**The original documents are located in Box 56, folder "9/24/76 HR13655 Automotive Transport Research and Development Act of 1976 (vetoed) (2)" of the White House Records Office: Legislation Case Files at the Gerald R. Ford Presidential Library.**

TO THE HOUSE OF REPRESENTATIVES:

I am returning, without my approval, H.R. 13655, the "Automotive Transport Research and Development Act of 1976."

This bill would establish a five-year research and development program within the Energy Research and Development Administration (ERDA) leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles to promote the development of advanced alternatives to existing automobiles. The major objective of the program would be the development and construction of integrated test vehicles which would incorporate advanced automobile engines into complete vehicles conforming to Federal requirements for safety, emissions, damageability, and fuel economy. Such development would unnecessarily duplicate existing authorities and extend into areas private industry is best equipped to pursue.

Both ERDA and the Department of Transportation (DOT), the two Federal agencies which would be most directly affected by this program, already have sufficient authority to accomplish the objectives of this bill. Under the authority of the Energy Reorganization Act of 1974 and the Federal Non-nuclear Energy Research and Development Act of 1974, ERDA's Highway Vehicle Systems Program is presently proceeding with the development of new automobile engine systems to the point where several prototype systems can be demonstrated in vehicles on the road. Under my fiscal year 1977 budget, ERDA will continue to emphasize the development of such advanced engines designed to meet higher levels of fuel economy and lower emissions.

Ongoing DOT programs under the authority of the Department of Transportation Act, the National Traffic and Motor Vehicle Safety Act of 1966, and the Motor Vehicle Information and Cost Savings Act are currently sponsoring advanced automobile

research that, except for advanced automobile engines, will achieve the purposes of this bill. Detailed design development for two versions of a Research Safety Vehicle should be completed before the end of this year. Under my fiscal year 1977 budget, DOT will have sufficient funds for its advanced automobile research and development activities.

The Federal government, through ERDA and DOT, can play an important role in exploring the research areas that must be developed before advanced automobiles are produced which meet the Nation's conservation goals -- especially in the critical area of new engine research. However, it must be recognized that private industry has substantial expertise and interest in the development and production of advanced automobiles. The appropriate Federal role in this area should be confined to research and development only, and not extend into borderline commercial areas which private industry is best able to perform.

This highly complex technological program, moreover, would eventually require a massive spending program not reflected in the bill's $100 million start-up authorizations for the first two years of the program. This bill would unnecessarily expand research and development programs now underway, and would provide no commensurate benefit for the taxpayers who must pay for this program. I am therefore returning the bill without my approval.

Gerald R. Ford



THE WHITE HOUSE,
September 24, 1976.

FOR IMMEDIATE RELEASE SEPTEMBER 24, 1976

Office of the White House Press Secretary

---

THE WHITE HOUSE

TO THE HOUSE OF REPRESENTATIVES:

I am returning, without my approval, H.R. 13655, the "Automotive Transport Research and Development Act of 1976."

This bill would establish a five-year research and development program within the Energy Research and Development Administration (ERDA) leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles to promote the development of advanced alternatives to existing automobiles. The major objective of the program would be the development and construction of integrated test vehicles which would incorporate advanced automobile engines into complete vehicles conforming to Federal requirements for safety, emissions, damageability, and fuel economy. Such development would unnecessarily duplicate existing authorities and extend into areas private industry is best equipped to pursue.

Both ERDA and the Department of Transportation (DOT), the two Federal agencies which would be most directly affected by this program, already have sufficient authority to accomplish the objectives of this bill. Under the authority of the Energy Reorganization Act of 1974 and the Federal Non-nuclear Energy Research and Development Act of 1974, ERDA's Highway Vehicle Systems Program is presently proceeding with the development of new automobile engine systems to the point where several prototype systems can be demonstrated in vehicles on the road. Under my fiscal year 1977 budget, ERDA will continue to emphasize the development of such advanced engines designed to meet higher levels of fuel economy and lower emissions.

Ongoing DOT programs under the authority of the Department of Transportation Act, the National Traffic and Motor Vehicle Safety Act of 1966, and the Motor Vehicle Information and Cost Savings Act are currently sponsoring advanced automobile research that, except for advanced automobile engines, will achieve the purposes of this bill. Detailed design development for two versions of a Research Safety Vehicle should be completed before the end of this year. Under my fiscal year 1977 budget, DOT will have sufficient funds for its advanced automobile research and development activities.

The Federal government, through ERDA and DOT, can play an important role in exploring the research areas that must be developed before advanced automobiles are produced which meet the Nation's conservation goals -- especially in the critical area of new engine research. However, it must be recognized that private industry has substantial expertise and interest in the development and production of advanced automobiles. The appropriate Federal role in this area should be confined to research and development only, and not extend into borderline commercial areas which private industry is best able to perform.

more

This highly complex technological program, moreover, would eventually require a massive spending program not reflected in the bill's $100 million start-up authorizations for the first two years of the program. This bill would unnecessarily expand research and development programs now underway, and would provide no commensurate benefit for the taxpayers who must pay for this program. I am therefore returning the bill without my approval.

GERALD R. FORD

THE WHITE HOUSE,

September 24, 1976.

# # # #

Calendar No. 793

94TH CONGRESS
2d Session

SENATE

REPORT
No. 94-835

# AUTOMOTIVE TRANSPORT RESEARCH AND DEVELOPMENT ACT

## REPORT

OF THE

## SENATE COMMITTEE ON COMMERCE

ON

## S. 3267

together with

## MINORITY VIEWS

TO AMEND THE MOTOR VEHICLE INFORMATION AND LOST SAVINGS ACT


MAY 13, 1976.—Ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1976

57-010

# CONTENTS

Calendar No. 793

94TH CONGRESS, 2d Session } SENATE { REPORT No. 94-835

# AUTOMOTIVE TRANSPORT RESEARCH AND DEVELOPMENT ACT

MAY 13, 1976.—Ordered to be printed

Mr. Moss (for Mr. TUNNEY), from the Committee on Commerce, submitted the following

## REPORT

together with

## MINORITY VIEWS

[To accompany S. 3267]

The Committee on Commerce, to which was referred the bill (S. 3267) to amend the Motor Vehicle Information and Cost Savings Act having considered the same, reports favorably thereon with amendments and recommends that the bill, as amended, do pass.

### PURPOSE AND SUMMARY

The purpose of the bill is to create an automotive research and development program within the Department of Transportation (DOT) which is coordinated closely with the Energy Research and Development Administration (ERDA).

The legislation requires the Secretary of Transportation to establish a program to insure the development of one or more production prototypes of advanced automobiles. Internal DOT authority is provided as is authority for grants and contracts. A loan guarantee provision provides additional financial support.

The program is designed to develop a complete automobile that meets Government and consumer requirements in the most economic manner. The present approach of industry patchwork response to Government performance regulation would be replaced by a systems approach to the development of a "car of the future."

## Background and Need

While the automobile offers great mobility and has become a necessity for most American families, it is clear that many of the Nation's most pressing problems in terms of energy conservation, environmental protection, and human safety are directly attributable to it.

The automobile stands out as the single largest end user of petroleum in this country, accounting for nearly 40 percent of present consumption. This amounts to approximately 6.5 million barrels per day, approximately equal to the amount of oil we are presently importing from other countries. Historically, gasoline consumption by automobiles has grown on an average annual rate of 4.9 percent, which doubles gasoline demand every 14 years.

At the same time, the automobile is a dominant source of pollutants, especially oxides of nitrogen (precursor of smog) and gaseous hydrocarbons.

Moreover, the automobile remains one of the leading causes of accidental death in this country, exceeding 45,000 deaths in 1975.

Present automobiles are the product of 70 years of development by the major automobile companies. The dominant feature of the automobile system is, of course, the powerplant. The internal combustion engine served past automotive needs well. It is relatively simple and inexpensive, and automotive engineers know a great deal about it. But as the energy, environmental, and safety crises have required strict regulation of the automobile, the internal combustion engine and the entire vehicular system, has been found wanting. Exhaust emission standards, which are necessary to protect the public health, have been subjected to enormous pressures for delay and revocation by the automobile industry which claims difficulty in attaining both emissions control and fuel economy. Furthermore, the manner in which safety and damageability requirements have been met by the automobile industry has added additional weight, also creating trade-offs between these requirements and fuel economy (weight is the single largest factor affecting fuel economy).

There are a number of other engine types, however, which do not present the kinds of trade-offs inherent in internal combustion engine-powered automobiles. Included would be diesels, Brayton cycle (turbines), Stirling cycle (an external combustion engine named after its inventor, a 19th century Scottish clergyman) and Rankine cycle (steam engines).

A number of studies have addressed the potential of these alternative propulsion systems to accomplish simultaneously the goal of energy conservation and emissions control while being packaged in a vehicular system which also provides safety, durability, and performance needs. One of the most recent of these studies was conducted by the Jet Propulsion Laboratory of the California Institute of Technology under funding of the Ford Motor Co. This study illustrates dramatically the kinds of advantages which could exist with alternative engines with respect to fuel consumption, emissions control, and life-cycle costs to consumers. The following two tables summarize information contained in the report with respect to fuel consumption and life-cycle costs relative to internal combustion engines. All of the data given represents known technology, but which needs additional research and development to fully exploit.



I.—FUEL ECONOMY

| Engine type | Sales weighted average fuel economy | Percent increase over I.C.E. |
|---|---|---|
| Conventional I.C.E. | 17.2 | |
| Stratified charge | 18.6 | +8 |
| Diesel | 19.5 | +13 |
| Brayton | 22.7 | +32 |
| Stirling | 25.2 | +47 |
| Ranking | 15.6 | −9 |

II.—LIFE CYCLE COSTS—SAVINGS OVER CONVENTIONAL I.C.E. OVER 100,000 MI (10 YR)

| Engine type | Small | Compact | Full-size |
|---|---|---|---|
| Conventional I.C.E. | 0 | 0 | 0 |
| Stratified charge | −$50 | −$50 | 0 |
| Diesel | +150 | −150 | −$150 |
| Turbine | −300 | −600 | −850 |
| Stirling | +250 | +450 | −600 |
| Rankine | +350 | +400 | +550 |

In the area of emissions control, three of these engine systems—Brayton cycle, Stirling cycle and Rankine cycle—have now been shown to meet fully all of the initial emissions control standards contained in the 1970 Clean Air Act Amendments—0.4 grams per mile hydrocarbons, 3.4 grams per mile carbon monoxide, and 0.41 grams per mile oxides of nitrogen.

Despite their promise, they have not advanced to the point of commercial viability under current R. & D. efforts. The following studies have commented on the need for Federal research and development to fully develop alternatives:

1. *The Role of the Federal Government in Automotive R & D*, Federal Energy Administration, November 6, 1974.

"Some simple estimates suggest that in order to generate the necessary new technology, a national R & D investment on the order of $150 million per year for the next 25 years or so will be required. Private industry is (prior to the current economic squeeze) investing on the order of one-third of this amount, concentrated in the near-term aspects of development. Furthermore, the integration of the national objectives of energy efficiency, alternatives to petroleum, and minimum environmental impact into a coherent long-term program in R & D requires perspectives and responsibilities well beyond those of the private automobile companies, whose objectives are rooted in the marketplace. Consequently, we perceive a major government role in automotive R. & D."

2. Letter From Dr. David Ragone (Chairman, Advisory Committee on Alternative Automotive Power Systems) to Dr. Russell Peterson (Chairman, Council on Environmental Quality), March 3, 1975.

"To summarize our conclusions, the Committee believes that there is a clear need for expanding the A.A.P.S. program. The program goal should be to develop new information concerning energy efficiency and environmentally acceptable alternatives to current automotive power trains (reciprocating, spark-ignited, internal combustion engines and their transmissions). Annual expenditures should rise at least to a level of $100 million within 3 or 4 years. The Committee recommends expenditures of at least $30 to $40 million in fiscal year 1976, and more if greater amounts can be administered effectively. This comparies to the presently budgeted $10 million in fiscal year 1976 which was recommended for the program when it was affiliated with the EPA."

