Reference

MANDATED FUEL ECONOMY STANDARDS AS A STRATEGY FOR IMPROVING MOTOR VEHICLE FUEL ECONOMY

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ABSTRACT

The major domestic motor vehicle manufacturers have projected that their new car fleet average fuel economy will meet the federally mandated fuel economy standard for 1985, of 27.5 miles per gallon. Assuming that these projections hold true, in one decade the domestic motor vehicle manufacturers will have more than doubled their domestic fleet average fuel economy. The fuel economy improvements will have been made while also meeting more stringent emission and safety standards. These improvements have required significant capital investments. In the process, the domestic auto industry has increased its manufacturing productivity and become a potential competitor in the world motor vehicle market. The pressure for these changes has, to some extent, been brought about by consumer forces, but to a much larger extent by federal legislation passed in support of the national goals of reducing petroleum consumption, reducing deaths and injuries on the highway, and improving air quality.

Fuel economy standards have, up to now, been successful in conserving petroleum by forcing improvements in motor vehicle fuel economy. However, if the Nation should choose to further increase motor vehicle fuel economy, the question arises as to whether or not mandatory fuel economy standards are the most effective policy tool for achieving this objective.

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*The views represented herein are the personal views of the authors and do not represent any official position or findings of the U.S. Department of Transportation.

On the basis of an analysis of both the legislative and administrative history and the response of concerned groups to the existing mandatory fuel economy legislation, the purpose of this paper is to show that the attainment of further improvements in fleet average fuel economy in the post-1985 period will require new industry and federal policy initiatives to support the existing mandatory fuel economy legislation.

The doubling of the domestic new car fleet average fuel economy by 1985 has been based, in large part, on the transfer and commercialization of available fuel economy technology from Western European and Japanese sources. These technology sources are fast becoming depleted; the motor vehicle technology knowledge base, safer light weight structures and more fuel efficient power trains, must be replenished. The motivation provided by the anticipation of more stringent fuel economy standards may not be sufficient to generate the technology required for another round of rapid and significant increase in fuel economy; and indeed, may even be a deterrent.

If the mandated standards are increased beyond the 1985 values of fuel economy, the resulting changes in motor vehicle design and manufacturing process technology may increasingly affect different industrial sectors, regions of the country, and segments of the work force. For example, the substitution of plastics and cast aluminum for sheet steel and cast grey iron may affect individuals, families, and communities when plants relocate or close. If in the post-1985 decade mandatory fuel economy standards are to continue to serve as a useful strategy for stimulating fuel economy improvements, they must be supported by other federal policies both to stimulate the marketability of fuel economic motor vehicles and to mitigate the impacts on affected groups in and outside the industry.

BACKGROUND

The major domestic motor vehicle manufacturers have each indicated that their new cars will either meet or exceed a corporate average fuel economy of 19 miles per gallon in the 1979 model year; a nearly 50 percent increase over the all-time low values of 12 to 14 miles per gallon which occurred during 1973-1974.[1] The motor vehicle manufacturers are forecasting further, far-reaching product changes targeted to achieve a 1985 model year corporate average fuel economy of 27.5 miles per gallon; a more than 100 percent improvement over the 1973-1974 values.[2]

The President of General Motors indicated further that not only would the goal be met, but the mix would be marketable:

> *We will be able to meet the required fuel economy averages in the 1980s and still provide a reasonable mix of attractive vehicles that will meet most of our customer's transportation needs.*[3]

The improvements in corporate average fuel economy have and are being attained with concurrent reductions in motor vehicle exhaust pollutants and improvements in vehicle safety. Allowable emission levels of carbon monoxide, hydrocarbon, and nitrogen oxides under current statutory emission standards (see Table 1) are significantly more stringent than the exhaust emission standards for the 1973-1974 new car fleet. In addition, the Secretary of Transportation has announced that all passenger cars will be required to have passive restraints by the model year 1984.[4] Thus, after ten years of often acrimonious debate with the executive and legislative branches of the federal government, the motor vehicle industry is embarked on a program of unprecedented scale to produce motor vehicles which will simultaneously meet consumer demands, conserve petroleum, cause less air pollution, and provide increased safety to occupants in crashes.

TABLE 1. EMISSION STANDARDS FOR AUTOMOBILES, 1974 VS. 1981

	1974	1980	1981
Hydrocarbons	3.4 g/mi	0.41 g/mi	0.41 g/mi
Carbon Monoxide	39.0 g/mi	7.0 g/mi	3.4 g/mi
Nitrogen Oxides	3.0 g/mi	2.0 g/mi	1.0 g/mi

Petroleum Conservation. If the domestic manufacturers successfully meet their 1985 corporate average fuel economy target of 27.5 miles per gallon, the cumulative 1975-2000 petroleum savings will be about 20 billion barrels, or about twice the amount estimated for the large oil fields in Alaska's North Slope.[5]

Increases in automobile fuel economy promise greater petroleum conservation through 1990 than can be accomplished in any other way. Improved automobile fuel economy is a central feature of United States energy policy, and has become the most visible national symbol of energy conservation.

In May 1977, John O'Leary, Administrator of the Federal Energy Administration, expressed his Agency's view on the proposed 1981-1984 passenger car fuel economy standards:

> *It is difficult to overstate the critical role improved automobile fuel economy must play in our overall petroleum conservation efforts. No other single sector of the economy is as large a user of petroleum or offers as great a potential for improving the efficiency of that use. Achievement of the 1985 standards of 27.5 miles per gallon is essential. As perhaps the most visible of all energy conservation programs, the automotive fuel economy standards will set the tone for a number of our other efforts by demonstrating to the public and industry the need for, and possibility of, significant energy conservation.*[6]

Modernization and Rejuvenation. Changeover of manufacturing facilities to the production of more fuel efficient, less polluting, and safer motor vehicles will require a capital investment of nearly 80 billion dollars through 1985.[7] This 80 billion dollar investment will also modernize and revitalize the production

facilities of the more than 50-year old domestic motor vehicle industry.

On the subject of the required capital expenditures, President Cafiero of the Chrysler Corporation recently stated:

> *Our 7.5 billion dollar five-year program to completely renew Chrysler's entire product line gives us an unparalleled opportunity to make a quantum leap in productivity, quality, and competitive positions.*[8]

In a similar vein, in commenting on the Ford Motor Company's projected capital expenditures of 20 billion dollars necessary to meet federal mileage, pollution, and safety standards, Mr. Philip Caldwell, President of the Ford Motor Company, remarked:

> *I think a lot about the problems but the important point is we will be able to do something we never had the opportunity to do before through these changes. If you can get two for one -- that is, if you meet required federal changes and make the company more efficient, this makes the business fun.*
>
> *I think our people sense this. Our younger people are really going to have a ball. Sure there are challenges and things to be concerned about. But how many people have the opportunity to have a clean sheet of paper?*[9]

In the short run, the mandatory standards have resulted in marketing and financial risks which have exceeded historic, 'normal' levels. In the longer term, changes being brought about in the domestic automobile industry by mandatory fuel economy legislation are in accord with the view that scarcity of resources can stimulate industrial rejuvenation. In projecting future alternatives for the domestic economy, Professor Robert Gilpin of Princeton University's Woodrow Wilson School has postulated that:

> *In the short run, economic conflict has been intensified by the energy crisis, global recession, and worldwide inflation. Yet viewed from a longer perspective, the critical problems of resources, environment, and inflation can have a beneficial effect. They may constitute the 'catastrophe' that will stimulate a rejuvenation of the American economy.*[10]

International Competition. As an additional benefit, mandated standards have resulted in the design and production of domestic vehicles which may not only capture a significant part

of the small car market currently dominated by imports, but which may be competitive in world markets.

In October 1977, soon after the 1981-1984 fuel economy standards had been announced, Mr. Henry Ford, Chairman of the Board of Ford Motor Company, announced in an interview:

> *The imports are going to have one hell of a battle here. They're going to be pushed right back into the sea.*[11]

Some Western European observers think that Mr. Ford's predictions understated the impact of fuel economy regulations on improving the American motor vehicle industry's competitiveness with imports. An article appearing in The Economist credits fuel economy regulations as having forced the American automobile industry into investing billions of dollars to make domestic cars look like European cars.

> *Car makers in Wolfsburg, Cowley, or Turin have a new nightmare; they will wake up one morning to see the winding roads of Europe clogged with nippy little front-wheel-drive cars built in Detroit.*[12]

On the subject of the Detroit-made 'world car,' General Motors, in a letter to the Secretary of Transportation and the Administrator of the Environmental Protection Agency, has requested consideration of world 'harmonization' of motor vehicle standards.

> *In order for the American auto industry to participate successfully with U.S.-built products in international markets and particularly to participate in the markets of developing countries which individually have small volume, we should strive for common emission and safety standards, whenever possible. This would mean that U.S. engineering would become directly applicable to international products, and the idea of a 'world car' rolling off U.S. assembly lines becomes possible.*[13]

The 80 billion dollar revamping of the domestic North American automobile industry has been undertaken by the industry for a variety of reasons: to respond to consumer market demand; to help in the achievement of societal goals; to maintain corporate profitability; and to meet federal regulations.

During the March 1977 Hearings on passenger automobile standards for 1981-1984, Dr. Henry Duncombe, Vice President and

Chief Economist of the General Motors Corporation, said that even without regulations General Motors had committed itself to improving fuel economy:

> *The fuel economy and product improvements to date are, in most major respects, the result of product programs started before the oil embargo; and long before either voluntary or mandatory fuel economy standards were imposed. It is safe to say that even greater progress would have been achieved if U.S. petroleum prices had not been arbitrarily held below world levels.*[14]

Shortly after the Arab oil embargo, there was a significant increase in the price of gasoline; however, since that time, the real price of gasoline has declined about 5 percent.[15] Therefore, notwithstanding Dr. Duncombe's assertions that the industry had a program underway to introduce fuel economy improvements, it is unlikely that free market forces would have been sufficient to double corporate fleet fuel economy, the 1985 goals under current regulations. The view is shared by Mr. Ford:

> *I think it is fair to say also that the law requiring greater fuel economy in motor vehicle usage has moved us faster toward energy conservation goals than competitive, free-market forces would have done.*[16]

Role of Fuel Economy Regulations: Post-1985. The mandatory fuel economy program has, up to the present time, been successful in conserving petroleum. Fleet average fuel economy has been improved; the motor vehicle public has had to make little, if any, changes in its transportation lifestyle; and although there have been dire predictions of financial catastrophe, the domestic industry remains, at least for the present, viable.

