions such as the Guggenheim Foundation, he sees the role of the foundation as more along the lines of that of a Renaissance patron. He wants to free the fellows from all institutional fetters and accountability; there will be no applications, peer reviews, periodic evaluations, and the like. As he has said, "Our aim is to support individual genius and to free those people from the bureaucratic pettiness of academe."

It took some doing to get the idea past his board, which, when the foundation was set up in December 1978, was stocked by MacArthur senior's old business cronies. To implement his scheme, MacArthur persuaded the board to take on seven new members: Jonas Salk; Murray Gell-Mann of the California Institute of Technology; former treasury secretary William Simon; Jerome Wiesner of the Massachusetts Institute of Technolgy; former attorney general Edward H.

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place more emphasis on development of such vehicles.

However, Richard Strombotne, director of DOT's fuel economy program, says that to think that DOT could impose a higher 1985 standard on an industry that has already invested billions of dollars to meet the present schedule of standards is just not realistic. But he adds that DOT now has studies under way that look to an increase in standards for model year 1986 and thereafter and that the department may have enough information in hand by next spring to support such an initiative.

Congress has done next to nothing about the auto fuel economy shortfall. Representative John Dingell (D-Mich.), chairman of the House Energy and Power Subcommittee, held a hearing in March that was supposed to have focused on this problem. But, as it turned out, Dingell, who is from Detroit and has a reputation of being protective of automobile manufacturers, was less interested in reforming fuel economy test procedures than in questioning EPA officials aggressively about fuel penalties associated with emission standards for pollution control—or so it seemed to observers from EPA and DOE.

The present automobile fuel economy situation falls into a familiar pattern. Congress passes a law that seems to promise great things. But as time passes, execution of the new programs mandated goes awry and delivery on the promise falls short. In light of this, the fuel economy shortfall and the absence of any special effort to correct it would not be especially surprising if the shortfall were not such an important setback to the Carter Administration's major policy objectives of conserving energy and reducing oil imports.

When Administration priorities are slighted by the agencies, it is up to OMB to knock heads and see that agency programs are set straight. Jim J. Tozzi, who serves under Cutter as chief of OMB's environment branch and as budget examiner for EPA, told *Science* that in the review of fiscal 1981 budget requests now beginning questions will be raised about the adequacy of the EPA and DOT commitment to the fuel economy program. "I think this thing will be a candidate for a change in agency priorities," he said.—LUTHER J. CARTER

U.N. Technology Meeting Lacked Clear Direction

The long awaited conference on technology and development produced few concrete proposals

As the United Nations Conference on Science and Technology for Development (UNCSTD) came to a close early this month, the Rev. Theodore M. Hesburgh, leader of the U.S. delegation, warned his fellow negotiators not to "give way to either discouragement or cynicism." After nearly 3 years of preparation, two grueling weeks of negotiations, and a final all-night session, many of the 4000 diplomats and technical advisers believed they had much to be cynical about.

They had gone to Vienna in search of new ways to apply the scientific and technological achievements of the industrialized nations to the social and economic problems of the developing countries. But in the face of such enormous problems as illiteracy and starvation that plague most of the nations of the world, the diplomats went home with pitiably little.

The gap between knowledge and its application to the developing world was hardly news to the participants. U.N. figures show that just six countries—America, Britain, France, Japan, Russia, and West Germany—account for nearly 85 percent of all spending and 70 percent of all manpower sources for research and development. Together the developing countries claim more than 72 percent of the world's population, but less than 3 percent of its expenditures on research and less than 13 percent of the scientists and engineers.

> No one would say who had made the decision to keep out the U.S. delegation but most participants assumed that the Group of 77 had had a hand in the matter.

To right the imbalances, the protracted negotiations among the 160 delegations at UNCSTD produced several dozen principles for using science and technology in development, but only a handful of concrete proposals. The recommendations in the conference's final plan of action are to be taken up by the U.N. General Assembly at its next regular session beginning 18 September. Among the most important parts of the plan are provisions to institute a new intergovernmental committee to oversee science and technology under the aegis of the U.N.'s Economic and Social Council (ECOSOC), a $25 million fund to support scientific and technological development projects over the next 2 years, and a study of a permanent financing system for future projects. In a separate resolution, the delegates called for the equal participation of both sexes in scientific careers as well as an equal division of the benefits of science and technology between men and women.

On the tough legal and political issues—such as a code of conduct for transnational corporations and new international patent agreements to share the fruits of new knowledge—the negotiators were not silent nor were they in agreement. By the time they had packed

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