3. *Should We Have A New Engine? An Automobile Power Systems Engine*, Jet Propulsion Laboratory, California Institute of Technology, August 1975.

"A funding rate of about $150 million per year is required for a total cost of about $1 billion over 5–10 years. Such a funding rate completely overshadows the $30–$40 million presently being spent annually on continuous-combustion alternates, including the $5 to $13 million annual expenditures in the ERDA (previously EPA) advanced automotive power systems program. This is perhaps indicative of why the emergence of alternate engines has been slow."

A strong Federal R. & D. program would not duplicate work currently being undertaken by the major automakers. In fact, the major automakers concentrate their research and development efforts on near term objectives which may not mesh with longer term needs. As the Federal Energy Administration (FEA) in its November 1974 report entitled *The Role of the Federal Government in Automotive R. & D.* pointed out:

"The integration of the national objectives of energy efficiency, alternatives to petroleum, and minimum environmental impact into a coherent long-term program in R. & D. requires perspectives and responsibilities well beyond those of the private automobile companies whose objectives are rooted in the marketplace. Consequently, we perceive a major government role in automotive R. & D."

Finally, it is extremely important that the Congress and the public have an accurate gage by which to measure the efforts of the automobile industry in complying with Federal requirements and satisfying consumer demands. At this point, the automobile industry is the dominant source of information upon which to judge this progress. The expanded Federal R. & D. program will provide this necessary technical base by which to measure the industry progress.



## Description

*1. Advanced automobile prototypes*

The Secretary of Transportation would be required, in coordination with ERDA, to develop a program to develop production prototypes of advanced automobiles within 4 years after the date of enactment, or within the shortest practical time consistent with appropriate research and development techniques.

Under the bill, $155 million would be authorized to be appropriated for in-house programs and grants and contracts. The prototype to be developed must represent the maximum practicable fuel efficiency obtainable consistent with environmental, safety, and damagability requirements.

In addition, the Secretary would be authorized to guarantee loans—up to $175 million total indebtedness—to support R. & D. programs likely to contribute to the development of advanced automobiles.

*2. Vehicle Certification Board*

The Low Emission Vehicle Certification Board—established under section 212 of the Clear Air Act Amendments of 1970—would be authorized to issue or deny certification of demonstration vehicles. The Board, in conjunction with the General Services Administration, would establish a system of guidelines for Federal agency procurement and use of automobiles so certified.

*3. Patents*

The patents section of the bill is essentially identical to that contained in section 9 of the Federal Non-Nuclear Energy Research and Development Act of 1974 (42 USC 5901, et seq.), the authority under which ERDA now operates. One exception is the provision which makes patents available, through court order, if such patents are necessary in furtherance of commercial application of advanced automotive technologies or in the development, demonstration, or commercial application of any advanced automotive invention, process, or system.

*4. Reports*

The Secretary of Transportation would be required, on or before July 1 of each year, to submit reports to the Congress on his activities under the program.

## Responses to Arguments

*1. DOT is the appropriate agency to have lead responsibility.*

The principal goal of the program envisaged by the bill is to build an integrated prototype of an automobile which represents the best mix of all of the various features of an automobile, including energy efficiency, pollution control, safety, damageability, reliability, and performance. While ERDA has capabilities in the energy area and has a current program relating to engines and transmissions, its mandate is not broad enough to provide for an integrated vehicular system. DOT is better equipped to rationalize and integrate the various aspects of an automobile, including not only engines and transmissions and energy efficiency, but all of the other factors as well.

As the agency responsible for overall transportation planning, DOT is better equipped to plan transportation within and between cities. DOT can take into consideration multi- or intermodal transportation and how motor vehicles might relate to other modes. For example, automobiles can be and have been used in conjunction with rail travel (the Auto-Train). Such innovative and comprehensive planning for transportation can be best accomplished by DOT.

*2. The requirement of the DOT Secretary to insure that development of production prototypes of advanced automobiles is appropriate.*

The production prototype phase in the development of an advanced automobile is extremely important. After a single vehicle—or a small number—has been developed there are questions remaining, and development work to be done, which is necessary to demonstrate durability, consumer acceptance, and ease of manufacture. It is at this crucial developmental stage—the production prototype stage—that one finds out whether the automobile will work when used over extended periods of time, whether it will be serviceable in the hands of consumers, and whether the automobile is capable of being produced in large numbers.

It is important that automobile manufacturers participate at this stage of the advanced automobile's development as the vehicle will be available for production by private companies. But without the authority of DOT to participate and insure the development through this phase, the vehicle produced may never go any farther than the initial prototype stage. With the exception of perhaps the major automakers, private capital in the sums necessary to go through the production prototype phase—estimated in testimony before the Committee to be from $100 to $200 million—is not available to research and development firms. Thus, without the requirement to insure the development of production prototypes, the entire R. & D. project could be stopped short of commercialization merely by the refusal of the automakers to finance production prototypes.

While the requirement of the Secretary under section 604 is to "insure the development of one or more production prototypes of an advanced automobile," it is clear that the Secretary need not assume the entire burden himself. The Secretary would be expected to provide financial assistance through the production prototype phase only to the extent necessary to insure their development. Thus, if private capital is available and can be utilized, the Secretary's involvement would be expected to be minimal.

Of course, it is not the intent of this legislation to mandate that private automobile companies commercially mass produce production prototype vehicles which have been developed pursuant to this program.

*3. The authorization for appropriations is established at a proper level.*

Under the bill, a total of $155 million is authorized to be appropriated for internal DOT programs and for grants and contracts. Furthermore, loan guarantees are provided up to a maximum of $175 million outstanding indebtedness guaranteed.

A number of studies, including studies by the Advisory Committee on Alternative Automotive Propulsion Systems, the Federal Energy Administration, the Atomic Energy Commission—now within ERDA—and the Jet Propulsion Laboratory of the California Institute of Technology (JPL) have estimated that from $50 million to $150 million per year should be provided for R. & D. alone. Some of them, like the JPL study and the advisory committee study, are for engine R. & D. alone.



The bill provides funds for total vehicle R. & D., not just engines. It also provides for the preparation of production prototypes—vehicles in their final stage of development which are capable of being placed into production. This is beyond the strict R. & D. stage. An estimate of the total program cost was given by Dr. John Hutcheson of the National Academy of Sciences Committee on Motor Vehicles at hearings of the Committee on Commerce. He estimated that the total program cost would be between $300 million and $500 million. This compares with the total authorization under the bill of $330 million.

*4. The patent provisions of the bill are appropriate.*

The patent provisions are largely patterned after section 9 of the Federal Non-Nuclear Energy Research and Development Act of 1974, ERDA's present authority.

In addition, the provision also authorizes the district courts to order owners or exclusive licensees to make available other patents which are reasonably necessary to fostering expeditious commercial application of advanced automotive technologies and for the development, demonstration, or commercial application of advanced automotive inventions, processes, or systems. A reasonable royalty is to be paid and terms and conditions established by the court which are reasonable and nondiscriminatory.

The provision making other patents available by the courts has passed the Senate twice previously. It was contained in the Senate version of the legislation which resulted in the Federal Non-Nuclear Energy Research and Development Act of 1974 and also in the National Fuels and Energy Conservation Act (S. 2176) of the 93d Congress.

Under section 1498 of the Judicial Code (28 U.S.C. 1498) the Federal Government and contractors thereof may freely use patented technology and may not be enjoined from doing so. Non-government researchers do not have this benefit. The provision contained in this legislation would fill that need and present balance to researchers within and outside the Federal Government.

In addition, once a breakthrough in technology takes place, regardless of whether or not the breakthrough was sponsored by the Federal Government, there is no provision under existing law which would make the other inventions necessary for the commercialization of the product available. Thus, entrepreneurs might well be in the position of having developed commercially viable technology through the R. & D. programs under this authority only to be stymied when seeking commercialization through the unavailability of patents necessary for commercialization.

Precedent for mandatory licensing of pollution technology and atomic energy technology are provided for in the Clean Air Act (77 Stat. 392) and the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.). No adverse effects on technological development have resulted from the inclusion of these safeguards in those statutes.

## Legislative Background

Automotive research and development legislation had its genesis in the 93d Congress when S. 1055 was introduced by Senators Tunney and Magnuson. In the 93d Congress, 6 days of hearings were held on this legislation and associated fuel economy legislation applicable to automobiles.

A modification of S. 1055 was included in the National Fuels and Energy Conservation Act (S. 2176) which passed the Senate on December 10, 1973. No further action took place on this legislation in the 93d Congress.

In the 94th Congress, legislation—S. 499, introduced by Senators Tunney, Hart, and Magnuson, and S. 783, introduced by Senators Domenici, Baker, and Glenn were before the Committee—was reported as title II of S. 1883, the Automobile Fuel Economy and Research and Development Act of 1975, following 2 additional days of hearings.

The automotive R. & D. provision in S. 1883 was incorporated into the Senate version of S. 622, the Energy Policy and Conservation Act. A modified version of the legislation was approved by the committee of conference on S. 622. A dispute on the floor of the House of Representatives, however, resulted in the provision being deleted.

Following the action by the House of Representatives on the conference report on S. 622, the legislation was reintroduced as S. 3267 by Senator Tunney on April 7, 1976. The Committee on Commerce considered the legislation on executive session on April 29, May 4, and May 11. The committee ordered the legislation reported favorably on May 11.

Similar legislation has been reported by the House Committee on Science and Technology.

## Section-by-Section Analysis

The bill amends the Motor Vehicle Information Cost Savings Act (15 U.S.C. 1901 et seq.) by adding at the end thereof a new title VI as follows:

*Section 601. Short Title.* The short title of the new title VI is the "Automotive Transport Research and Development Act."

*Section 602. Findings and Purposes.* Subsection (a) asserts congressional findings that, on average, existing automobiles fall short of meeting the long-term goals of the Nation with respect to safety, environmental protection, and energy conservation, and that with additional research and development, several alternatives to existing automobiles have the potential to be mass produced at reasonable cost with less environmental degradation and fuel consumption than existing automobiles, while conforming with the requirements of Federal law.

This subsection also states that insufficient resources are being devoted to automotive R. & D. both by the Federal Government and by the private sector, and that an expanded Federal R. & D. effort is needed to complement and increase private efforts and to encourage automobile manufacturers to consider advanced automobiles and automobile components as alternatives to existing automobiles and components.

Finally, this subsection states that because of the urgency of energy, safety, and environmental problems, advanced automobiles and components should be developed, tested, and prepared for manufacture within the shortest practicable amount of time.



Subsection (b) declares that the purposes of this title are to make contracts and grants and to support through obligation guarantees, research and development projects leading to production prototypes of advanced automobiles within 4 years from the date of enactment of this Act, or within the shortest practicable time consistent with appropriate research and development techniques, and that such automobiles be certified in accordance with the provisions of section 609 (c) as prototypes which are likely to meet the Nation's long-term goals with respect to fuel economy, safety, environmental protection and other objectives.

It is also declared to be the purpose of the Congress to preserve, enhance, and facilitate competition in research, development and production of existing and alternative automobiles and automobile components.

*Section 603. Definitions.* This section contains the various definitions used throughout title VI.

The definition of "advanced automobile" is particularly important as it defines the type of automobile to be developed under this title. As defined, the term means a personal use vehicle propelled by fuel which is energy efficient, safe, damage-resistant, and environmentally sound. The advanced automobile requires the least total amount of energy to be consumed with respect to its manufacture, operation, and disposal, and should represent a substantial improvement over existing automobiles considering such factors. At the same time, the advanced automobile must be capable of being mass produced at the lowest possible cost and must operate safely and with sufficient performance.