In the final notice of rulemaking on the 1981-1984 passenger car fuel economy standards, the Department of Transportation indicated that it was considering an upward revision of the 1985 legislated standards which are 27.5 miles per gallon.

> *Our analysis indicates that levels of average fuel economy in excess of 27.5 miles per gallon are achievable in the 1985 time period.*[17]

The Administrator of NHTSA, at the July 1977 Automotive News World Congress, said:

> *Instead of 27.5 mpg, it is not unrealistic to seek 40 or 50 mpg.*[18] *(Time period not referenced)*

Assuming that after appropriate debate on the risks and benefits of such an action, the nation adopts a goal of increased motor vehicle fuel economy beyond that required by current mandatory standards, the issue arises as to the most effective policy to achieve this goal. As indicated previously, the purpose of this paper is to review the legislative and administrative history of the mandatory fuel economy standards, and to assess the potential of such standards towards achieving further improvements in new car fleet fuel economy.

LEGISLATIVE HISTORY

The legislative history of the mandatory motor vehicle fuel economy standards is closely related to the earlier legislative development of mandatory motor vehicle safety and emission standards (see Table 2).

TABLE 2. MOTOR VEHICLE REGULATORY STANDARDS GOVERNING LEGISLATION

Product Regulatory Standard	Governing Legislation	Political Environment
SAFETY	National Highway Traffic Safety Act of 1966	Ralph Nader's Unsafe At Any Speed (1966)
EXHAUST EMISSIONS	Clean Air Act of 1970	Strong Public Environmental Movement (1970)
FUEL ECONOMY	Energy Policy and Conservation Act of 1975	Aftermath (1975) of Oil Embargo

Safety Legislation. Motor vehicle occupant safety had become a public issue by the end of the 1940s; however, concerns and potential regulations were directed mainly at the driver. With a rising death toll in the 1960s, and the publication in 1965 of Ralph Nader's Unsafe At any Speed, consideration of vehicle design as a major causative factor in motor vehicle safety increased dramatically. In response to public pressure, the Congress passed, and President Johnson approved, the National Highway Traffic Safety Act of 1966.[19] The legislation specified a set of national motor vehicle safety objectives and required that the Executive Branch promulgate appropriate standards to achieve these goals. No specific or easily quantifiable goals were prescribed in the legislation. This factor has made this legislation more difficult to administer than the subsequent motor vehicle emissions and fuel economy legislation.

Environmental Legislation. In 1965, the Congress passed legislation that motor vehicle emission control standards were to be promulgated by the Executive Branch giving appropriate consideration to "technical feasibility and economic costs".[20] Both the safety and early emission control legislation prescribed that the Executive Branch both develop and administer the standards. The Clean Air Act Amendments of 1970 represented a dramatic change from this earlier approach; in the case of the Clean Air Act Amendments, Congress dictated the standards. In arriving at the 1970 clean air standards -- 90 percent reduction of CO, HC, and NO_x by 1975-1976 -- the Congress paid minimal attention to technological feasibility and economic effects. In the same sense that the Safety Act was, in part, a legislative response to R. Nader's Unsafe At Any Speed, the Clean Air Act Amendments of 1970 were, in part, a response to the spirit of that time. During the first six months of 1970, legislation had been prepared in the Congress to ban the internal combustion engine;[21] the Administration had proposed a research effort to develop a nonpolluting engine by 1975; and the New York Times, editorializing on the Muskie Committee Clean Air Amendments Bill hearings, concluded that:

> *A nation that can put a man on the moon in less than ten years can clean up its engines in half that time.*[22]

Fuel Economy Legislation. The first Congressional debates on motor vehicle fuel economy legislation occurred in 1973 in response to numerous reports of a forthcoming energy crisis, a cold winter, early summer gasoline shortages, and the October Arab oil embargo. Since that time, over one hundred Congressional bills have been introduced on the subject of improving motor vehicle fuel economy (see Table 3).

TABLE 3. CONGRESSIONAL BILLS TO IMPROVE MOTOR VEHICLE FUEL ECONOMY - 1973 TO 1977

Nature of Proposed Legislation	Number of Legislative Initiatives 1973	1974	1975	1976	1977
A. Consumer Economic Incentives					
Auto Gas Guzzler Tax	16	6	36		2
Gasoline Tax	2	4	13		
Gasoline Rationing		3	4	1	1
B. Information; Fuel Economy Labeling	2	2	1		
C. Product Regulation					
Mandated Fuel Economy	8	2	15		9
Relax Emissions/Safety Standards	14	14	19		1
D. Motor Vehicle R/D	11	5	19	4	11

The bills have covered a wide range of public policy alternatives, including gasoline and motor vehicle taxes, consumer fuel economy information, mandated fuel economy standards, and mandatory fuel economy labels. Of the many proposed pieces of legislation, only three are currently law. Two of these pertain to federally funded motor vehicle research and development, and the other to mandatory fuel economy standards. The price mechanism has not been adopted. In 1975, the Energy Reorganization Act (PL 93-438) was passed, providing for research and development of advanced automotive propulsion systems; in 1976, the Electric and Hybrid Vehicle Research, Development, and Demonstration Act (PL 94-413) was passed, providing research into electric vehicle technology. Both these laws directed the expenditure of federal funding for long-term automotive research and development. The research and development were to be in areas to which industry would be hesitant to apply major resources because of the long pay-back periods. Mandatory fuel economy legislation was passed in December 1975 as part of the Energy Policy and Conservation Act (PL 94-163).

The fuel economy standards reflected the same strategy that Congress used in the Clean Air Act Amendments of 1970, i.e., Congress dictated the standards -- 27.5 miles per gallon by 1985 -- and the Executive Branch was to carry them out.

Thus, after almost three years of debate, the Congress chose federally funded motor vehicle research and development and mandatory product regulations rather than the price mechanism, (i.e., gasoline taxes or gas guzzler tax), as the public policy to attain improved motor vehicle fuel economy. Although the gasoline tax was viewed as a potentially powerful means for reducing petroleum consumption, it was also viewed as a regressive tax which would be unpopular with the voter. Consequently, federal actions to reduce motor vehicle fuel consumption have been primarily aimed at improving the fuel economy of the new car fleet rather than on impacting consumer behavior.

LEGISLATIVE HISTORY - FUEL ECONOMY DEBATE

The choice of mandatory fuel economy standards as the public policy for improving motor vehicle fuel economy has been the result of prolonged debate both within and outside the legislative and executive branches of the government. The selection has not been capricious or arbitrary any more or less than the working of the democratic process is capricious or arbitrary. Views on pending fuel economy legislation have been expressed by many individuals and organizations including domestic motor vehicle manufacturers, labor, the motor vehicle repair industry, public interest groups, and various federal agencies.

Prime Domestic Manufacturers. During the many years of Congressional testimony on the subject of fuel economy legislation, the prime domestic automobile manufacturers have been strongly opposed to the concept of mandated fuel economy standards, and strong advocates of the need of the nation to rely on market forces and the price mechanism.

Henry Duncombe, Chief Economist at General Motors, maintains that:

> *For the Government to impose regulation in an area where competition clearly can do a better job is not only redundant, but also costly to the auto buyer and to the Nation's economy.*[23]

Fred Secrest, Executive Vice President of Operations, Ford Motor Company, stated a similar view:

> *It seems far better to achieve the desired fuel economy objectives through market forces - which allow manufacturers the flexibility to respond to consumer demand through innovation spurred by competition - rather than arbitrary standards that would tend to limit flexibility and might well deter innovation and improvement.*[24]

United Auto Workers. The United Auto Workers see the fuel economy standards acting as a catalyst to encourage the motor vehicle industry to compete overseas and, more importantly, to

halt the flow of imports. The U.A.W. concern, expressed as early as 1949, was that:

> *U.S. auto firms deliberately refuse to compete either in the export or the domestic market or both.*[25]

On the subject of using the price mechanism -- gas guzzler and gasoline taxes -- the major concern of the U.A.W. was jobs not petroleum conservation. At the time of the 1975 hearings, almost one-third of the U.A.W. membership was unemployed.

> *...we shouldn't restrict oil imports by any means, by quotas, tariffs, or anything else...the world is awash with oil. We have no shortage of supply... The only victims, then, would be the members of my union.*[26]

U.A.W.'s responses to different federal initiatives on the motor vehicle have been in large part, based on whether the nature and timing of the resulting innovation has a positive, or at least neutral, effect on the employment of U.A.W. members. Changes which have the potential for leading to increased employment -- for example, the manufacture of fuel economical cars which compete with foreign imports -- are to be encouraged; those leading to unemployment are to be discouraged. The first job of the U.A.W. is, quite naturally, to protect the interests of its members.

Independent Repair Industry. Other sectors of the industry, including the independent repair industry as well as various public interest groups, have become involved in the debates. Donald Randall, of the Automotive Service Council, representing the independent repair industry, has expressed concern that too rapid introduction of sophisticated technology to obtain fuel economy improvement would lead to consumer discontent:

> *If we are going to look for a villian [for increased repair costs], then we should look more at the complexity of today's cars than at the people repairing them. To fix those gadgets and power units the customer wants requires a high level of experience and specialized tooling. Add to that the sophisticated electronic controls coming in the years ahead to control emissions and increase fuel economy, and it is inevitable to me that we will have more consumer discontent in the years to come.*[27]

Public Interest Group. The principal concern of the Center for Auto Safety, however, has been to ensure that energy conservation measures are not adopted at the expense of the improved levels of automotive safety that have been brought about by the Federal Motor Vehicle Safety Standards. In the 1974 Department of Commerce Hearings, a representative of the Center for Auto Safety testified:

> *The Center (for Auto Safety) is confident that reduced automotive fuel consumption can be obtained with existing technology. Second, we are convinced that gasoline economy can be improved without placing arbitrary limits on needed safety and pollution standards.*[28]

The debate on the benefits and disbenefits of different policy alternatives, including the price mechanism and mandated fuel economy standards, has by no means been confined to a simple confrontation between federal policy makers and the vehicle manufacturers.