In addition, the advanced automobile must be capable of "intermodal adaptability" to the extent practicable. For example, it should be capable of transport on railroads to facilitate service like the "Auto-Train" now in service between Washington, D.C., and Sanford, Fla. Other possibilities include the capability, under certain driving conditions, of being operated in a "hands-off" manner by an onboard computer which assumes the functions of the driver, thus minimizing the threat of accidents and eliminating driver variations which lead to the inefficient use of automobiles.

Finally, the definition of an advanced automobile includes the requirement that, at a minimum, such automobile can be produced, distributed, operated and disposed of in compliance with any requirement of Federal law.

*Section 604. Duties of the Secretary.* This section requires the Secretary to ensure the development of one or more production prototypes of an advanced automobile within 4 years after the date of enactment, or in the shortest practicable time consistent with appropriate research and development techniques. The advanced automobile is also to utilize, to the maximum extent practicable, nonpetroleum based fuels in order to conserve scarce petroleum resources.

In furtherance of the purposes of title VI, the Secretary is further required to (i) make contracts and grants for research and development in accordance with section 607; (ii) make obligation guarantees for research and development in accordance with section 608; (iii) establish, conduct, and accelerate research and development programs

within the Department of Transportation; and (iv) test or direct the testing of production prototype vehicles, and secure certification as advanced automobiles for those vehicles which meet the requirements of section 609.

The Secretary would also be required to collect, analyze, and disseminate to developers information, data, and materials relevant to the development of advanced automobiles, and to prepare and submit the studies described in section 612.

Finally, this section requires that the Secretary evaluate any reasonable new or improved technology, a description of which is submitted in writing, which could lead or contribute to the development of an advanced automobile.

*Section 605. Coordination Between the Secretary and the Administrator.* This section sets forth the manner in which the authority of the Secretary under this title is meshed with that of the Administrator of the Energy Research and Development Administration, who also has responsibilities with respect to conducting research and developing new automotive power plants and fuels.

Subsection (a) specifies that the Secretary of Transportation shall have overall management responsibility for the R. & D. program. But in carrying out the program, the Secretary is required to utilize ERDA to the maximum extent practicable with respect to advanced propulsion systems and may utilize ERDA or other agencies to the extent the other agencies have capabilities which would contribute to the attainment of the R. & D. program.

Subsection (b) authorizes the ERDA Administrator to exercise the powers granted to the Secretary under sections 606, 607, and 608 whenever ERDA is utilized under the provisions of subsection (a).

Subsection (c) authorizes the Secretary to obtain the assistance of other departments, agencies, or instrumentalities of the Executive Branch on a reimbursable basis or otherwise, and with the consent of the other department, agency, or instrumentality.

*Section 606. Powers of the Secretary.* This section specifies the powers of the Secretary in addition to those specifically mentioned in other provisions of this title. Included is the authority to appoint such attorneys, employees, agents, consultants and other personnel as the Secretary deems necessary, and to define the duties of such personnel and determine their compensation and other benefits. Of course, the Secretary and any personnel responsible to the Secretary under this title will be fully subject to the Civil Service and Classification laws, as specified in title 5, United States Code.

The Secretary would also be authorized to procure temporary and intermittent services under the provisions of section 3109 of title 5, United States Code, but at rates not to exceed $150 per day for qualified experts.

The Secretary is also authorized to enter into such contracts, leases, cooperative agreements or other transactions as may be necessary to conduct his duties under this title with any Government agency or any person without regard to the requirements of section 3709 of the Revised Statutes (41 U.S.C. 5).

Finally, this section authorizes the Secretary to receive and dispose of any property or other assets or to accept gifts or donation of any property or services for the purposes of this title.



*Section 607. Contracts and Grants.* This section gives specific direction to the Secretary in administering the contract and grants program required by section 604.

Subsection (a) requires the Secretary to provide funds by grant or contract to initiate, continue, supplement, and maintain research and development programs or activities which appear likely to lead to production prototypes of an energy efficient, low-polluting automobile or automobiles. Such grants or contracts could be made with any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual.

Subsection (b) requires the Secretary to establish procedures for consultation with representatives of science, industry, or such other groups as may have expertise in the areas of automobile research, development, or technology. The Secretary would be authorized to establish advisory or review panels for the purpose of making recommendations to the Secretary on applications for funding.

Subsection (c) specifies that contracts and grants made under this section shall be in accordance with rules and regulations of the Secretary. Each application for funding is to be made in writing in such form and with such content and other submissions as the Secretary shall require.

*Section 608. Obligation Guarantees.* This section gives specific direction to the Secretary in administering the obligaton guarantees program required by section 604.

Subsection (a) authorizes the Secretary to guarantee and to make commitments to guarantee the payment of interest and principal balance of obligations to initiate, continue, supplement, and maintain research and development which appears likely to lead to production prototypes of an energy efficient, low-polluting automobile or automobiles. Applications for obligation guarantees are to be made to the Secretary in a manner that the Secretary shall prescribe to reasonably protect the interests of the United States. Each guarantee or commitment to guarantee shall be extended in a manner appropriate in order to reasonably protect the interests of the United States. Each guarantee or commitment to guarantee will insure to the benefit of the holder of the obligation to which such guarantee or commitment applies. The Secretary may approve any modification of a guarantee or a commitment to guarantee, including interest rates, payment, security, or other terms, if the Secretary finds that the modification is equitable and will not prejudice the interests of the United States. Any such modifications must be consented to by the holder of the obligation.

Guarantees and commitments to guarantee may be made to any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or indivdual. All guarantees are to constitute general obligations of the United States backed by the full faith and credit of the United States Government.

Subsection (b) requires that no obligation shall be guaranteed under subsection (a) unless the Secretary finds that no other reasonable means of financing or refinancing is available to the applicant. The purpose of this exception is to exclude those applicants from the benefits of obligation guarantees which have capital available or can

reasonably obtain such capital for the purposes of financing projects under this title. If capital is unavailable to a party to conduct research and to develop a technology which appears likely to lead to an energy efficient, safe, low-polluting automobile, or if such capital is not available under reasonable terms, then the Secretary should make the guarantee or commitment to guarantee the obligation as long as all other requirements are met. Clearly, the Secretary must weigh a number of factors in determining whether an applicant does not have reasonable means of financing or refinancing available to him, including the promise of the technology, the interest rates or other conditions required by lending institutions, and the ability of the party to pay such interest rates or comply with such terms.

Subsection (c) requires the Secretary to charge and collect such amounts as may be reasonable for the investigation of applications, the appraisal of properties offered as securities, or for the issuance of commitments. The Secretary is to set a premium charge of not more than 1 percent per annum on any obligation guaranteed pursuant to this section.

Subsection (d) prohibits any guarantee or commitment to guarantee from being terminated, canceled, or otherwise revoked, except in accordance with such reasonable terms and conditions as the Secretary shall prescribe and in effect at the time such guarantee or commitment was entered into.

Subsection (e) specifies the method by which payment of interest and principal will be made in the case of default by the obligor. If such default continues for 60 days, the holder of the obligation shall have the right to demand payment by the Secretary. The Secretary is to make payment within 45 days, unless the Secretary finds that there was no default or that the default has been remedied.

If the Secretary makes a payment on a defaulted loan, the Secretary shall have all the rights specified in the guarantee or related agreements with respect to any security held by the Secretary with respect to the guarantee. The Secretary would have the authority to complete, maintain, operate, lease, sell or otherwise dispose of any property acquired pursuant to such guarantee or related agreements.

If default occurs under a guarantee or commitment to guarantee under this section, the Secretary would be required to notify the Attorney General, who in turn would be required to take such action against the obligor, or any other party liable to the extent necessary to protect the interests of the United States.

Subsection (f) authorizes appropriations not to exceed $175 million to pay the interest on and the principal balance of any obligation guaranteed by the Secretary as to which the obligor has defaulted.

*Section 609. Testing and Certification.*—This section establishes the procedure by which the Administrator of the Environmental Protection Agency and the Secretary of Transportation shall test production prototypes for compliance with this title, and the means by which the Low Emission Vehicle Certification Board shall certify such automobiles for procurement by the Federal Government.

Subsection (a) requires the Administrator of the Environmental Protection Agency to test or cause to be tested each production prototype of an automobile assisted under this title or referred to the EPA



Administrator by the Secretary for the purpose of determining whether such automobile complies with the requirements of any law administered by the EPA. The Administrator is to submit all test data to the Low Emission Vehicle Certification Board for the purposes of certification in accordance with subsection (c) of this section.

Subsection (b) requires the Secretary to test or cause to be tested production prototypes of automobiles which the Secretary or a developer may submit to the Low Emission Vehicle Certification Board for certification under subsection (c). It is intended that any vehicle submitted for this purpose by a developer should possess characteristics which give it a reasonable chance to achieve such certification. The purpose of such test is to determine whether each such automobile complies with any requirements or statutes administered by the Secretary and any other statute enacted by Congress and applicable to automobiles. The results of such tests are to be submitted to the Low Emission Vehicle Certification Board for the purpose of certification in accordance with subsection (c).

Subsection (c) requires the Low Emission Vehicle Certification Board, established pursuant to section 212 of the Clean Air Act, to issue or deny certification as an energy efficient, safe, low-polluting automobile as defined in section 603 of this title. Certification is important as it forms the basis for procurement by the Federal Government under section 613.

*Section 610. Patents.*—This section specifies the manner in which inventions developed with support under this title are to be made available for commercial application. With the exception of subsection (k), the language is very similar to that contained in the Federal Nonnuclear Research and Development Act of 1974.

Subsection (a) establishes the general policy that, whenever an invention is made or conceived under a contract under this title, title to such invention shall vest in the United States. As defined in subsection (m), a "contract" means any manner in which assistance is given under the terms of this title and an "invention" is any invention or discovery, whether patented or unpatented.

Subsection (b) requires that each person with which the Secretary enters into a contract under this title shall furnish to the Secretary a report with respect to any invention, discovery, improvement or innovation made with assistance under this title.

Subsection (c) authorizes the Secretary to waive all or any part of the right of the United States with respect to any invention made with assistance under this title if the Secretary determines that the interest of the United States and of the general public would best be served by such a waiver.

Subsection (c) further specifies the goals of any such waiver. They include:

(1) making the benefits of the research and development program available to the public in the shortest practicable time;

(2) promoting the commercial utilization of inventions; and

(3) encouraging participation by private parties in the research, and development program, and fostering competition and preventing undue market concentration or other situations that are inconsistent with the antitrust laws.

Subsection (d) specifies the considerations to be taken into account when the Secretary determines whether a waiver of the interest of the United States in an invention is to be waived at the time a contract is entered into. The subsection includes 11 considerations which are designed to protect the interests of the United States in the invention, while at the same time making sure that the research and development will be conducted and the fruits of the research and development utilized.

Subsection (e) provides for waiver of the interests of the United States in an invention at a time subsequent to entering into a contract with respect to research and development under this title. In addition to the relevant considerations under subsection (d), this subsection also requires the Secretary to consider the extent to which a waiver is a reasonable and necessary incentive to call forth private risk capital for the development and commercialization of the invention and the extent to which the plans, intentions and ability of the contract are likely to result in the expeditious commercialization of the invention.

Subsection (f) permits, but does not require, the Secretary to reserve to a contractor a revocable, or irrevocable, nonexclusive, paidup license and rights to patents in foreign countries with respect to inventions made under this title, subject to enumerated safeguards.

Subsection (g) authorizes the Secretary to grant exclusive or partially exclusive licenses to any invention made under aid or given under this title under very narrowly defined circumstances. Exclusive licenses may be granted only when necessary to bring the invention to practical or commercial fruition.