Federal Agencies. In October 1974, the New York Times reported that Federal Energy Administrator, John Sawhill, had been forced to resign because of policy differences with the Administration, which included his public advocacy of a gasoline tax.[29] The basic policy of the Ford Administration toward motor vehicle fuel economy improvement had been to establish a voluntary program with the industry.

In the National Energy Plan, presented to the Congress by President Carter on April 20, 1977, a gas guzzler tax and rebate were proposed on the grounds that present law and regulations, i.e., mandatory fuel economy standards, were insufficient to assure needed petroleum conservation by automobiles. A graduated excise tax would be imposed on new automobiles and light trucks whose fuel economy failed to meet the applicable fuel economy standard under existing law. The proposed gas guzzler tax and rebate are still being debated in the Congress.[30]

Council of Economic Advisors - Charles Schultze, current head of the Council of Economic Advisors, in his 1976 Harvard Godkin Lectures, explained why, in his view, public regulation of the

private sector is inherently difficult and how it might be improved.[31] His main thesis was that regulatory laws have attempted to force people and businesses to do certain things rather than to encourage them through indirect methods to achieve the same objectives. He suggested, as an alternative, the use of market-like incentives, such as tax and transfer arrangements, that would convert public goals into private interests.

The debate on the efficacy of the price mechanism versus the product regulation for improving fuel economy continues. Mandatory fuel economy standards are now law and, although still the subject of intense debate, will remain so until the law is changed.

COMPARISON OF FUEL ECONOMY, EMISSION CONTROL, AND SAFETY MOTOR VEHICLE STANDARDS[32]

In each of the three major motor vehicle areas -- fuel economy, emission control, and safety -- the Congress has selected product standards as its major policy instrument rather than taxes or some sort of monetary incentive scheme. The nature of the product standards is however, quite different for each of the three areas. A comparison of assigned responsibilities and the structure of the motor vehicle regulatory standards are shown in Tables 4 and 5.

Safety. In the initial regulation of the motor vehicle, the National Traffic and Motor Vehicle Safety Act of 1966, Congress gave the Executive Branch the authority to set safety performance standards and goals that were 'practical.' The burden of proof as to what was 'practical' was on the Executive Branch. The Highway Traffic Safety Administration was to prescribe 'practical' performance goals which were to be promulgated within the constraints of the Federal Administrative Procedures. Under the Administrative Procedures, any proposed administrative standards are subject to interagency and public review, and can be challenged on a variety of grounds, including inflationary and environmental impacts.[33] In contrast, a Congressionally mandated numerical goal, legally, can only be contested on Constitutional grounds.

Automotive safety standards were required by the Safety Act to be performance standards; however, because of the difficulty of formulating a single motor vehicle safety performance standard, the administering agency, i.e., NHTSA, has defined performance standards for specific items of motor vehicle equipment such as headlights, side structure, etc. These standards are therefore referred to as equipment performance standards.

TABLE 4. COMPARISON OF ASSIGNED EXECUTIVE AND CONGRESSIONAL RESPONSIBILITIES IN FEDERAL REGULATIONS FOR FUEL ECONOMY, SAFETY, AND EMISSIONS

- o In the Case of Safety (National Traffic and Safety Act, 1966):
  - Congress gave the Executive Branch authority to set performance standards with the constraint that they be "practical."
  - Burden of proof on agency
  - NHTSA prescribed performance goals which are subject to public hearings and can be contested by all "concerned" parties.
- o In the Case of Emissions (Clean Air Act of 1970):
  - Congress mandated numerical emission goals (e.g., NO_x=0.41 gm/mile).
  - Congressionally mandated numerical goal can legally be contested only on Constitutional grounds.
- o In the Case of Fuel Economy (Energy Policy and Conservation Act 1975):
  - Legislation combines strategies of legislatively prescribed and agency prescribed performance goals.

TABLE 5. STRUCTURE OF MOTOR VEHICLE REGULATORY STANDARDS

STANDARD	CHARACTERISTICS	COMMENTS
SAFETY	Equipment Performance	1. Little flexibility to manufacturer. 2. No motive to provide innovative technology.
EMISSIONS	Vehicle Performance	1. No particular equipment required by regulation 2. Near-term technical fix.
FUEL ECONOMY	Fleet Performance	1. Allows flexibility to manufacturer. 2. Final new car fleet average fuel economy is a function of consumer behavior.

Equipment performance standards leave little flexibility to the manufacturer as the manufacturer must improve the specified equipment on each vehicle to the mandated minimum performance level. In order to attain higher levels of safety, new standards must be added, but the burden of proof that these new standards are warranted rests with the administrating agency. The manufacturer has no incentive to use innovative technology beyond the requirement called for by the agency except to reduce cost or to minimize consumer discomfort.

Emissions. In the two subsequent motor vehicle product regulation initiatives, the Clean Air Act Amendments of 1970 and the Energy Policy and Conservation Act of 1975, the Congress set numerical values for the emission and fuel economy performance goals, and took over what had essentially been an Executive Branch function. A key motivating factor in this procedural change was the Congress' and public's growing unhappiness with the responsiveness of the industry to national goals.[34]

The Clean Air Act Amendments of 1970 set numerical limits on each of three major pollutants emitted by the automobile: carbon monoxide, hydrocarbons, and nitrogen oxides. The standards were to be met by each vehicle produced on a specified timetable. All vehicles produced in a given year were to meet the same standard. The legislation did not require any particular equipment; the legislation only required that the standards be met. The role of the administering agency, in this case the Environmental Protection Agency, was to enforce the standards; the burden of proof was on the manufacturer to show that the emission standards could not be met. The emission control standards have encouraged the industry to develop near term technical fixes which can be implemented within the time constraints of the standard. The technology that is implemented may however not be the most effective (e.g., early emission control technology resulted in a significant fuel economy penalty), for meeting the original purpose of the Clean Air Act Amendments of 1970. The legislatively mandated motor vehicle performance standards, in

general, offer more flexibility than the administrative agency mandated equipment performance standards in that they can be gradually tightened, thus giving the manufacturer an incentive to develop new technology.

Fuel Economy. Finally, the Energy Policy and Conservation Act of 1975 combines the strategies of Congressionally mandated performance and agency prescribed performance goals. The mandatory fuel economy portion of the Energy Policy and Conservation Act prescribed passenger car fuel economy standards for model years 1978, 1979, 1980, and 1985, and directed that the Secretary of Transportation set passenger car fuel economy standards for model years 1981 through 1984, as well as for light trucks and vans, with consideration given to; (1) technical feasibility; (2) economic practicability; (3) effect of other standards; and (4) need of nation to conserve energy. The passenger car fuel standards were set by Congress at 18 miles per gallon for model year 1978, 19 miles for 1979, 20 miles for 1980, and 27.5 miles for 1985.

The new car fleet fuel economy performance standards are, from the manufacturer's viewpoint, most flexible since they allow the manufacturer to phase-in new technology development over different motor vehicle lines. The ability to phase-in new technology is particularly important from the viewpoints of both technical and market risks.

ADMINISTRATIVE HISTORY[35]

Background. During the early 1970s, a number of studies and programs were undertaken by the Executive Branch on the subject of improved motor vehicle fuel economy (see Table 6). These initiatives had subsequent impacts on the form and administration of the mandatory fuel economy standards. Non-mandatory fuel economy programs complemented on-going Congressional debates on mandatory fuel economy standards.

In June 1971, the Office of the Secretary in the Department of Transportation completed an internal study on the identification of targets of opportunity for transportation energy conservation.[36] The analyses concluded that the motor vehicle fleet represented the most promising target. During 1972, an interagency task force consisting of participants from the Department of Transportation (DOT), the Environmental Protection Agency (EPA), the National Aeronautics and Space Administration, and the Department of Defense prepared a summary of Energy Research and Development Goals for the White House Office of Science and Technology. The Transportation Panel of this task force concluded that motor vehicle fuel economy could be significantly improved by 1980 with no major changes in vehicle functional characteristics.[37] These findings were confirmed in the 1974 DOT/EPA Report to Congress on the Potential for Motor Vehicle Fuel Economy Improvement. The DOT/EPA Report to Congress had been Congressionally mandated as part of the Energy Supply and Conservation Act of 1974. The Act required that DOT/EPA assess the feasibility of a 20 percent improvement in new car fuel economy by 1980. The resulting DOT/EPA report concluded that rather than 20 percent, a 40-60 percent improvement could be obtained by 1980. These findings became a critical technical input for President Ford's Voluntary Fuel Economy Program and for the subsequent Congressional mandatory program.[38]

TABLE 6. EXECUTIVE BRANCH ACTIVITIES ON MOTOR VEHICLE FUEL ECONOMY - 1970 TO 1976 (NON-MANDATORY FUEL ECONOMY PROGRAM)

DATE	ACTION	COMMENT
June, 1971	DOT study to determine major transportation energy conservation opportunities	The motor vehicle represented major opportunity to conserve energy in transportation.
Sept. 1972	DOT/EPA/NASA/DOD participated in study on "Energy Research and Development Goals" for White House Office of Science and Technology	Report projected that automobiles could achieve 30 to 40% fuel economy improvement and still meet emission goals.
Nov. 1972	EPA published report on Fuel Economy and Emission Control	Major findings were that vehicle weight is most instrumental factor affecting fuel economy.
Jan. 1973	Auto Energy Efficiency Program established at DOT's Transportation Systems Center	Program aimed at assessing auto industry's ability to improve auto fuel economy.
Oct. 1973	Arab oil embargo	Organization of Arab Petroleum Exporting States announced oil boycott.
Dec. 1973	EPA published the 1974 Gas Mileage Guide	Result of voluntary fuel economy labelling program.
Feb. 1974	Washington Energy Conference	Program of international cooperation to deal with world energy situations. New energy ethic to promote conservation.
June 1974	Request from Federal Energy Administration to auto manufacturers on feasibility of voluntary fuel economy program	Auto manufacturers asked to respond to feasibility of achieving 30% fuel economy improvement by 1985.
Aug. 1974	Industry response to FEA's request on feasibility of 30% fuel economy improvement by 1985	Motor industry responded positively to FEA request.