Subsection (h) authorizes the Secretary to specify such terms and conditions as the Secretary may determine to be appropriate to any waiver of the rights of the United States or the grant of any exclusive or partially exclusive license. The subsection enumerates the types of terms and conditions that may be specified,

Subsection (i) requires the Secretary to give notice in the Federal Register advising the public of the hearing authorized under subsection (h) when the Secretary requires the granting of a nonexclusive or partially exclusive license, or terminates a waiver or a nonexclusive or partially exclusive license.

Subsection (j) requires the Secretary to give consideration and appropriate weight to small businesses in granting waiver of rights of the United States to inventions made under this title.

Subsection (k) authorizes the Secretary to certify to appropriate district courts that any right under any patent of the United States is reasonably necessary for the expeditious commercial application of technology developed under this title. The court would then be authorized to order the owner or exclusive licensee of the patent to grant licenses on reasonable and nondiscriminatory terms and conditions as the court shall determine.

Subsection (l) authorizes the Secretary to take all necessary and appropriate steps to protect any invention or discovery to which the United States holds title.

Subsection (m) defines the various terms used in this section.

*Section 611. Records, Audit and Examination.*—This section establishes the procedures by which the Secretary and the Comptroller General will maintain surveillance over the manner in which assistance is utilized under this title.



Subsection (a) requires each recipient of financial assistance or guarantees under this title to keep such records as the Secretary shall prescribe with respect to such assistance or guarantees, including records which fully disclose the amount and disposition of the proceeds of such assistance, the total cost of the project or undertaking, the amount of the cost of the project supplied by other sources, and such other records as will facilitate an effective audit.

Subsection (b) gives the Secretary and the Comptroller General access to any books, documents, papers, and records of such receipts which may be related or pertinent to assistance referred to under this section, for the purposes of audit and examination.

*Section 612. Reports.*—This section requires the Secretary to submit on or before July 1 of each year a report to Congress of activities under this title. The report is to include (i) an account of the state of automobile research and development in the United States; (ii) the number and amount of grants made and obligations guaranteed; (iii) the progress made in developing production prototypes of advanced automobiles within the shortest practicable time after the date of enactment of this title; and (iv) suggestions for improvements in advanced automobile research and development, including recommendations for legislation.

*Section 613. Government Procurement.*—This section requires the Administrator of General Services to consult periodically with the Low Emission Vehicle Certification Board to determine when production prototypes of an advanced automobile are likely to be available. After a production prototype has been certified, under section 609(c) of this title, as an advanced automobile, the Low Emission Vehicle Certification Board, in conjunction with the Administrator of General Services, shall prescribe such regulations as are necessary to require all Federal agencies to procure and to use such advanced automobiles to the maximum extent feasible. The Administrator of General Services shall, with the assistance of the Board, provide technical specifications and other information with respect to automobiles certified under this title as advanced automobiles and, together with all other appropriate officers of the United States, take all steps which the necessary or appropriate to comply with and to implement such regulations with respect to all Federally owned motor vehicles, by the earliest practicable date.

*Section 614. Relationship to Antitrust Laws.*—Subsection (a) states that nothing in this title shall grant to any person immunity from civil or criminal liability, or create any defenses to actions, under the antitrust laws.

Subsection (b) defines the term "antitrust laws."

*Section 615. Authorization For Appropriation.*—This section authorizes appropriations for purposes other than the obligation guarantee provisions of section 608. It provides for appropriations to the Secretary not to exceed $55 million for the fiscal year ending September 30, 1977, and not to exceed $100 million for the fiscal year ending September 30, 1978.

## Changes In Existing Law

No changes in existing law are made by the bill as reported by the Committee. An additional title VI is added to the Motor Vehicle Information and Cost Savings Act.

## Estimated Costs

Pursuant to the requirements of section 252 of the Legislative Reorganization Act of 1970, the Committee estimates the cost of the bill to be as follows:

| Fiscal year: | Amount |
|---|---|
| 1977 | $55,000,000 |
| 1978 | 100,000,000 |

No provision is made in the above cost estimate for any portion of the funds authorized to be appropriated to cover the cost to the Federal Government of defaults on obligations guaranteed pursuant to section 608. The outstanding indebtedness guaranteed under section 608 is limited to $175,000,000. As the default rate has historically been low for this type of obligation guarantee program, appropriations for this purpose should be small.

## Record Votes In Committee

While the bill was ordered reported favorably on a voice vote, Senator Robert P. Griffin wished to be recorded in opposition.

## Text of S. 3267, As Reported

A BILL To amend the Motor Vehicle Information and Cost Savings Act.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.) is amended by adding at the end thereof the following new title:

# TITLE VI—RESEARCH AND DEVELOPMENT

### SHORT TITLE

Sec. 601. This title may be cited as the "Automotive Transport Research and Development Act of 1976".

### FINDINGS AND PURPOSES

Sec. 602. (a) Findings.—The Congress finds that—

(1) Existing automobiles, on the average, fall short of meeting the long-term goals of the Nation with respect to safety, environmental protection, and energy conservation.

(2) Advanced alternatives to existing automobiles could, with sufficient research and development effort, meet these long-term goals, and have the potential to be mass produced at reasonable cost. Such advanced automobiles could be operated with significantly less adverse



environmental impact and fuel consumption than existing automobiles, while meeting all of the other requirements of Federal law.

(3) Insufficient resources are being devoted, both by the Federal Government and by the private sector, to research and development of advanced automobiles and automobile components.

(4) An expanded research and development effort by the Federal Government into advanced automobiles and automobile components would complement and stimulate corresponding efforts by the private sector and would encourage automobile manufacturers to consider seriously the substitution of such advanced alternatives for existing automobiles and automobile components.

(5) The Nation's energy, safety, and environmental problems are urgent, and therefore advanced automobiles and automobile components should be developed, tested, and prepared for manufacture within the shortest practicable time.

(b) Purposes.—It is therefore the purpose of the Congress in this title—

(1) to make contracts and grants for, and support through obligation guarantees, research and development leading to production prototypes of advanced automobiles within 4 years from the date of enactment of this title, or within the shortest practicable time consistent with appropriate research and development techniques, and to secure the certification after testing of those prototypes which are likely to meet the Nation's long-term goals with respect to fuel economy, safety, environmental protection, and other objectives; and

(2) to preserve, enhance, and facilitate competition in research, development, and production of existing and alternative automobiles and automobile components.

### DEFINITIONS

Sec. 603. As used in this title, the term—

(1) "Administrator" means the Administrator of the Energy Research and Development Administration;

(2) "advanced automobile" means a personal use transportation vehicle propelled by fuel, which is energy-efficient, safe, damage-resistant, and environmentally sound and which—

(A) requires, consistent with environmental requirements, the least total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing automobiles with respect to such factors;

(B) can be mass produced at the lowest possible cost consistent with the requirements of this title;

(C) operates safely and with sufficient performance with respect to acceleration, cold weather starting, cruising speed, and other performance factors;

(D) to the extent practicable, is capable of intermodal adaptability; and

(E) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any requirement of Fed-

eral law, including, but not limited to, requirements with respect to fuel economy, exhaust emissions, noise control, safety, and damage resistance;

(3) "damage resistance" refers to the ability of an automobile to withstand physical damage when involved in an accident;

(4) "developer" means any person engaged in whole or in part in research or other efforts directed toward the development of production prototypes of an advanced automobile or automobiles;

(5) "fuel" means any energy source capable of propelling an automobile;

(6) "fuel economy" refers to the average number of miles traveled in representative driving conditions by an automobile per gallon of fuel consumed, as determined by the Administrator of the Environmental Protection Agency, in accordance with test procedures established by rule. Such procedures shall require that fuel economy tests be conducted in conjunction with emissions tests mandated by section 206 of the Clean Air Act (42 U.S.C. 1857f–5);

(7) "intermodal adaptability" refers to any characteristic of an automobile which enables it to be operated or carried, or which facilitates such operation or carriage, by or on an alternate mode or other system of transportation;

(8) "production prototype" means an automobile which is in its final stage of development and which is capable of being placed into production, for sale at retail, in quantities exceeding 10,000 automobiles per year;

(9) "reliability" refers to the average time and distance over which normal automobile operation can be expected without repair or replacement of parts, and to the ease of diagnosis and repair of an automobile and of its systems and parts which fail during use or which are damaged in an accident;

(10) "safety" refers to the performance of an automobile or automobile equipment in such a manner that the public is protected against unreasonable risk or accident and against unreasonable risk of death or bodily injury in case of accident;

(11) "Secretary" means the Secretary of Transportation;

(12) "State" means any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, or any other territory or possession of the United States; and

(13) "Vehicle Certification Board" means the Low-Emission Vehicle Certification Board established pursuant to section 212 of the Clean Air Act (42 U.S.C. 1857f–6e).

DUTIES OF THE SECRETARY

SEC. 604. The Secretary shall establish, within the Department of Transportation, a program to insure the development of one or more production prototypes of an advanced automobile or advanced automobiles within 4 years after the date of enactment of this title, or within the shortest practicable time consistent with appropriate research and development techniques and which utilizes, to the maximum extent practicable, nonpetroleum base fuels. In furtherance of the purposes of this title, and in order to stimulate such development of an advanced automobile by private interests, the Secretary shall—



(1) make contracts and grants for research and development efforts which are likely to lead or contribute to the development of an advanced automobile or advanced automobiles in accordance with the provisions of section 607 of this title;

(2) make obligation guarantees for research and development efforts which show promise of leading or contributing to the development of an advanced automobile or advanced automobiles, in accordance with the provisions of section 608 of this title;

(3) establish and conduct new projects and accelerate existing projects within the Department of Transportation which may contribute to the development of production prototypes of an advanced automobile or advanced automobiles;

(4) test or direct the testing of production prototypes, and secure certification as advanced automobiles for those which meet the applicable requirements, in accordance with section 609 of this title;

(5) collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of an advanced automobile or advanced automobiles;

(6) prepare and submit studies, as required under section 612 of this title; and

(7) evaluate any reasonable new or improved technology, a description of which is submitted to the Secretary in writing, which could lead or contribute to the development of an advanced automobile.

COORDINATION BETWEEN THE SECRETARY AND THE ADMINISTRATOR

SEC. 605. (a) The Secretary shall have overall management responsibility for carrying out the program under this title. In carrying out such program, the Secretary, consistent with such overall management responsibility—

(1) shall utilize the Energy Research and Development Administration, to the maximum extent practicable and in accordance with subsection (c), in carrying out any activities under this title with respect to advanced propulsion systems; and

(2) may utilize the Energy Research and Development Administration or any other Federal agency (except as provided in paragraph (1)), in accordance with subsection (c), in carrying out any duties under this title, to the extent that the Secretary determines that any such agency has capabilities which would allow such agency to contribute to the attainment of the purposes of this title.

(b) The Energy Research and Development Administration Administrator, whenever the Energy Research and Development Administration is utilized under subsection (a), may exercise the powers granted to the Secretary under subsection (c) and under sections 606, 607, and 608, subject to the overall management responsibility of the Secretary.

(c) In addition to the powers specifically enumerated in any other provision of this title, the Secretary may, in order to carry out this title, obtain the assistance of any department, agency, or instrumentality of the executive branch of the Federal Government upon written request, on a reimbursable basis or otherwise, and with the consent of such department, agency, or instrumentality, identifying the assistance the Secretary deems necessary to carry out any duty under this title.

POWERS OF THE SECRETARY

SEC. 606. In addition to the powers specifically enumerated in any other provision of this title, the Secretary is authorized to—

(1) appoint such attorneys, employees, agents, consultants, and other personnel as the Secretary deems necessary, define the duties of such personnel, determine the amount of compensation and other benefits for the services of such personnel and pay them accordingly;

(2) procure temporary and intermittent services to the same extent as is authorized under section 3109 of title 5, United States Code, but at rates not to exceed $150 a day for qualified experts;

(3) enter into, without regard to section 3709 of the Revised Statutes, as amended (41 U.S.C. 5), such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of duties under this title, with any government agency or any person; and

(4) purchase, lease, or otherwise acquire, improve, use, or deal in and with any property; sell, mortgage, lease, exchange, or otherwise dispose of any property or other assets; and accept gifts or donations of any property or services in aid of any purpose of this title.