DATE	ACTION	COMMENT
Oct. 1974	DOT/EPA Report on Potential for Motor Vehicle Fuel Economy Improvement (120 Day Study)	Report concluded that 40-60% improvement could be obtained in motor vehicle fuel economy by 1980. Became critical technical base for voluntary program and subsequent mandatory standards.
Oct. 1974	Congressional Address by President Ford on The Economy	Announcement of a goal of 40% improvement in new car fuel economy by 1980. Goal based on 120 Day Study.
Jan. 1975	Initiation of Voluntary Fuel Economy Monitoring Project in DOT	Project aimed at monitoring industry's progress toward fuel economy goal of 40% improvement.
Jan. 1975	State of Union Message	President Ford announced agreement by the manufacturers on the voluntary fuel economy program.
Mar. 1975	DOT Secretary Coleman asked by White House to head task force on Motor Vehicle Goals Beyond 1980	Task force to study long range goals compatible with environmental safety, and economic objectives.
Sept. 1975	FEA announces possibility of increase in fuel economy goals	Auto makers were achieving large gains in fuel economy, and Administration wanted to continue voluntary program in spite of Congressional pressure.
Dec. 1975	Energy Policy and Conservation Act signed into law	Legislation called for 20 mpg in 1980 and 27.5 mpg in 1985. Over 100% improvement in fuel economy levels compared to 1973/1974 values.
Apr. 1976	Dept. of Transportation's Monitoring Report on Auto Voluntary Fuel Economy Program	Final report on voluntary program concluded that future product programs would meet 1980 goal of 40% improvement.

DATE	ACTION	COMMENT
Nov. 1976	Report by the Federal Task Force on Motor Vehicle Goals Beyond 1980	Report concluded that goal of 100% improvement in fuel economy by 1985 was achievable.

In October 1974, based in part on the results of the DOT/EPA Study, President Ford announced in a message to Congress a goal of 40 percent improvement in new car fuel economy by 1980.[39] The President indicated, in his State-of-the-Union-Message in January 1975, industry agreement to the Voluntary Fuel Economy Program. The voluntary program was initiated in January 1975, and was closed out in April 1976, as the Mandatory Fuel Economy Program came into being. The final April 1976 report on the Voluntary Fuel Economy Program concluded that future industry product programs then in progress would meet the planned target of 40 percent improvement by 1980.

In March 1975 the White House Energy Resources Council, chaired by Secretary Rodgers Morton, requested that the Department of Transportation establish an interagency task force to study long range goals for the motor vehicle fleet which were to be compatible with national environmental, safety, and economic objectives. The final report from this study, Report by the Federal Task Force on Motor Vehicle Goals Beyond 1980, was issued in November 1976, and concluded that a goal of 100% improvement in motor vehicle fuel economy by 1985, compared to model year 1973/1974, was achievable. This finding was compatible with the goal of 27.5 miles per gallon set by the Mandatory Fuel Economy Program.

As a result of the DOT/EPA Study and other similar agency and interagency assessments, the efficacy of the Voluntary Fuel Economy Program received considerable attention in the summer of 1975. The potential for long term motor vehicle fuel economy improvements appeared good, and the Congress was asking whether a voluntary program was sufficient to realize it. From the Congressional hearing records on mandatory fuel economy standards, it is clear that there was little faith on the part of Congress in the efficacy of any voluntary program.[40] Mandatory fuel economy legislation did pass as part of the Energy Policy and Conservation Act (PL 94-163) in December 1975. This formally killed the voluntary program.

The mandated fuel economy numbers were, in part, based on projections made in the DOT/EPA Study. Heywood, et al., suggest that the 1985 fuel economy standards set by Congress were "arbitrary."

> *Those (standards) for the longer term (1985) seem again to have been chosen principally for their symbolic value -- a doubling of the economy of existing new cars.*[41]

Available evidence suggests that this was not the case. At least five years of agency and Congressional background work had been performed prior to the passage of the mandatory fuel economy legislation. The available data were by no means perfect, but, on the other hand, the final mandated standards were not by any means produced in a completely arbitrary fashion.

Rule-Making Process. The Energy Policy and Conservation Act (EPCA), Public Law 94-163, enacted December 22, 1975, amends the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 2001 et reg) to include a new Title V, "Improving Automotive Efficiency." This Title required the Secretary of Transportation to define and implement a program for improving the fuel economy of new automobiles in the United States market.

On June 22, 1976 the authority to administer the program was delegated by the Secretary of Transportation to the Administrator of NHTSA. NHTSA's responsibilities under the Act can be divided into four major areas: (1) to establish and enforce motor vehicle fuel economy standards; (2) to grant exemptions from applicable standards; (3) to review and assess reports from the automobile manufacturers; and (4) to report to Congress on the fuel economy program.

In the process of fuel economy rule-making, the NHTSA follows the pattern required by the Administrative Procedure Act;[42] other Federal agencies, industry, interested groups, and private citizens are requested, through the Federal Register, to comment on the fuel economy proposals. From these comments, and other available data, NHTSA acquires information that will contribute to the final rules.[43]

In support of the fuel economy rule-making process, NHTSA has an on-going research and analysis program which is, in part, carried out by the Department of Transportation's Transportation Systems Center, under the direction of the NHTSA Associate Administrator for R/D, Office of Passenger Vehicle Systems. The objectives of this program are to develop, maintain, and update the data base and analytical tools necessary for rule-making and policy formulation activities in the area of automotive energy conservation.[44] The philosophy and goal of the rule-making process are to maximize information gathering and interaction with all the affected and interested parties.

Passenger Car Rule-Making. Under the provisions of the Energy Policy and Conservation Act, the Secretary of Transportation (authority was subsequently delegated to the Administrator of NHTSA) was required to develop fuel economy standards for 1981 to 1984 model year passenger cars and for light trucks. Table 7 summarizes the major actions undertaken by NHTSA on the 1981 to 1984 passenger car and the 1980 and 1981 light truck (under 8500 pound gross vehicle weight) standards.

An advanced notice of rule-making on the 1981 through 1984 standards was issued in September 1976; the formal notice of rule-making was published in February 1977; and the final rule was published in the Federal Register in June 1977. The sequence of rule-making actions on the 1980-1981 light truck standards followed those on the 1981 through 1984 passenger cars. A questionnaire requesting information from truck manufacturers to help in the standard setting process was issued in March 1977; this questionnaire took the place of the advanced notice of rule-making. The formal notice of rule-making was issued in December 1977; and the final rule was published in the Federal Register in March 1978. The two separate rule-making activities each required about 12 months to complete. Both rule-making activities involved significant interaction among the administering agency (i.e., NHTSA), the public, and the automotive industry.

TABLE 7. AFEP SECOND ANNUAL REPORT

AFEP Second Annual Report

Summary of Rule-making Activities for FY'77

Rule-making Activities		Publication date NPRM	Comments closing date NPRM	Final EIS[1]	Published final rule
Docket No.	Description				
FE 76-01	1981-84 Passenger Automobile Standards	2/22/77	4/12/77	6/1/77	6/30/77
FE 76-02	Reduction of Passenger Automobile Fuel Economy Standards	10/26/76	12/27/76	([2])	11/14/77
FE 76-03	Nonpassenger Automobile Standards 1979	11/26/76	1/10/77	3/3/77	3/14/77
FE 76-04	Exemption from Average Fuel Economy Standards	12/9/76	1/24/77	([2])	7/28/77
FE 76-05	Vehicle Classification	12/20/76	1/19/77	([2])	7/28/77
FE 77-02	Manufacturers of Multistage Vehicles	2/9/77	3/9/77	([2])	7/28/77
FE 77-03	Automotive Fuel Economy Reports	4/11/77	5/11/77	([2])	12/12/77
FE 77-05	1980-81 Nonpassenger Automobile Standards	12/15/77 Public Hrng. 1/16-17/78	1/30/78	3/15/78 (DEIS draft available to public 12/12/77)	3/15/78

Notes: [1] Environmental Impact Statement
[2] Not Applicable

Eleven groups participated in the 1981-1984 Passenger Car Hearings, held in March 1977. Five were automobile manufacturers and four were "funded" public interest groups. These Hearings represented the first application by the Secretary of Transportation of a new program in which participation of public interest groups which might be unable to participate otherwise was supported in part by DOT funding.

The industry in general expressed concern with the technical, financial, and marketing risks associated with the proposed standards. Their concerns, however, were more directed at financial and marketing feasibility than at technical feasibility.

Mr. Henry Duncombe, the Chief Economist of the General Motors Corporation, speaking at the Hearings testified:

> *One element of uncertainty is the success of specific technology we are now developing. However, the range of this uncertainty is relatively small. Technical feasibility is not the key issue here today--cars on the market already exceed 27.5 mpg--The major uncertainty will be the potential losses of auto sales caused by fuel economy standards--It seems safe to say that the more rapidly the fuel economy standards are raised, and the higher the 1985 standards, the greater the risk will be if there is a decline in the rate of replacement of the existing fleet.*[45]

The other manufacturers made similar comments.

The four "funded" public interest groups included Citizens for Clean Air, Inc., Public Interest Economic's Foundation, Environmental Defense Fund, and Public Interest Campaign.

Dr. Balgord, a consultant for Citizens for Clean Air, testified:

> *The particles in the diesel exhaust contain several known or suspected carcinogens---Dieselization will trade the carbon monoxide problem which we know in our cities for a particulate problem which we do not know. We find it hard to believe that EPA will long allow such an engine to emit carcinogenic materials without improving controls.*[46]

Because of uncertainty with potential health effects, the notice of final rule-making on both the 1981 through 1984 passenger car and the 1980 and 1981 light trucks assumed negligible diesel penetrations.