CONTRACTS AND GRANTS

SEC. 607. (a) GENERAL.—(1) The Secretary shall provide funds, by contract and grant, to initiate, continue, supplement, and maintain research and development programs or activities which, in the Secretary's judgment, appear likely to lead or contribute to the development, in production prototype form, of an advanced automobile or advanced automobiles.

(2) The Secretary is authorized to make such contracts and grants with any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual.

(b) CONSULTATION.—In addition to the requirements of section 605 of this title, the Secretary, in the exercise of duties and responsibilities under this section, shall consult with the Administrator of the Environmental Protection Agency and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in the areas of automobile research, development, and technology. The Secretary may establish an advisory panel or panels to review and to make recommendations with respect to applications for funding under this section.

(c) PROCEDURE.—Each contract and grant under this section shall be made in accordance with such rules and regulations as the Secretary shall prescribe in accordance with the provisions of this section and of section 602 of this title. Each application for funding shall be made in writing in such form and with such content and other submissions as the Secretary shall require.



OBLIGATION GUARANTEES

SEC. 608. (a) GENERAL.—(1) The Secretary is authorized, in accordance with the provisions of this section and such rules and regulations as the Secretary shall prescribe, to guarantee, and to make commitments to guarantee, the payment of interest on, and the principal balance of, loans and other obligations, if the obligation involved is, or will be, entered into in order to initiate, continue, supplement, and maintain research and development programs or activities which, in the Secretary's judgment, appear likely to lead to the development, in production prototype form, and to the availability of an advanced automobile or advanced automobiles. Each application for such an obligation guarantee shall be made in writing to the Secretary in such form and with such content and other submissions as the Secretary shall require, in order reasonably to protect the interests of the United States. Each guarantee and commitment to guarantee shall be extended in such form, under such terms and conditions, and pursuant to such regulations as the Secretary deems appropriate in order to reasonably protect the interests of the United States. Each guarantee and commitment to guarantee shall inure to the benefit of the holder of the obligation to which such guarantee or commitment applies. The Secretary is authorized to approve any modification of any provision of a guarantee or a commitment to guarantee such an obligation, including the rate of interest, time of payment of interest or principal, security, or any other terms or conditions, upon a finding by the Secretary that such modification is equitable, not prejudicial to the interests of the United States, and has been consented to by the holder of such obligation.

(2) The Secretary is authorized to so guarantee and to make such commitments to any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual.

(3) All guarantees issued by the Secretary under this section shall constitute general obligations of the United States backed by the full faith and credit of the United States Government.

(b) EXCEPTION.—No obligation shall be guaranteed by the Secretary under subsection (a) of this section unless the Secretary finds that no other reasonable means of financing or refinancing is reasonably available to the applicant.

(c) CHARGES.—(1) The Secretary shall charge and collect such amounts as the Secretary may deem reasonable for the investigation of applications for the guarantee of an obligation, for the appraisal of properties offered as security for such a guarantee, or for the issuance of commitments to guarantee.

(2) The Secretary shall set a premium charge of not more than 1 percent per year for a loan or other obligation guaranteed under this section.

(d) VALIDITY.—No guarantee or commitment to guarantee an obligation entered into by the Secretary shall be terminated, canceled, or otherwise revoked, except in accordance with reasonable terms and conditions prescribed by the Secretary and in effect at the time such guarantee or commitment was entered into.

(e) DEFAULT AND RECOVERY.—(1) If there is a default in any payment by the obligor of interest or principal due under an obligation guaranteed by the Secretary under this section, and such default has continued for 60 days, the holder of such obligation shall have the right to demand payment by the Secretary of such unpaid amount. Within such period as may be specified in the guarantee or related agreements, but not later than 45 days from the date of such demand, the Secretary shall promptly pay to such holder the unpaid interest on, and unpaid principal of, the obligation guaranteed by the Secretary as to which the obligor has defaulted, unless the Secretary finds that there was no default by the obligor in the payment of interest or principal or that such default has been remedied.

(2) If a payment is made by the Secretary under paragraph (1) of this subsection, the Secretary shall have all rights specified in the guarantee or related agreements with respect to any security which the Secretary held with respect to the guarantee of such obligation, including, but not limited to, the authority to complete, maintain, operate, lease, sell or otherwise dispose of any property acquired pursuant to such guarantee or related agreements.

(3) If there is a default under any guarantee or commitment to guarantee an obligation, the Secretary shall notify the Attorney General who shall take such action against the obligor or any other parties liable thereunder as is necessary to protect the interests of the United States. The holder of such obligation shall make available to the United States all records and evidence necessary to prosecute any such action.

(f) AUTHORIZATION FOR APPROPRIATIONS.—There are authorized to be appropriated to the Secretary such sums as are necessary, not to exceed $175,000,000, to pay the interest on, and the principal balance of, any obligation guaranteed by the Secretary as to which the obligor has defaulted: *Provided*, That the outstanding indebtedness guaranteed under this section shall not exceed $175,000,000.

TESTING AND CERTIFICATION

SEC. 609. (a) ENVIRONMENTAL PROTECTION AGENCY.—The Administrator of the Environmental Protection Agency shall test, or cause to be tested, in a facility subject to Environmental Protection Agency supervision, each production prototype of an automobile developed in whole or in part with Federal financial assistance under this title, or referred to the Environmental Protection Agency for such purpose by the Secretary, to determine whether such production prototype complies with any exhaust emission standards or any other requirements promulgated or reasonably expected to be promulgated under any provision of the Clean Air Act (42 U.S.C. 1857 et seq.), the Noise Control Act of 1972 (42 U.S.C. 4901), or any other provision of Federal law administered by the Administrator of the Environmental Protection Agency. In conjunction with any test for compliance with exhaust emission standards under this section, the Administrator of the Environmental Protection Agency shall also conduct tests to determine the fuel economy of such prototype automobile. Such Administrator shall submit all test data and the results of such tests to the Vehicle Certification Board.



(b) SECRETARY.—The Secretary shall test, or shall cause to be tested in a facility subject to supervision by the Secretary, all production prototypes of advanced automobiles which the Secretary or a developer may submit to the Vehicle Certification Board for certification under subsection (c) of this section. Such tests shall be conducted, according to testing procedures to be developed by the Secretary, to determine whether each such automobile complies with any standards promulgated as of the date of such testing or reasonably expected to be promulgated prior to the sale at retail of such automobile, under any provision of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1381), the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.), the Automobile Information Disclosure Act (15 U.S.C. 1232), and any other statute enacted by Congress and applicable to automobiles. The Secretary shall also refer any such automobile to the Administrator of the Environmental Protection Agency for testing pursuant to the provisions of subsection (a) of this section. All production prototypes of advanced automobiles may be submitted to the Secretary for testing under this subsection, including vehicles developed without any Federal financial assistance under this title. All test data and the results of all tests conducted by the Secretary, or subject to the Secretary's supervision, shall be submitted to the Vehicle Certification Board, together with all conclusions, and reasons therefor, with respect to whether the automobile tested merits certification as an advanced automobile. The Secretary, or the Administrator of the Environmental Protection Agency, if appropriate, shall conduct, or cause to be conducted, any additional tests which are requested by the Vehicle Certification Board and shall furnish to such Board any other information which it requests or which is deemed to be necessary or appropriate.

(c) VEHICLE CERTIFICATION BOARD.—Upon application by a developer or by the Secretary, with respect to a production prototype of a particular automobile or automobiles, and upon the receipt of all required and relevant test data and test results pursuant to subsections (a) and (b) of this section, the Vehicle Certification Board shall certify such automobile as an advanced automobile or shall issue a denial of such certification with reasons therefor. Each application for certification shall be made to the Vehicle Certification Board in writing, in such form and with such content and other submissions as such Board may require. Each determination as to certification shall be made in accordance with such reasonable rules and regulations as such Board shall prescribe.

PATENTS

SEC. 610. (a) TITLE TO INVENTIONS.—Whether an invention is made or conceived during, or in the course of, or as a consequence of, activity conducted in accordance with or related to a contract made or entered

into under this title, title to such invention shall vest in the United States, if the Secretary determines that—

(1) the person who made the invention was employed or assigned to perform research or development work, and that the invention is related to the work such person was employed or assigned to perform, or that it was within the scope of such person's employment duties, whether or not the invention was made during working hours and whether or not the invention was made with a contribution from the Government; or

(2) the invention is related to the contract, or to the work or duties which the person who made the invention was employed or assigned to perform, even though such person was not employed or assigned to perform research or development work, if the invention was made during working hours, or if it was made with a contribution from the Government.

As used in this subsection, the term "contribution from the Government" includes the use of Government facilities, equipment, materials, allocated funds, information proprietary to the Government, or any services during working hours of Government employees. If patents are issued on such an invention the patents shall be issued to the United States, unless in particular circumstances the Secretary, in accordance with this section, waives all or any part of the rights of the United States.

(b) REPORT.—Each contract entered into by the Secretary under this title with any person shall contain effective provisions requiring such person to furnish a prompt and written report to the Secretary with respect to any invention, discovery, improvement, or innovation which may be made in the course of, or as a consequence of, activity conducted in accordance with or related to such contract. Each such report shall contain accurate and complete technical information, in accordance with specifications of the Secretary.

(c) WAIVER.—The Secretary may waive all or any part of the rights of the United States with respect to any invention or class of inventions which is made, or which may be made, by any person or class of persons in the course of, or as a consequence of, activity conducted in accordance with, or related to, any contract under this title, pursuant to regulations prescribed by the Secretary in conformity with the provisions of this section, if the Secretary determines that the interests of the United States and of the general public would best be served by such a waiver. The Secretary shall maintain and periodically update a publicly available record of waiver determinations. In making such determinations, the Secretary shall strive to—

(1) make the benefits of the advanced automobile research and development program widely available to the public in the shortest practicable time;

(2) promote the commercial utilization of such inventions;

(3) encourage participation by private persons in the Secretary's advanced automobile research and development program; and

(4) foster competition and prevent undue market concentration, or the creation or maintenance of other situations inconsistent with the antitrust laws.



(d) CONTRACT WAIVERS.—In determining whether it would best serve the interests of the United States and of the general public to grant such a waiver to a contractor at the time a contract is entered into, the Secretary shall include as considerations—

(1) the extent to which the participation of the contractor will expedite the attainment of the purposes of the program;

(2) the extent to which a waiver of all or any part of such rights in any or all fields of technology is needed to secure the participation of the particular contractor;

(3) the extent to which the contractor's commercial position may expedite utilization of the research and development program results;

(4) the extent to which the Government has contributed to the field of technology to be funded under the contract;

(5) the purpose and nature of the contract, including the intended use of the results developed thereunder;

(6) the extent to which the contractor has made or will make substantial investment of financial resources or technology developed at the contractor's private expense which will directly benefit the work to be performed under the contract;

(7) the extent to which the field of technology to be funded under the contract has been developed at the contractor's private expense;

(8) the extent to which the Goverament intends to further develop, to the point of commercial utilization, the results of the contract effort;

(9) the extent to which the contract objectives are concerned with the public health, public safety, or public welfare;

(10) the likely effect of the waiver on competition and market concentration; and

(11) the extent to which a contractor, which is a nonprofit educational institution, has a technology transfer capability and program which is approved by the Secretary as being consistent with the applicable policies of this subsection.

(e) SUBSEQUENT WAIVERS.—In determning whether it would best serve the interests of the United States and of the general public to grant such a waiver at a subsequent date to a contractor or to an inventor, with respect to an identified invention, the Secretary shall specifically consider (1) paragraphs (4) through (11) of subsection (d), as applied to such invention; (2) the extent to which such waiver is a reasonable and necessary incentive to call forth private risk capital for the development and commercial distribution of such invention; and (3) the extent to which the plans, intentions, and ability of the contractor or inventor are likely to result in expeditious commercial distribution of such invention.