Mr. Walter Adams of the Public Interest Foundation indicated concern about the lack of competition and innovation in the automobile industry:

> *Since World War II American automobile manufacturers, particularly the 'big three', have had a record of innovative lethargy and unprogressive sluggishness. They have lagged, not led, in the battle to develop cleaner, safer, and more fuel efficient cars. The Government should adhere to its (proposed) fuel economy standards so that the industry will then proceed to do that which it has previously demonstrated it is capable of doing when faced with a national crisis and national challenge.*[47]

Other public interest groups presented statements on the health, safety, and consumer impacts of the standards. The passenger car hearings were unlike the light truck hearings, which occurred later in the year, in that little concern was expressed about the potential industrial employment impacts of the proposed standards.

Following the Hearings and subsequent submissions, the final rule was published in June 1977. The proposed and final fuel economy standards are compared in Table 8. (The notice of proposed rule-making, issued in February 1977, indicated a possible range rather than a single value of fuel economy.) The values in the final rule tended to be on the high side of the original projections.

TABLE 8. PASSENGER AUTOMOBILE FUEL ECONOMY STANDARDS, 1981-1984

Proposed in NPRM	Final Standards
1981 21.5-22.5 mpg	22 mpg
1982 22.5-23.5	24
1983 23.5-25.0	26
1984 24.5-26.5	27

Two weeks later, at the July 1977 Senate Commerce Committee Hearing on Auto Fuel Economy, the 'Big Four' automakers testified that they would meet the fuel economy requirements of the law, i.e., 1981-1984 passenger car fuel economy standards.[48]

To some observers the industry's testimony at the Congressional Hearings in July, in which they said they could meet the standards, is at odds with their testimony at the Department of Transportation Fuel Economy Hearings in March, in which they said they could not meet the proposed standards. A perceptive statement of the industry's dilemma in such situations was made in a remark by Elliot Estes, President of the General Motors Corporation:

> *The trouble is, we've got a serious problem with our image--our credibility.*
>
> *In dealing with the government--and in raising questions and explaining the possible difficulties and costs, we have reinforced the negative image that many people have of us--I don't know how it can be avoided.*
>
> *In all honesty, we have contributed to this lack of credibility because we wanted to see some promising results with real hardware before we predicted our ability to make progress to meeting some of these standards and rules.*
>
> *Early last year (1976) we were saying that we didn't know how to meet the 27.5 miles per gallon fuel economy average for 1985 except by building 92% Chevettes. That was the case at the time, and, in saying so, I didn't mean that we were not working to do better. Now we are going to take the risk that we can meet the required fuel economy average in the 1980s and still provide a reasonable mix of attractive vehicles that will meet most of our consumers' transportation needs.*[49]

Thus, in the summer of 1977, the auto-manufacturers indicated that although there were major financial and market risks, they felt they could meet the mandated 1980 to 1985 fuel economy standards with a "marketable product mix."

Light Truck Rule-Making. In November 1977 a draft of the proposed 1980-81 light truck fuel economy rule-making was sent out for interagency review as required in the rule-making process. Despite the legal requirement for confidentiality, the draft proposal was leaked to industry officials. The proposed standards were, in the industry's view, quite restrictive, and they reacted with a massive lobbying effort to modify the proposal before it became public. White House, Congressional, and different agency

officials were contacted, including Messrs. W.M. Blumenthal, Treasury Secretary; J. Kreps, Commerce Secretary; and B. Adams, Secretary of Transportation. Notwithstanding this lobbying, the light truck fuel economy standards in the notice of rule-making, issued in December 1977, were basically unchanged from the draft which had leaked to industry.[50]

Prior to and during the January light truck public hearings, the manufacturers made public disclosures of possible plant closings. Chrysler indicated that they had been forced to postpone the conversion of their Jefferson Avenue plant in inner-city Detroit because of uncertainty on truck standards.

> *We had planned to convert the Jefferson Plant to van production at a cost of $50 million. In the process, we would keep more than 3,000 jobs in the city of Detroit. We have been forced to delay that project until the question of truck standards is settled. We can't go ahead and commit millions of dollars to build vehicles that we know can't meet the regulations NHTSA is planning to impose on us.*[51]

The arguments in the light truck public hearings and submissions were in marked contrast to those of the earlier 1981-1984 passenger car hearings. Whereas 11 groups had participated in the passenger car hearings, 31 groups participated in the light truck hearings. The notice of proposed rule-making on the 1981-1984 passenger car standards resulted in 48 responses to the public docket; the 1980-1981 light truck rule-making brought in 326 responses. The presentations at the passenger car fuel economy hearings and the docket submissions pertained to the technical and marketing risks associated with the standards, and the potential health effects of diesel particulates. The presentations at the light truck hearings pertained primarily to potential unemployment and particularly to minority unemployment.

V. Lonnie Peak, Jr., member of the Board of Trustees, New Detroit Incorporated said:

> *In Detroit, who is affected? I am not here to wage a battle for Chrysler and other truck manufacturers. This is a battle for poor and black people. These people are the 'who' that will be so severely affected. They are*

the ones who work in the plants. Heavy industry is a major employer of black and poor people. Blacks are not heavily employed in plastics. Blacks are not heavily employed in aluminum. Blacks are not heavily employed in aircraft production. Twenty-eight percent of all auto industry employees are black Americans, but in the cities the majority of assembly line workers are black.[52]

Gerald Smith, President of the Detroit Chapter of the National Association of Black Social Workers, Inc., had this to say about the situation:

Finally, a not so subtle negative effect of the new rule is the shambles it makes of affirmative action hiring practices for minorities and women. It stands to reason that aluminums and plastics are the building materials of the future if automobile companies are to successfully build lighter, more economical vehicles. Few minorities and women have skills or hold jobs in the aluminum/plastics industries, as compared with the vast network of steel industries involved in producing automobiles. As vehicle production moves away from dependence on the urban located steel industry, toward the suburban located aluminum/plastics industries, urban job displacement will follow. In practical terms, that means 'last hired are first fired' or if one gets a job he/she must come to the suburbs. Therefore, we can ill afford to discourage business from expanding or remodeling in the cities; in fact, I would think national urban policy would develop incentives for attracting new and maintaining old business in the cities.[53]

M. Carl Holman, President of the National Urban Coalition, responds to the issue in plain terms:

As we understand it, DOT believes that the work which must be done in order to meet its standards will increase job opportunities, rather than reduce them. The industry, evidently, thinks not. For blacks, this poses a cruel Hobson's choice. There is much discussion about whether jobs should be brought to people, or people should go or be taken to where the jobs are. The cold fact is that most blacks and other minorities, as the society currently operates, simply do not have the mobility and the choices which a great many Americans enjoy.[54]

Following the Hearings and submission of new information which had not been previously available,[55] the final 1980-1981 light truck standards were published in the Federal Register in March 1978. A comparison of the originally proposed standards

and the final standards (see Table 9) shows that the final fuel economy values were considerably less severe than the standards proposed prior to the Hearings. In the "Final Impact Assessment" of the 1980-1981 Light Truck Standards, NHTSA stated:

> *The regulatory agency gathers information--in this instance primarily from the industry it is regulating; proposes a standard based on the information; industry and others comment on the proposal--especially in terms of use and adequacy of supplied information; and the proposal is modified on the basis of the latest, most complete data.*[56]

TABLE 9. COMPARISON OF PROPOSED AND FINAL LIGHT TRUCK FUEL ECONOMY STANDARDS (WITHOUT CAPTIVE IMPORTS)

Model Year	Proposed Rule (mpg)		Final* Rule (mpg)	
	2 Wheel Drive	4 Wheel Drive	2 Wheel Drive	4 Wheel Drive
1980	19.2	16.2	16.0	14.0
1981	20.5	17.7	18.0	15.5

* The actual standards include the following provisions:
- If EPA does not approve use of slippery oils in testing by January 1, 1980, then standard may be reduced 0.5 mpg.
- No reliance on dieselization was made in establishing the technological feasibility of meeting those standards.
- All domestic trucks under 8500 lb. gross vehicle weight are included; manufacturers may not include imported vehicles (captive imports) in calculating new fleet average.
- Manufacturers using only truck type engines (i.e., International Harvester) granted special one-time standards.

Following the March 1978 announcement of the final standards, the industry and Congressional reactions were generally positive. General Motors and American Motors asserted that they could meet the new light truck standards in 1980 and 1981; Ford repeated an earlier announcement that they would spend 600 million dollars to keep Ford light trucks as industry leaders in fuel economy; and Chrysler indicated that, although the 1981 light truck standards demand an increase in fuel economy beyond their current capability, they had every intention of meeting the standards in both years.[57]

Senator Ronald Riegle, Michigan Democrat, indicated:

> *The standards originally proposed were just technologically impossible for the industry to meet and would have resulted in large scale unemployment--the closing of Chrysler's Detroit Jefferson Ave. plant and numerous layoffs in other Detroit plants and in Flint. Under these new standards no jobs should be lost and we will still achieve a 23 percent improvement in fuel efficiency by 1981 over the present standards.*[58]

The 1981-1982 light truck fuel economy rule-making activity can be considered as indicative of the course of future fuel economy rule-making activity. As the proposed passenger car and light truck fuel economy standards become more stringent,[59] the required changes in product design and the associated manufacturing processes will increasingly raise the possibility of significant changes in the nature and regional distribution of the motor vehicle industry workforce.

...downsizing and material substitution would imply either slightly retarded or slightly accelerated growth rates.[63]

In the rule-making activity on the 1980-1981 light truck standards, the consideration of 'economic practicability' came to include much more specific assessment of the possible effects of plant closings and re-locations associated with meeting the originally proposed standards. Economic practicability has many facets. The decision as to what is economically practical rests with the policy makers of DOT/NHTSA subject to the legislative and executive checks and balances of the rule-making process; however, as the standards are being increased the nature and significance of the associated economic impacts are becoming more complex.

o Community/Regional Economics. As discussed previously, the substitution of light-weight materials -- aluminum and plastic -- and more sophisticated power plant technology, are considered as potential threats to minority and inner-city employment. UAW Vice President, Marc Stepp recently proposed to the House Subcommittee on Labor Standards that legislation be enacted to govern plant relocation and closings, that it include, among others, the following provision.