(f) RESERVATIONS.—Whenever title to an invention is vested in the United States, a revocable or irrevocable, nonexclusive, and paid-up license for the practice of such invention throughout the world may be reserved to the contractor or to the inventor thereof. The rights to such an invention may be similarly reserved in any foreign country in which the United States has elected not to secure patent rights and in which such contractor or inventor elects to secure a patent, subject

to the rights described in subsection (h)(2), (h)(3), (h)(6), and (h)(7) of this section: *Provided*, That such a contractor or inventor shall 3 years after the date of issuance of such a patent, and at any time upon the specific request of the Secretary, submit the report specified in subsection (h)(1) of this section.

(g) LICENSES.—(1) Subject to subsection (g)(2) of this section, the Secretary shall determine and promulgate regulations specifying the terms and conditions upon which licenses may be granted in any invention to which title is vested in the United States.

(2) Pursuant to subsection (g)(1) of this section and after notice and an opportunity for a hearing, the Secretary may grant exclusive or partially exclusive licenses in any invention, only if the Secretary determines that—

(A) the proposed license would best serve the interests of the United States and of the general public, in light of the applicant's intentions, plans, and capacity to bring such invention to practical or commercial applications;

(B) the desired practical or commercial applications of such invention have not been achieved, or are not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on such invention;

(C) exclusive or partially exclusive licensing is a reasonable and necessary incentive to make available the risk capital and other financing necessary to bring the invention to the point of practical or commercial applications; and

(D) the terms and scope of exclusivity of the proposed license are not substantially greater than are necessary to provide sufficient incentive for bringing such invention to the point of practical or commercial applications, and to provide the licensee with sufficient opportunity to recoup its costs and to earn a reasonable profit thereon: *Provided*, That the Secretary shall not grant such an exclusive or partially exclusive license if the Secretary determines that the grant of such a license will tend substantially to lessen competition or to result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates. The Secretary shall maintain and periodically update a publicly available record of determinations concerning applications for and the grant of such licenses.

(h) TERMS AND CONDITIONS.—Any waiver of rights, and any grant of an exclusive or partially exclusive license, shall contain such terms and conditions as the Secretary may determine to be appropriate for the protection of the interests of the United States and of the general public. Such terms and conditions may include, but need not be limited to—

(1) periodic written reports, at reasonable intervals and at any time when specifically requested by the Secretary, on the commercial use that is being made or is intended to be made of the invention involved;

(2) the right, at a minimum, of an irrevocable, nonexclusive, and paid-up license to make, use, and sell the invention involved throughout the world, by or on behalf of the United States (including any Government agency) and by or on behalf of the



States and their political subdivisions, unless the Secretary determines that it would not be in the public interest to acquire such a license for the States and their political subdivisions;

(3) the right in the United States to sublicense any foreign government to make, use, and sell the invention involved, pursuant to any existing or future treaty or agreement, if the Secretary determines it would be in the national interest to acquire this right;

(4) the reservation in the United States of the rights to the invention involved in any country in which the contractor does not file an application for a patent within such time as the Secretary shall determine;

(5) the right in the Secretary to require the granting of a nonexclusive, exclusive, or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances (A) to the extent that the invention involved, or an application thereof, is required for public use by governmental regulations; (B) to the extent that it may be necessary to fulfill health, safety, or energy needs; or (C) for such other purposes as may be stipulated in the applicable agreement;

(6) the right in the Secretary to terminate the waiver or license involved, in whole or in part, unless the person who receives such waiver of rights or who is granted such license demonstrates to the satisfaction of the Secretary that such person has taken, or that such person will take within a reasonable time thereafter, effective steps to accomplish substantial utilization of the invention involved;

(7) the right in the Secretary, commencing 3 years after the grant of a license and 4 years after the effective date of a waiver of rights to an invention, to require the granting of a nonexclusive or partially exclusive license to any responsible applicant, upon terms reasonable under the circumstances, and the right in the Secretary, under appropriate circumstances, to terminate such a waiver or license, in whole or in part, following the filing of a petition with the Secretary, by an interested person, and after notice and an opportunity for a hearing—

(A) if the Secretary after providing an opportunity to the recipient of such waiver or license, and to any other interested person, to submit such relevant and material information as may be appropriate and after reviewing such information, determines that such waiver or license has tended substantially to lessen competition or to result in undue concentration in any section of the country in any line of commerce to which the technology relates; or

(B) unless the recipient of such waiver or license demonstrates to the satisfaction of the Secretary at such hearing that such recipient has taken, or that such recipient will take, within a reasonable time thereafter, effective steps to accomplish substantial utilization of the invention involved.

(i) NOTICE.—The Secretary shall cause a notice to be published periodically, not less than once each year, in the Federal Register and in other appropriate publications, including the electronic media,

advising the public of the right to have a hearing, as provided in subsection (h)(7) of this section, and of the availability of the records of determinations under this section.

(j) SMALL BUSINESS.—If the applicant for a waiver of rights to an invention or for a license is a small business, as defined by regulations of the Small Business Administration, the Secretary shall consider and accord weight to such factor.

(k) OTHER LICENSES.—Whenever the Secretary, pursuant to such regulations as the Secretary shall prescribe, and upon the application by any person, determines that—

(1) a right under any patent, which is not otherwise reasonably available, is reasonably necessary, in furtherance of the policy of fostering expeditious commercial application of advanced automotive technologies, to the development, demonstration, or commercial application of any advanced automotive invention, process, or system; and

(2) there are no other reasonable methods to achieve such development, demonstration, or commercial application,

the Secretary shall so certify to an appropriate district court of the United States. The Secretary shall petition such court to order the owner and/or the exclusive licensee of such patent to grant a license thereunder at such reasonable royalty and on such reasonable and nondiscriminatory terms and conditions as the court shall determine. The court shall provide such patentee or exclusive licensee, or both, as appropriate, an opportunity for a hearing, including a de novo review of the determination of the Secretary. The appropriate district court shall be the district court for the judicial district in which the patentee or the exclusive licensee of such patent resides, does business, or is found.

(l) PROTECTION.—The Secretary is authorized to take all necessary and appropriate steps, which are suitable, to protect any invention or discovery to which the United States holds title. The Secretary shall require that any contractor or other person, who acquires rights to an invention under this section, protect such invention.

(m) DEFINITIONS.—As used in this section, the term—

(1) "contract" means any contract, grant, agreement, understanding, obligation guarantee, or other arrangement which involves any research and development work; the term includes any assignment, substitution of parties, or subcontract thereunder;

(2) "contractor" means any person who has a contract with or on behalf of, the Secretary under this title;

(3) "invention" means any invention or discovery, whether patented or unpatented; and

(4) "made", when used in relation to any invention, means the conception or first actual reduction to practice of such invention.

RECORDS, AUDIT, AND EXAMINATION

SEC. 611. (a) RECORDS.—Each recipient of financial assistance or guarantees under this title, whether in the form of grants, subgrants,



contracts, subcontracts, obligation guarantees, or other arrangements, shall keep such records as the Secretary shall prescribe, including records which fully disclose the amount and disposition by such recipient of the proceeds of such assistance, the total cost of the project or undertaking in connection with which such assistance was given or used, the amount of that portion of such total cost which was supplied by other sources, and such other records as will facilitate an effective audit.

(b) AUDIT AND EXAMINATION.—The Secretary and the Comptroller General of the United States, or any of their duly authorized representatives shall, until the expiration of 3 years after completion of the project or undertaking referred to in subsection (a) of this section, have access for the purpose of audit and examination to any books, documents, papers, and records of such receipts which in the opinion of the Secretary or the Comptroller General may be related or pertinent to the grants, subgrants, contracts, subcontracts, obligation guarantees, or other arrangements referred to in such subsection.

REPORTS

SEC. 612. On or before July 1 of each year, the Secretary shall submit to Congress an annual report of activities under this title. Such report shall include, but need not be limited to—

(1) an account of the state of automobile research and development in the United States;

(2) the number and amount of contracts and grants made and of obligations guaranteed;

(3) the progress made in developing production prototypes of advanced automobiles within the shortest practicable time after the date of enactment of this title; and

(4) suggestions for improvements in advanced automobile research and development, including recommendations for legislation.

GOVERNMENT PROCEDURE

SEC. 613. The Administrator of General Services shall consult periodically with the Vehicle Certification Board to determine when production prototypes of an advanced automobile are likely to be available. After a production prototype has been certified, under section 609(c) of this title, as an advanced automobile, the Vehicle Certification Board, in conjunction with the Administrator of General Services, shall prescribe such regulations as are necessary to require all Federal agencies to procure and to use such advanced automobiles to the maximum extent feasible. Such Administrator shall, with the assistance of such Board, provide technical specifications and other information with respect to automobiles certified under this title as advanced automobiles. Such Administrator, and all other appropriate officers of the United States shall take all steps which are necessary or appropriate to comply with and to implement such regulations, with respect to all Federally owned motor vehicles, by the earliest practicable date.

RELATIONSHIP TO ANTITRUST LAWS

SEC. 614. (a) DISCLAIMER.—Nothing in this title shall be deemed to convey to any person any immunity from civil or criminal liability, or to create any defenses to actions, under the antitrust laws.

(b) ANTITRUST LAWS DEFINED.—As used in this section, the term "antitrust laws" means the Act of July 2, 1890 (15 U.S.C. 1 et seq.), as amended; the Act of October 15, 1914 (15 U.S.C. 12 et seq.), as amended; the Federal Trade Commission Act (15 U.S.C. 41 et seq.) sections 73 and 74 of the Act of August 27, 1894 (15 U.S.C. 8 and 9), as amended; and the Act of June 19, 1936, ch. 592 (15 U.S.C. 13, 13a, and 21a), as amended.

AUTHORIZATION FOR APPROPRIATION

SEC. 615. There are authorized to be appropriated to carry out the purposes of this title, other than section 608 of this title, funds not to exceed $55,000,000 for the fiscal year ending September 1977, and not to exceed $100,000,000 for the fiscal year ending September 30, 1978.

## MINORITY VIEWS OF MR. GRIFFIN

Although Congress has already imposed Federal regulations on virtually every aspect of private sector design and production of the automobile, this bill would carry the process to the extreme: it would put the Federal Government into the business of designing automobiles.

The bill authorizes $330 million for the Government to build an "advanced automobile" (whatever that is), which would be "energy-efficient, safe, damage-resistant, and environmentally sound. . . ."

Under the bill, the Secretary of Transportation is directed to develop production prototypes of such a "supercar" within 4 years. A production prototype is described as an automobile in its final development stage that can be produced commercially in volumes of more than 10,000 per year.

Ralph Nader once observed, "If there is one thing worse than GM producing cars, it would be the U.S. Government producing them." On that point, he was absolutely right.

Perhaps some Federal R. & D. to improve engine fuel efficiency and safety technology can be justified. Indeed, both the Department of Transportation and the Energy Research and Development Administration have active auto R. & D. programs already underway. Additional funds to speed up such efforts could be defended.

But it is wasteful and foolhardy in the extreme to move Government into the business of designing automobiles—or for that matter dishwashers, television sets, or vacuum cleaners. During hearings before the Committee last year, Dr. James Kane, Acting Deputy Assistant Administrator of ERDA for Conservation, emphasized that:

> The Government does not have, and in my opinion, should not seek to develop, capabilities in engineering development and product improvement. In other words, the final phase, manufacturing, is an area in which industry has superior capabilities *and Government has almost none.* (emphasis added)

More recently, in March of this year, Dr. R. Rhoads Stephenson of the Jet Propulsion Laboratory at the California Institute of Technology strongly counseled the House Science and Technology Committee against "Government involvement in the production, engineering, tooling, or actual production."