Advanced notice of an impending plant shutdown with an intensive effort to provide alternative employment for affected workers--Mobility assistance to make easier for workers victimized by economic dislocation to relocate.[64]

In the same vein, a recent directive from the Office of Management and Budget states that Executive Branch agencies shall prepare urban and community impact analyses of proposed policy initiatives.[65] Fuel economy regulations would be covered by this directive. There is increasing national concern about the possible impact of federal regulations on inner cities, low income households, and minority employment. This concern will be reflected in future rule-making activity.

o Industry Competition and Structure. The ability to generate the capital necessary to fund the mandated changeover to fuel economical motor vehicles is strongly dependent on the general

ADMINISTRATIVE HISTORY -- ECONOMIC PRACTICALITY

o Background. The mandatory fuel economy portion of the Energy Policy and Conservation Act directs that the Secretary of Transportation set standards for light trucks and for passenger cars, for model years 1981 through 1984, that were 'economically practical'. In the rule-making activity on the 1981-1984 passenger car standards,[60] the standard was considered economically practical if the fuel economy standards were "within the financial capability of the industry, but not so stringent as to threaten substantial economic hardship for the industry."[61] NHTSA concluded that a cost-benefit analysis would be "useful as a supplemental evaluation, but sole reliance on such an analysis would be contrary to the intent of the Act." NHTSA further analyzed several economic impact areas that would bear directly on the industry's financial capability to convert to the production of fuel economical cars, including projection of total car sales and thus potential revenue. In addition, NHTSA analyzed the economic impact of the standards on the consumer by comparing the decrease in discounted operating cost, resulting from improved fuel economy, with the increase in motor vehicle prices associated with the implementation of fuel efficient technology. This "cost-benefit" analysis concluded that consumers' savings in gasoline and maintenance costs would be greater than the new car price increase required to cover costs attributable to fuel economy standards. Potential macro economic impacts were also analyzed, including the effect of the mandated standards on the Gross National Product, Unemployment Rate, and Consumer Price Index. The change in these indices due to the imposition of the standards was small, indeed to quote the Rule-Making Support Paper: "Essentially insignificant, amounting to much less than one percent of the value of these indicators."[62] A macro-analysis of the motor vehicle material supply industries was also provided. This analysis concluded that:

TABLE 10. PERCENT OF TOTAL U.S. NEW CAR REGISTRATIONS*

Year	GM	Ford	Chrysler	AMC	Imports
1968	46.7	23.7	16.3	2.8	10.5
1969	46.8	24.3	15.1	2.5	11.3
1970	39.8	26.4	16.1	3.0	14.7
1971	45.2	23.5	13.7	2.5	15.1
1972	44.2	24.3	14.0	2.9	14.6
1973	44.5	23.5	13.3	3.5	15.2
1974	41.9	25.0	13.6	3.8	15.7
1975	43.3	23.1	11.7	3.7	18.2
1976	47.2	22.5	12.9	2.5	14.9

*Reproduced from the Contributions of Automobile Regulations (Table 5, pg. 21)

The available information suggests that, to date, the motor vehicle regulations have had little effect on industry competitive position; however, both Chrysler Corporation and the Ford Motor Company have expressed concern about their financial future because of the necessity for maintaining a "mandated' continuing capital investment program, whatever the economic climate. Future rule-making will have to assess the validity of these claims.

o Inflation/Trade Balance. Rule-making will, in addition, have to continually reassess the positive and negative impacts of mandated fuel economy standards on inflation and on the balance of payments.

In an April, 1978 White House meeting, business leaders, including representatives of the motor vehicle industry, met with President Carter and identified regulations as a significant causal factor in inflation. Since that time the domestic manufacturers have proposed -- as one element in the fight against inflation -- that: the 1981 through 1983 passenger car standards, calling for 2 mpg annual increases in fuel economy, be re-examined; the 27.5 miles per gallon standard not be raised because of the attendant cost and risk; and the 1982-1984 light truck standards reflect the load-carrying function of trucks and be increased at a slower rate than cars.

economic climate and marketability of the new products. The sale of new cars is, in turn, closely related to the state of the economy. Since the state of the economy and auto sales have historically been cyclical, the requirements to meet mandated standards by specific dates -- independent of the state of the economy -- considerably increase the manufacturers' financial risk. It has been proposed that the financial risk is greatest for the smaller manufacturers who do not have the same access as larger companies to capital resources to carry them through an economic downturn.

In their 1977 Annual Report Chrysler Corporation indicated:

> *These standards impact more heavily on Chrysler Corporation than on its two larger competitors---*
>
> *The effect of these unreasonable standards -- is to have the government strengthen the competitive advantage of the largest manufacturers.*

Similar comments have been made by the Ford Motor Company[67]

> *It is ironic that the cumulative impact of government regulation may be to strengthen the position of GM and the imports and possibly weaken domestic competition in the automotive industry.*

In a recent study, The Contributions of Automobile Regulations, NHTSA questioned the industry statements on the effects of regulation on industry structure.

> *It has been charged that despite efforts by some Government agencies to prevent concentration in industry, the regulators are fast bringing the automobile industry to the point where only the largest companies can survive. This assertion is easily refuted by the figures in Table 5 (duplicated in Table 10 below) which shows the share of the market enjoyed by each manufacturer since the NHTSA regulations first became effective. As the table demonstrates there is no discernible trend in percent of market for any individual producer, much less an overall movement toward concentration.*[68]

further, it can be questioned as to whether energy replacement 'production costs' are the 'best' measure of energy conservation benefits. It is clear, however, that as the fuel economy standards are made more stringent, rule-making will increasingly involve assessments of total consumer, industry, labor and societal risks compared to the total benefits of petroleum conservation.

In order to reduce the capital requirement necessary to meet the mandated standards, the domestic manufacturers are sourcing components from overseas suppliers rather than producing them domestically.

> *Chrysler Corporation will purchase more than $200 million in components from its newest partner, Peugeot-Citroen for use in a new line of front-drive compacts.*[69]

On the other hand, the massive capital investments required to meet the standards are resulting in improved domestic industry productivity. The subjects of both inflationary and negative trade impacts of mandatory standards remain open.

o Energy Conservation Costs vs Benefits. Juanita Kreps, Secretary of Commerce, has recently indicated the need for better understanding of the regulatory process:

> *For each federal regulation it is essential to ask: What does it cost? What benefits are we buying? Do these costs and benefits accurately reflect our priorities? Is there a way to achieve the same benefits at lower cost?*[70]

Along these lines the industry has raised the issue that in setting the level and rate of introduction of fuel economy standards, the NHTSA should consider the concept of a cost versus benefit analysis. General Motors in their response to NHTSA's request for information on the 1984-1986 passenger automobile has suggested that a study is required to:

> *...find the point at which the financial resources used in fuel production is close to the financial resources used for conservation per gallon produced or saved over the life cycle of the vehicle.*[71]

As fuel economy standards are increased, the incremental petroleum savings become less -- a doubling of fleet fuel economy from 25 to 50 mpg saves only one half as much fuel as a doubling of fleet fuel economy from 12.5 to 25 mpg -- and, in the absence of significant technological innovation, the incremental costs become greater. The determination of the level of fuel economy at which 'production costs' equal 'conservation costs' depends on the availability of information which does not currently exist;

actuators, sensors, and on-board micro-processors are being incorporated for more accurate engine control and improved fuel utilization. Diesel penetration is being increased with associated uncertainties in the health effects of diesel exhaust emissions. As in the case of weight reduction, the incremental improvements in powertrain efficiency are becoming more difficult to achieve.

o Projected Technology Requirements. No Western European maker has a corporate sales weighted average fuel economy as high as needed for 1985, although a number of individual production models have a fuel economy in excess of 27.5 miles/gallon.[72] The available fuel efficient motor vehicle technology in Western Europe and Japan is rapidly being used up. If the nation chooses to further increase motor vehicle fleet fuel economy in the post-1985 decade, it appears reasonable to ask the question: Will the anticipation of more stringent fuel economy standards be sufficient to generate the technology required for another round of rapid and significant increase in fuel economy?

The answer to this question is controversial. One view is that the motor vehicle industry has the necessary resources and it can be stimulated into action through product regulation. Another view is that without knowledge of whether the regulation is feasible, the Government is not in a position to make a regulation. If the automobile companies say "no", the Government has to have some basis for saying "yes".[73] According to this view, the possibility of more stringent fuel economy standards may be a deterent to innovation since in developing new technology the industry will only be increasing the Government's basis for demanding higher standards. Unless fuel economy continues to be a marketable quantity, the motivation for industry to show it can exceed the 1985 mandated fleet average of 27.5 mpg is likely to be small.

Independent of the resolution of this conflict, the sources of motor vehicle technology are being depleted. If the nation chooses -- on the basis of an assessment of the benefits and

NATURE OF CURRENT AND PROJECTED TECHNOLOGICAL INNOVATIONS

o Current Technology Availability. By 1985 the projected domestic new car fleet average fuel economy will be more than double its 1973/1974 low value of about 13 miles per gallon. This increase will have been accomplished with relatively small changes in motor vehicle functional characteristics -- interior passenger and baggage volume and performance will be about the same as at present. The 1975 industry predictions that mandatory fuel economy regulations would require a fleet of subcompacts has not come to pass. The fuel efficient motor vehicle technologies being domestically commercialized were developed, in large part, by Western European and Japanese motor vehicle manufacturers and suppliers in an environment in which there were high fuel prices and horsepower taxes. The advanced electronic control technology currently being adopted, while not derived from the foreign auto industry, has been derived from technology developed in other industrial sectors. The existence of fuel economy standards has accelerated the commercialization and transfer of existing technology, but the situation is now changing.

The first round (1977-1982) of motor vehicle weight reduction was achieved by downsizing. Motor vehicles were downsized and changes made in motor vehicle styling and design. In the next round (1982-1985) there will be increased emphasis on material substitution in body panels, structural members, and powertrain castings. The incremental weight changes associated with material substitution are smaller than those associated with the original downsizing programs.