Similar advice was given to the House Committee by Dr. Lawrence H. Linden of the Energy Laboratory at the Massachusetts Institute of Technology, who recommended that the Government should not "commence an Apollo-style crash program for the development of production prototypes. . . ."

Those who genuinely seek to help consumers by holding down prices will resist this ridiculous, extravagant thrust toward more—not less—Government intervention. This legislation represents an unwise abandonment of the very economic system that has made our country great.

ROBERT P. GRIFFIN.



O

94TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 94–1169

# AUTOMOTIVE TRANSPORT RESEARCH AND DEVELOPMENT ACT OF 1976

MAY 15, 1976.—Ordered to be printed

Mr. TEAGUE, from the Committee on Science and Technology, submitted the following

## REPORT

together with

## INDIVIDUAL VIEWS

[Including cost estimate and comparison of the Congressional Budget Office]

[To accompany H.R. 13655]

The Committee on Science and Technology, to whom was referred the bill (H.R. 13655) to establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes, having considered the same, report favorably thereon with amendments and recommend that the bill as amended do pass.

The amendments are as follows:

Page 14, line 18, add "and" after the comma.

Page 14, strike out lines 19 through 24, and page 15, strike out lines 1 and 2 and insert in lieu thereof the following:

(2) such sums as may be included in the annual authorization for the nonnuclear programs of the Energy Research and Development Administration for each subsequent fiscal year.

CONTENTS



57-006

## I. Bill

The bill (H.R. 13655), as reported by the Committee on Science and Technology, follows:

[H.R. 13655, 94th Cong., 2d sess.]

A BILL To establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That this Act may be cited as the "Automotive Transport Research and Development Act of 1976".

FINDINGS AND PURPOSES

Sec. 2. (a) Findings.—The Congress finds that—

(1) existing automobile propulsion systems, on the average, fall short of meeting the long-term goals of the Nation with respect to environmental protection and energy conservation;

(2) advanced alternatives to existing automobile propulsion systems could, with sufficient research and development effort, meet these long-term goals, and have the potential to be mass produced at reasonable cost; and automobiles with advanced propulsion systems could be operated with significantly less adverse environmental impact and fuel consumption than existing automobiles, while meeting all of the other requirements of Federal law;

(3) insufficient resources are being devoted, both by the Federal Government and by the private sector, to research on and development of advanced automobile propulsion systems and their components;

(4) an expanded research and development effort to research on and development of advanced automobile propulsion systems and their components would complement and stimulate corresponding efforts by the private sector and would encourage automobile manufacturers to consider seriously the substitution of such advanced alternatives for existing automobile propulsion systems and their components; and

(5) the Nation's energy, safety, and environmental problems are urgent, and therefore advanced automobile propulsion systems and components should be developed, tested, and prepared for manufacture within the shortest practicable time.

(b) Purposes.—It is therefore the purpose of the Congress in this Act—

(1) to make contracts and grants under a five-year program for research and development leading to advanced automobile propulsion systems which are likely to help meet the Nation's long-term goals with respect to fuel economy and supply, environmental protection, and other objectives;

(2) to preserve, enhance, and facilitate competition in research and development in and production of existing and alternative



automobiles, automobile propulsion systems, and automobile components; and

(3) to supplement, but not supplant, the automotive research and development efforts of private industry.

DEFINITIONS

Sec. 3. As used in this Act—

(1) the term "Administrator" means the Administrator of the Energy Research and Development Administration;

(2) the term "advanced automobile" means a personal use transportation vehicle which is fuel-propelled and is energy efficient, safe, reliable damage resistant, and environmentally sound, and which—

(A) requires, consistent with environmental requirements, the least total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing automobiles with respect to such factors;

(B) can be mass produced at the lowest possible cost consistent with the requirements of this Act;

(C) has a projected ownership cost to the first owner which is comparable with automobiles of the same size and class which are produced using standard technology;

(D) operates safely and with sufficient performance with respect to acceleration, cold weather starting, cruising speed, and other performance factors;

(E) to the extent practicable, is capable of intermodal adaptability; and

(F) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any requirement of Federal law, including, but not limited to, requirements with respect to fuel economy, exhaust emissions, noise control, safety, and damage resistance;

(3) the term "advanced automobile propulsion system" means an energy conversion system, including engine and drive train, which is used to propel an advanced automobile;

(4) the term "damage resistance" refers to the ability of an automobile to withstand physical damage when involved in an accident;

(5) the term "developer" means any person engaged in whole or in part in research or other efforts directed toward the development of advanced automobiles, advanced automobile propulsion systems, or components thereof;

(6) the term "fuel" means any energy source capable of propelling an automobile;

(7) the term "fuel economy" refers to the average distance traveled in representative driving conditions by an automobile per unit of fuel consumed, as determined by the Administrator of the Environmental Protection Agency in accordance with test procedures which shall be established by rule and shall require that

fuel economy tests be conducted in conjunction with emissions tests mandated by section 206 of the Clean Air Act (42 U.S.C. 1857f–5);

(8) the term "intermodal adaptability" refers to any characteristic of an automobile which enables it to be operated or carried, or which facilitates its operation or carriage, by or on an alternative mode or other system of transportation;

(9) the term "reliability" refers to the average time and distance over which normal automobile operation can be expected without extensive repair or replacement of parts, and to the ease of diagnosis and repair of an automobile and of its systems and parts which fail during use or are damaged in an accident;

(10) the term "safety" refers to the performance of an automobile or automobile system or equipment in such a manner that the public is protected against unreasonable risk of accident and against unreasonable risk of death or bodily injury in case of accident;

(11) the term "Secretary" means the Secretary of Transportation; and

(12) the term "State" means any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virginia Islands, Guam, American Samoa, or any other territory or possession of the United States.

DUTIES OF THE ADMINISTRATOR

SEC. 4. The Administrator shall establish, within the Energy Research and Development Administration, a five-year program aimed at the development of advanced automobile propulsion systems which to the maximum extent practicable are flexible in the type of fuel used. In furtherance of the purposes of this Act, and in order to stimulate such development of advanced automobile propulsion systems by private interests, the Administrator shall—

(1) make contracts and grants for research and development efforts on advanced automobile propulsion systems which are likely to lead or contribute to the development of an advanced automobile or advanced automobiles;

(2) make such contracts and grants with any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual;

(3) establish a research, development, and demonstration program within the Energy Research and Development Administration which may contribute to the development of advanced automobile propulsion systems or advanced automobiles;

(4) intensify research in key basic science areas which limit development of advanced automobile propulsion systems;

(5) give full consideration to the capabilities of the Federal laboratories in the conduct of the research, development, and demonstration program: *Provided*, That not more than 60 per centum of the funds authorized in section 11 shall be directly expended in Federal laboratories;



(6) conduct an active industry-government fellowship program providing for exchange of governmental and industrial scientists involved in research and development relating to advanced automobile propulsion systems;

(7) prepare and submit studies, as required under this Act;

(8) (A) consider any reasonable new or improved technology, a description of which is submitted to the Administrator in writing, which could lead or contribute to the development of advanced automobile propulsion systems or their components;

(B) make available at laboratories described in paragraph (5) facilities and expertise for developing and proof-testing components and subsystems which in the Administrator's judgment show promise of contributing to advanced automobile propulsion systems; and

(C) establish procedures for utilizing the Office of Energy Related Inventions at the National Bureau of Standards;

(9) give due consideration to the capabilities of the National Aeronautics and Space Administration, the Department of Defense, and other Federal agencies, and coordinate with them in the conduct of research, development, and demonstration programs;

(10) consult with the Administrator of the Environmental Protection Agency and establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in the areas of automobile research, development, and technology, and establish such advisory panel or panels as he deems appropriate to review and make recommendations with respect to applications for funding under this Act; and

(11) insure that research and development under this Act supplements, but does not supplant, the automotive research and development efforts of private industry.

DUTIES OF THE SECRETARY

SEC. 5. The Secretary, in furtherance of the purposes of this Act, shall—

(1) make available facilities and expertise for testing any prototypes which may be developed based on activities related to the programs under paragraphs (1), (2), and (3) of section 4, and secure certification as advanced automobiles for those which meet the applicable requirements;

(2) collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of advanced automobile propulsion systems or advanced automobiles; and

(3) evaluate the posture of the automotive industry in meeting societal needs by the utilization of current technology, and recommend incentive measures to the Congress on an annual basis.

COORDINATION BETWEEN THE SECRETARY AND THE ADMINISTRATOR

SEC. 6. The Secretary and the Administrator shall consult and cooperate with respect to their respective duties and responsibilities, and

they shall coordinate their respective activities, in areas of shared concern, to the extent practicable, in order that the duties and responsibilities of both officers under this Act may be performed in a way that will lead to the most meaningful and effective results from the program in an efficient manner: *Provided*, That nothing in this section shall alter the assigned responsibilities of the Administrator under other sections of this Act: *And provided further*, That nothing in this section shall be construed to reduce in any way the responsibilities of the Administrator for automotive research, development, and demonstration under the Energy Reorganization Act of 1974 and the Federal Nonnuclear Energy Research and Development Act of 1974.

REPORTS

SEC. 7. As a separate part of the annual report submitted under section 15(a) of the Federal Nonnuclear Energy Research and Development Act of 1974 with respect to the comprehensive plan and program then in effect under section 6 (a) and (b) of such Act, the Administrator shall submit to Congress an annual report of activities under this Act. Such report shall include, but need not be limited to—

(1) a current comprehensive program definition for implementing this Act;

(2) an account of the state of automobile research and development in the United States;

(3) the number and amount of contracts and grants made;

(4) the progress made in developing advanced automobile propulsion systems and their components; and

(5) suggestions for improvements in advanced automobile research and development, including recommendations for legislation.

AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT

SEC. 8. (a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended by redesignating subsection (d) as subsection (e), and by inserting immediately after subsection (c) the following new subsection:

"(d) The Congress declares that the general welfare of the United States requires that the unique competence in scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the development of advanced automobile propulsion systems. Such development shall be conducted so as to contribute to the achievement of the purposes set forth in section 2(b) of the Automotive Transport Research and Development Act of 1976.".

(b) The subsection of section 102 of such Act redesignated as subsection (e) by subsection (a) of this section is amended by striking out "and (c)" and inserting in lieu thereof "(c), and (d)".

INFORMATION DISSEMINATION

SEC. 9. The information maintained by the Administrator under this Act shall be made available to the public, subject to the provisions of section 552 of title 5, United States Code, and section 1905 of title 18, United States Code, and to other Government agencies in a manner that will facilitate its dissemination: *Provided*, That upon a showing satisfactory to the Administrator by any person that any information, or portion thereof, obtained under this Act by the Administrator directly or indirectly from such person, would, if made public, divulge (1) trade secrets or (2) other proprietary information of such person, the Administrator shall not disclose such information and disclosure thereof shall be punishable under section 1905 of title 18, United States Code: *Provided further*, That the Administrator shall, upon request, provide such information to (A) any delegate of the Administrator for the purpose of carrying out this Act, and (B) the Attorney General, the Secretary of Transportation, the Federal Trade Commission, the Federal Energy Administration, the Environmental Protection Agency, the Administrator of the National Aeronautics and Space Administration, the General Accounting Office, other Federal agencies, or heads of other Federal agencies, when necessary to carry out their duties and responsibilities under this and other statutes, but such agencies and agency heads shall not release such information to the public. This section is not authority to withhold information from Congress, or from any committee of Congress upon request of the chairman. For the purposes of this subsection, the term "person" shall include any borrower.



TRANSFER OF FUNCTIONS

SEC. 10. Within sixty days after the date of the enactment of the law creating the electric vehicle research, development, and demonstration program, all of the authorities of such program and all of the research, development, and other functions which are vested in Federal agencies under such program, along with related records, documents, personnel, obligations, and other items, to the extent necessary or appropriate, shall, in accordance with regulations prescribed by the Office of Management and Budget, be transferred to and vested in the Administrator of the Energy Research and Development Administration and exercised by him as a part of the program established by this Act.