The first round improvements in powertrain efficiency have been associated with engine resizing; four and five speed transmissions have been substituted for three speed transmissions; turbo-chargers have been used to preserve vehicle passing and acceleration performance. In the second round, more sophisticated

costs -- that motor vehicle fuel economy should be further increased, the motor vehicle technology base, including safer lightweight structures and more fuel efficient powertrains, must be replenished.

MANDATORY FUEL ECONOMY STANDARDS--WHAT WE HAVE LEARNED

IMPACTS

o Petroleum Conservation. Mandatory fuel economy standards have proved to be a powerful instrument for stimulating improvements in new car fleet average fuel economy and in achieving the societal goal of decreased petroleum consumption. It is projected that new car fleet average fuel economy will be doubled in the period from 1975 to 1985 with a resulting annual petroleum savings of 2 to 3 million barrels/day by the early 1990s.

o Rejuvenation and Modernization. The accelerated capital spending required to meet the mandatory standards has provided the domestic motor vehicle manufacturers with a unique opportunity to modernize and rejuvenate their aging manufacturing facilities and put into place a more efficient and productive physical plant than previously existed.

o Competition. The mandated standards have resulted in the domestic production of motor vehicles which may not only capture a significant segment of the domestic small car market, but which may also be competitive in the world market.

o Market and Financial Risk. The ability to generate the new capital necessary to fund the accelerated changeover to fuel economical motor vehicles is strongly dependent on the general economic climate and market acceptance of the new products. The financial risk is greater for the smaller manufacturers, who do not have the same access as large companies to capital resources, to carry them through an economic downturn.

LEGISLATIVE HISTORY

o Price Mechanism Versus Product Regulation. The selection of fuel economy product standards and federally funded research and development rather than the price mechanism for increasing motor vehicle fuel economy has not been arbitrary but the subject of extensive legislative debate. U.S. motor vehicle energy policy has in large part been based on the ability of the motor vehicle industry to produce technological innovations as a means of meeting societal goals rather than on economic measures directly affecting the driving public.

o Fuel Economy Target of 27.5 MPG. Prior to the 1975 passage of the mandatory 1985 motor vehicle fuel economy standard of 27.5 miles per gallon there had been a number of significant analyses -- both by the Executive Branch and the Congress -- on the potential for motor vehicle fuel economy improvement over the 1973/1974 domestic fleet value of 12 to 13 miles per gallon. The legislative selection of a mandatory fuel economy standard of 27.5 miles per gallon was neither completely arbitrary nor a simple symbolic doubling of the 1973/1974 fleet average fuel economy, but was based on the best information available at the time.

COMPARISON OF MOTOR VEHICLE FUEL ECONOMY, EMISSION CONTROL, AND SAFETY STANDARDS

o Congressional and Executive Responsibilities. The Safety Act of 1966 gave the Executive Branch the responsibility for setting and implementing motor vehicle safety standards that were practical. In the Clean Air Amendment Act of 1970 Congress set the emission standards and took over what had been an Executive Branch function. Congressionally-mandated numerical standards can only be contested on constitutional grounds. The burden of proof as to what was practical was shifted from the administering agency to the manufacturer. The Energy Policy and Conservation Act of 1975, which mandated motor vehicle economy standards, combined the two approaches. A 1985 fuel economy value of 26 to 27.5 miles per gallon was Congressionally mandated; and the Secretary of Transportation was assigned the responsibility for setting standards for light trucks and vans as well as interim 1981 to 1984 standards for passenger cars.

o Equipment, Vehicle and Fleet Performance Criteria. The fleet average fuel economy regulations provide the manufacturers with more flexibility in product planning than either the emissions standards which are to be met by all vehicles in a single year, or the motor vehicle safety standards which are generally applicable to specific pieces of motor vehicle equipment.

ADMINISTRATIVE HISTORY

o Passenger Car and Light Truck Rule-Making. Mandatory fuel economy standards for model year 1981 through 1984 passenger cars were issued in June 1977; standards for 1980-1981 model year light trucks were issued in March, 1978. The public response to the proposed light truck standards was much broader than the response to the proposed passenger car standards. The major issues during the passenger car fuel economy hearings were industry concerns as to the level of their projected technical, financial, and market risks; and the environmentalists' concern with the health impacts of dieselization. At the light truck hearings the industry threats of possible shutdowns of light truck plants brought strong appeals from the impacted communities and from groups representing inner-city minorities that the standards be made less stringent.

o Participation by Community, Regional and National Labor Groups. As the standards are made more stringent -- for example, by the 1980-1981 light truck rule-making activity -- the required changes in the motor vehicle design and the associated manufacturing processes will have potential impacts on employment in specific geographic regions, and on specific segments of the work force. It is anticipated that these affected groups will be active and more intense participants in future fuel economy rule-making activities and will add their voices to those of different industry, labor, and public interest groups which have been heard in the past.

MANDATED FUEL ECONOMY STANDARDS FOR THE POST-1985 MOTOR VEHICLE FLEET

o Technology Generation. The projected doubling of motor vehicle fuel economy by 1985 will have been accomplished, for the most part, by the use of mass-produced technology which had already been commercialized in Western Europe and Japan. The development and commercialization of innovative fuel economy technology is and will be stimulated by the mandatory fuel economy regulations. It is not clear, however, whether the anticipation of more stringent standards in the post-1985 period will, by itself, result in the allocation of resources -- trained manpower, equipment and capital -- to the generation of new motor vehicle technology in the United States, Western Europe, and Japan, at a rate sufficient to achieve significant additional gains in motor vehicle fuel economy in the next ten years. If motor vehicle fuel economy is to be increased, additional efforts -- on the part of the industry and the government -- may be required to replenish the technology base.

o Policy Alternatives. Mandatory fuel economy standards have proved to be a powerful, and flexible instrument for in creasing motor vehicle fuel economy at a rate greater than that which would have been brought about by the market place. Because of their effectiveness, the fuel economy standards are likely to be employed if the nation chooses to achieve further gains in motor vehicle fuel economy. Experience with the current fuel economy rule-making process has indicated that as the mandated standards are increased the resulting changes in motor vehicle design and manufacturing process technology may increasingly affect different industrial sectors, regions of the country, and segments of the work force. Since it is not possible at the start of the rule-making action to properly assess all the impacts of the action, continuous re-appraisal of the proposed standards is required as more new information and knowledge is provided by concerned groups. If, in the post-1985 decade mandatory fuel economy standards are to continue to be useful as a strategy

for stimulating fuel economy improvements, they must be supported by other federal policies both to stimulate the marketability of fuel economic motor vehicles and to mitigate the impacts on affected groups in and outside the industry.

REFERENCES

1. "Fuel Economy," Ward's Engine Update, Vol. 4, No. 19, Sept. 15, 1978, p. 6.

2. During the Automobile Fuel Economy Senate Commerce Committee Hearings and the Mandatory Fuel Economy Hearings in July 1977, Messrs. H. Misch (Ford), S. L. Terry (Chrysler), F. Stewart (American Motors), and H. Duncombe (GM) all testified that they would meet mandatory fuel economy standard of 27.5 mpg by 1985. (See Reference 48 for further details.)

3. Elliott Estes, speech presented at Automotive News World Congress, Detroit, MI, July 1977.

4. Department of Transportation News, Office of Public Affairs, No. DOT-72-77, June 30, 1977.

5. The Report by the Federal Task Force on Motor Vehicle Goals Beyond 1980, Draft, Vol. 2, Sept. 1976, p. 8-8, 8-16. The report asserts that assuming a continuation of the model year 1975 new passenger car fuel economy levels, annual passenger car fleet petroleum consumption in 1985 is projected to be about 6.1 million barrels/day and in 1995 about 7.5 million barrels/day. Projected fuel consumption for meeting the 1985 corporate average fuel economy target of 27.5 mpg would be about 4.5 million barrels/day in 1985 and about 4.3 million barrels/day in 1995. (Both projections assume a growth in the total vehicle miles traveled of about 2% per year.) The projected 1985 and 1995 savings are about 1.6 million barrels/day and about 3.2 million barrels/day, respectively.

6. John F. O'Leary to Brock Adams, May 31, 1977, NHTSA Fuel Economy Docket: FE 76-01-N03-037.

7. Robert W. Irvin, "Big Four Spending Jacked Up Again - By 41% to $78 Billion," Automotive News, June 5, 1978, p. 1.

8. E. A. Cafiero, President, Chrysler Corp., Annual Meeting of Shareholders, May 2, 1978.

9. Robert W. Irvin, "Caldwell Zeroes in on U.S.," Automotive News, Oct. 2, 1978, p. 42.

10. R. Gilpin, U.S. Power and the Multinational Corporation, Basic Books, Inc., 1975.

11. Richard J. Fosdick, "Pushing Imports Back Into the Sea, "Automotive Industries, October 1, 1977, p. 13.

12. "Cars: Soon It Will be Europe's Turn to Squeal," The Economist, Dec. 31, 1977, p. 84.

13. E.M. Estes, President of GM Corp., in a letter to Brock Adams and Douglas Costle, June 20, 1978.

14. Statement of General Motors Corporation to the National Highway Traffic and Safety Administration on 1981-1984 Passenger Automobile Average Fuel Economy Standards, (presented by Dr. Henry L. Duncombe), Washington, D.C., March 22, 1977.

15. For Consumer Price Index see Bureau of Labor Statistics, Monthly Labor Review. While the Consumer Price Index (U. S. City average 1967=100) for all items went from 148 in 1974 to 182 in 1977, the Index for gasoline went from 160 to 188.

16. Henry Ford, II, at a White House Conference on Balanced National Growth and Economic Development, Jan. 30, 1978.

17. Passenger Automobile Average Fuel Economy Standards, Final Rule, March 1977.

18. Joan Claybrook, "The Snail's Pace of Innovation," Speech presented at Automotive News World Congress, Detroit, MI, June 13, 1977.

19. A background summary on automobile safety legislation is given in Philip A Lorang and Lawrence H. Linden's Automobile Safety Regulation: Technological Change and the Regulatory Process, Massachusetts Institute of Technology, Energy Lab., MIT-EL-77-036 WP, Oct. 1977, Chapter 2, p. 19-23.

20. PL 89-272, amendments to the Clean Air Act of 1963, Oct. 20, 1965.

21. HR 6599, March 16, 1971 and HR 3091, Jan. 29, 1973, House Interstate and Foreign Commerce Committee.

22. "Fume-Free '75," New York Times, Aug. 23, 1970, Section III, p. 12.

23. Presidential Energy Program, House Interstate and Foreign Commerce Committee Hearings, Feb. 20, 1975, p. 420.

24. Energy Conservation Working Paper, Senate Commerce Committee Hearings, Dec. 10, 1974, p. 174.

25. Statement of Leonard Woodcock, President, International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America (U.A.W.), Multinational Corporations, Hearings, Subcommittee of International Trade, Committee on Finance, U.S. Senate, 93rd., Feb./March 1973, p. 281.

26. "Statement of Leonard Woodcock, President, International Union, United Auto Workers; Accompanied by Howard Young, Consultant," U.S. Senate Committee on Commerce; hearings on Automobile Fuel Economy and Research and Development (March 12-13, 1975), p. 205

27. Jake Kelderman, "Industry Takes a Pasting at Hearings on Car Repair," Automotive News, March 27, 1978, p. 37.

28. Statement of the Center for Auto Safety in Energy Conservation Working Paper hearings, p. 270-271.

29. "President Ford announces forced resignation of Federal Energy Administrator John C. Sawhill..., "New Yorks Times, Oct. 30, 1974. p. 8.

30. "Conferees Agree to Penalize Makers of Gas Guzzlers," Congressional Quarterly Weekly Report, Sept. 30, 1978, p. 2714.

31. Charles L. Schultze, The Public Use of Private Interest, Washington: Brookings, 1977.

32. A summary of the characteristics of motor vehicle standards is provided in John B. Heywood et al., Regulating the Automobile, Massachusetts Institute of Technology, Energy Lab. report MIT-EL 77-007, Nov. 1977, Chapt. 1, "The American System of Regulating the Automobile," by Lawrence H. Linden and David Iverach, pp. 1-1 through 1-53.

33. The role of the Federal Administrative Procedures Act in establishing the framework within which the regulatory process must function is developed in Eugene Goodson's, Federal Regulation of Motor Vehicles - A Summary and Analysis, Purdue University, prepared for U.S. DOT, March 1977.

34. Heywood, Regulating the Automobile, Chapter 5: "Another View of the Politics of Auto Emmissions Control," by Howard Margolis.

35. A summary of the administrative history of fuel economy regulation is presented in Goodson, Federal Regulation of Motor Vehicles, p. 14-29.

36. DOT Office of the Assistant Secretary for Systems Development and Technology, New Technology Initiatives, Internal Report, June 1971.

37. Transportation Energy Panel, Research and Development Opportunities for Improved Transportation Energy Usage, Report No. DOT-TSC-OST-73-14, Sept. 1972.

38. Energy Conservation Working Paper, Senate Commerce Committee (Nov.-Dec. 1974), hearings pp. 1 and 8.

39. President Gerald R. Ford, "The Economy," address before a Joint Session of Congress. Oct. 8, 1974, Weekly Compilation of Presidential Documents, Oct. 14, 1974, pp. 1239-1247.

40. U. S. House Interstate and Foreign Commerce Committee, Subcommittee on Energy and Power, Energy Conservation and Oil Policy, Part 2, Hearings, March/May 1975.

41. Heywood, Regulating the Automobile, Chapter 1, Laurence H. Linden and David Iverach, "The American System of Regulating the Automobile,"

42. Administrative Procedure Act, 5 U.S.C., Sec. 553 as amended.

43. National Highway Traffic Safety Administration, Automotive Fuel Economy Program, First Annual Report to Congress, Jan. 1977, pp. 25-27.

As part of the fuel economy rule-making process, NHTSA is required to:

1) Prepare an engineering draft of the proposed rule, describing technical specifics; 2) Prepare a rule-making support paper (RSP), preliminary impact assessment (PIA) and draft environmental impact statement (DEIS) if needed. The RSP provides technical basis for the PIA:

3) Prepare legal draft of proposed rule-making action; 4) Obtain concurrence of the Secretary and complete interagency coordination; 5) Publish Notice of Proposal Rule-making (NPRM) in Federal Register; 6) Collect comments from interested parties; hold public hearings as appropriate; 7) Incorporate information and comments into rule-making documentation; 8) Prepare final draft of proposed rule-making action; 9) Obtain concurrence of the Secretary and complete interagency coordination; 10) Publish rule in Federal Register.

44. National Highway Traffic Safety Administration, Automotive Fuel Economy Program, Second Annual Report to Congress, Jan. 1978, p. 33.

45. Henry Duncombe, NHTSA hearings on 1981-84 passenger car fuel economy, March 22, 1977.

46. William D. Balgord, NHTSA hearings on 1981-84 passenger car fuel economy, March 22, 1977.

47. Walter Adams, NHTSA hearings on 1981-84 passenger car fuel economy, March 22, 1977.

48. At the Senate Commerce Committee hearings on automobile fuel economy, July 1977, Herbert Misch of the Ford Motor Company said: "We will meet the fuel economy standards recently set by the Secretary of Transportation at levels substantially more stringent than we anticipated." Sidney Terry of Chrysler similarly confirmed that his company would meet the law: "We at Chrysler have made our commitment to meet the requirements of the law. We are well along in a multi-billion dollar program to redesign every vehicle we now make and to introduce a new line of lighter more fuel-efficient passenger cars."
Frederick Stewart of American Motors put it quite simply: "There is no question as far as American Motors is concerned too, Mr. Chairman, we will meet the standards."
Finally, GM's Dr. Henry Duncombe quoted GM President Elliot Estes, saying: "Now we are going to take the risk that we can meet the required fuel economy average in the 1980's and still provide a reasonable mix of attractive vehicles that will meet most of our consumers' transportation needs."

49. Elliot Estes, speech at Automotive News World Congress, June 1977.

50. Saul Freidman, "Leaks Let Carmakers Zero In on Fuel Rules", Detroit Free Press, Jan 6, 1978; "Tough Truck MPG Rules Stir Washington Ruckus," Helen Kahn, Automotive News, Dec. 19, 1977, p. 1.

51. Chrysler comment at NHTSA Light Truck (1980-81) Hearings, Jan. 16-17, 1978.

52. V. Lonnie Peak, Jr., New Detroit, Inc., NHTSA Light Truck Hearings, Jan. 17, 1978.

53. Gerald K. Smith, National Association of Black Social Workers, Inc., NHTSA Light Truck Docket FE 77-05-N01-059, Jan. 6, 1978.

54. Mr. Carl Holman, National Urban Coalition, NHTSA Light Truck Docket FE-77-05-N01-079, Jan. 27, 1978

55. "DOT Sets Final Truck MPG Rules," Helen Kahn, Automotive News, March 20, 1978, p. 102.

56. Final Impact Assessment, Light Truck and Van Fuel Economy Standards for Model Years 1981 and 1984, NHTSA, Mar. 1978, p. 426.

57. "DOT Sets Final Truck MPG Rules", p. 101-103.

58. Ibid., p. 102.

59. The NHTSA Five Year Plan for Motor Vehicle Safety and Fuel Economy Rulemaking indicates that NHTSA plans to perform the necessary analysis and issue notices of proposed rulemaking and final rules for model year 1985 and 1986 passenger automobiles and for model year 1982 through 1984 light trucks in 1979; during the 1985 and 1986 passenger car rulemaking activity the existing fuel economy standards for model year 1984 will be reexamined.

60. DOT/NHTSA Rulemaking Support Paper Concerning The 1981-84 Passenger Automobile Average Fuel Economy Standards (July 1977).

61. Ibid., p. ES-3.

62. Ibid., p. ES-15.

63. Ibid., p. ES-15.

64. Marc Stepp/UAW Vice President and director of the Unions' Independent Parts Supplier Department before the House Subcommittee on Labor Standards and to the Automotive News World Congress. "UAW Official Cities Grief Caused by Plant Closings", Automotive News, August 28, 1978, p. 9.

65. Office of Management and Budget, "Circular No. A-116 to the Heads of Executive Departments and Establishments on Agency Preparation of Urban and Community Impact Analyses.", Aug. 16, 1978.

66. Chrysler Corporation, 1977 Annual Report, p. 6.

67. Ford Motor Co., State of the U. S. Automobile Industry, June 13, 1978, p. 32.

68. NHTSA/DOT, The Contributions of Automobile Regulations, June 1978, p. 19-20.

69. "Peugeot to Supply FWD Parts for '81 Chrysler Small Cars," Automotive News, Sept. 11, 1978, p. 4.

70. "Why We Need a Regulatory Budget", Juanita M. Kreps, U. S. Secretary of Commerce, Business Week, July 31, 1978, p. 14.

71. "GM Cites Difficulties to Clear In Meeting MPG Rule for '80s", by Helen Kahn, Automotive News, p. 1 and 43. The article quotes from the non-confidential portion of GM response to NHTSA fuel economy questionnaire, docket FE 76-01-N)3, "General Motors Corporation on Request for Information on Passenger Automobiles Questionnaire for Vehicle Manufactures", August 7, 1978.

72. "Europe Way of 1985 CAFE Regulations", Automotive News, Sept. 25, 1978.

73. "Statement of Dr. Kenneth Arrow, Professor of Economics, Harvard University and President of the American Economic Association", at Hearings before the Special Subcommittee on Science, Technology, and Commerce of the Committee on Commerce, United States Senate, Federal Incentive for Innovation, Aug. 31, Sept. 4, 1973, Serial No. 93-57, p. 20-33. Dr. Arrow testified that: "In fact, without a knowledge of whether the regulation is feasible or not, the Government is in no position to make such a regulation. There has therefore to be independent research, if for nothing else, merely to establish the feasibility..." P. 26.