AUTHORIZATION OF APPROPRIATIONS

SEC. 11. (a) There are authorized to be appropriated to carry out the purposes of this Act—

(1) not to exceed $20,000,000 for the fiscal year 1977, *and*

[(2) not to exceed $30,000,000 for the fiscal year 1978,

[(3) not to exceed $35,000,000 for the fiscal year 1979,

[(4) not to exceed $35,000,000 for the fiscal year 1980, and

[(5) not to exceed $30,000,000 for the fiscal year 1981.]

*(2) such sums as may be included in the annual authorization for the nonnuclear programs of the Energy Research and Development Administration for each subsequent fiscal year.*

(b) Any request for appropriations pursuant to the authority in subsection (a) shall specify the relationship between the research, development, and demonstration to be supported with such appropriations and any related programs which are being supported or proposed to be supported under the authority of other laws or that have been requested for authorization.

## II. Explanation of the Bill as Amended

The objective of H.R. 13655 is to develop more efficient engines and drive trains for automobiles within five years. The expert testimony presented to the Committee's Subcommittee on Energy Research, Development and Demonstration indicated the need for such a short term program to develop two alternative engines (the most likely candidates being the Brayton (gas turbine) and Stirling cycles) together with more efficient transmissions, drive train components and controls.

*Summary*

H.R. 13655, as amended, sets forth findings that existing automotive propulsion systems fall short of meeting the nation's long term goals with respect to energy use and environmental protection, and that advanced alternatives to existing propulsion systems hold promise of meeting those goals provided adequate research and development is carried out.

The Bill establishes in ERDA a five-year research and development program on advanced automotive propulsion systems. The program will supplement current R&D in private industry. Included in the ERDA program are the following elements:

(1) Research and development conducted in government laboratories, with other Federal agencies, and through contracts and grants;

(2) Industry-government fellowships to permit exchange of scientists involved in research on advanced propulsion systems; and

(3) Making available facilities and expertise for development and testing of promising ideas in advanced automotive propulsion.

H.R. 13655 directs that the Administrator of ERDA give full consideration to the capabilities of the Federal laboratories in the conduct of the R&D program.

It directs the Secretary of Transportation:

(1) To make available facilities and expertise for testing and certifying any prototypes developed;

(2) Collect, analyze, and disseminate information to developers on advanced automobile propulsion systems or advanced automobiles;

(3) Evaluate the auto industry's activities in meeting societal needs by utilization of current technology; and

(4) Recommend incentives to Congress.

Other provisions provide for: amendment of the National Aeronautics and Space Act to require NASA to conduct advanced automotive propulsion R&D and to support the activities of this bill; information dissemination; annual reporting as a part of the ERDA comprehensive plan and program, including a program definition for carrying out the Act; and transfer of the electric vehicle demonstration activities into this program.

The bill, as amended, authorizes $20 million for FY 77 and provides for annual authorizations for fiscal years 1978 through 1981.

*Findings and purposes*

The bill finds that inadequate resources are being devoted to research and development of efficient, and environmentally sound, automotive propulsion systems, including engines, transmissions and other drive train components. It therefore establishes a five-year R&D program in ERDA to develop these propulsion systems in a manner that supplements the efforts of private industry.



*Definitions*

Section 3 of the bill defines a number of administrative and technical terms relative to the establishment and implementation of the R&D program specified under this legislation.

*Duties of the ERDA Administrator*

The ERDA Administrator is required to establish a five-year program to develop automotive propulsion systems. He is authorized to fund such activity through Federal agencies and laboratories, universities and other non-profit organizations, industries and other public and private non-Federal entities. Specifically included in this authorization is the support of associated basic science and the establishment of an industry-government fellowship program that provides for the exchange of government and industry scientists involved in R&D related to automotive ground propulsion systems.

The bill directs that full consideration be given to the capabilities of Federal laboratories in the conduct of the research, development and demonstration program established under the bill. No more than 60% of authorized funds may be expended in Federal laboratories.

The Administrator of ERDA shall establish procedures for utilizing the Office of Energy-Related Inventions at the National Bureau of Standards and to consider any reasonable new or improved technology for which description is submitted to him in writing and which would lead to contributions to the development of advanced automobile propulsion systems or their components.

ERDA is to make available facilities and expertise at Federal laboratories for developing and proof-testing of components and subsystems which show promise of contributing to advanced automobile propulsion systems. An important provision of the Act provides that the most promising ideas to emerge from the National Bureau of Standards' screening procedures can be developed and tested at Federal laboratories with expertise in automotive propulsion research. It is important that the patent and technical literature be taken into account and the Administrator has been requested by this Committee to provide an account of how ERDA currently handles this problem. He has been further asked to assess the possibility of doing a patent and technical literature evaluation study.

The program established under this bill will be most effective if the Administrator of ERDA determines the two or three best alternative engines to be developed and then proceeds with those selected alternatives. If too many alternatives are pursued, adequate progress cannot be made on any one at a rate permitting production decision by the early 1980's. Specific alternatives which appear attractive at this time are the Brayton and Stirling engines. However, ERDA is expected to evaluate the problem in detail before making a decision on specific alternatives, and include these results in its program definition.

A number of propulsion systems will be built and may be incorporated into automobiles for testing and demonstration purposes. The number of such testing or demonstration prototypes may number several but not hundreds or thousands. The emphasis of the program in

this Act, then, is upon solution of problems and the generation of knowledge and technology as opposed to the procurement and generation of hardware.

The ERDA Administrator is required to consult with the head of the Environmental Protection Agency and establish appropriate advisory panels to review and recommend funding for programs supported under this legislation.

ERDA is also required to structure this program in such a manner that it supplements rather than supplants other R&D efforts in private industry.

*Duties of the Secretary of Transportation*

The Department of Transportation is required to make available its facilities and expertise for the testing of prototypes which may be developed as an outgrowth of programs supported under this bill.

The Department of Transportation is also required to collect, analyze, and disseminate data and other information useful to potential developers of advanced automobile propulsion systems or advanced automobiles, and to evaluate the adequacy of the automotive industry in meeting societal needs. DOT is also enjoined to recommend incentive measures annually to the Congress should they be needed to accomplish these needs.

*Coordination*

Section 6 of the bill sets forth requirements for ERDA and DOT to coordinate their activities. This should be carried out, however, in a manner that does not change the responsibilities of the Energy Research and Development Administration for automotive R&D as provided in the Energy Reorganization Act of 1974 (P.L. 93-438) and the Federal Nonnuclear Energy Research and Development Act of 1974 (P.L. 93-577).

*Reports*

As a separate part of the annual report of the ERDA, submitted to the Congress, the Administrator shall submit to Congress an annual report of the activities under this Act. This report shall include, but not be limited to, a current, Comprehensive Program Definition implementing the Act; an account of the state of automobile research and development in the United States; the number and amount of contracts and grants made; the progress made in developing advanced automobile systems and their components; and, suggestions for improvements in advanced automobile research and development including recommendations for legislation.

In preparation of the program definition and plan, it is felt the Administrator should consult with the head of each agency referred to in the Act. ERDA should also consult with other appropriate Federal agencies and private organizations and provide an opportunity for public review and comment of the draft Program Definition and plan before submission to the Congress. The Comprehensive Program Definition should include a variety of elements, including consideration and discussion of reports and studies which impact upon the automotive power systems future of the nation. Examples of such reports include the Interagency Motor Vehicle Goals Task Force Report, The Office of Technology Assessment's Technology Assessment of Changes in the Use and Characteristics of Automobiles, the Jet Propulsion Laboratory Report, "Should We Have a New Engine" and the MIT Energy Laboratory Report, "Federal Support for the Development of Alternative Automotive Power Systems."



The Comprehensive Program Definition should also include, insofar as practicable: (A) Specific delineations of responsibility of each participating Federal agency in the conduct of activity under this Act; (B) mechanisms established to coordinate research and development, where more than one agency is involved; (C) review and management procedures at the Secretary and agency Administrator levels; (D) advisory mechanisms and procedures for review of and comment on project activities by private industry and public interest groups; (E) procedures for public dissemination of information resulting from the project, consistent with Section 10, Information Dissemination and Protection of Proprietary Information; and (F) the status of any memoranda of understanding or other agreements required to implement this Act:

An assessment of the state-of-the-art and the state of practice in each area of research and development specified in this Act;

An assessment of the then existing research and development by private industry in each area of research and development specified in this Act;

An assessment of the then-existing research and development supported by the Federal Government under other authority which is related to the research and development specified in this Act;

An assessment of existing procedures and technology which are not currently in use in automotive propulsion systems, but which may by technology transfer be effectively applied to achieve the research and development objectives specified in this Act;

Identification, based on subsections (2) through (5), of specific research and development opportunities and strategies to achieve the objectives specified in this Act;

Funding estimates for the resulting research and development opportunities and strategies in subsection (7), as a function of varying schedules and budgets to achieve the objectives specified in this Act;

Cost-benefit analyses of the research and development opportunities and strategies based on subsection (8);

Procedures for assuring international cooperation in advanced automotive propulsion research and development, consistent with protection of American industry's position in such technology;

A program for analysis of institutional barriers to private research and development and technology transfer in advanced automotive propulsion and for consideration of regulatory reforms to increase such private sector research and development and technology transfer; and

A comprehensive and integrated plan for implementation of the resulting recommended program of Federal research, development and demonstration to achieve the objectives specified in this Act.

Section 5 also requires the Secretary of Transportation to evaluate the posture of the automotive industry in meeting societal needs by the

utilization of current technology and recommend incentive measures to the Congress on an annual basis.

*National Aeronautical and Space Administration*

The bill amends the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) to specifically authorize NASA to utilize the unique competence of its science and engineering systems in the development of advanced automobile propulsion systems.

*Information dissemination*

Section 5 requires the Secretary of Transportation to collect, analyze and disseminate information, data and other materials that may be relevant to the development of advanced automobile propulsion systems or advanced automobiles.

Section 9 provides that the information maintained by ERDA under this Act shall be made available to the public except when disclosure would divulge (1) trade secrets or (2) other proprietary information.

*Transfer of functions*

Section 10 provides that if the electric vehicle research, development and demonstration program should be enacted into law and is placed in agencies other than ERDA it shall be transferred to ERDA within 60 days after the date of enactment of the electric vehicle legislation, and shall be administered as a part of this advanced automotive research and development program.

*Authorization of appropriations*

$20 million is authorized to fund this program for FY 77.

Funds for the remaining four years are to be included in the annual ERDA authorization bills for FY 78 through FY 1981.

---

## III. Background

The largest manufacturing industry in the United States is the automotive industry. In 1974, there were more than 92 million passenger automobiles in use. Statistics show that "Americans overwhelmingly prefer private transportation for job commuting, shopping, necessary errands, business, and recreation. In 1973, four out of every five U.S. households owned one or more passenger automobiles." [1]

Americans depend quite heavily on their automobiles—figures indicate that the total annual trips made in the United States number in the billions, of which 54 percent of the trips are for distances of less than 5 miles; more than 85 percent are for distances of 15 or less miles; and only about 1 percent involve one-way travel of 100 miles or more.[2]

The dependence of Americans on their automobiles is also reflected in a rise in fuel consumption. Table 1 shows the fuel consumption for passenger cars, trucks, and all motor vehicles from 1960 to 1974 (estimated) : [3]

[1] 1975 Automobile Facts and Figures. Detroit, Michigan, 1975. p. 28.
[2] Ibid., p. 41.
[3] Ibid., p. 4.



TABLE 1.—MOTOR VEHICLE FUEL CONSUMPTION

[In millions of gallons]

| Year | Passenger cars | Trucks | All motor vehicles |
|---|---|---|---|
| 1960 | 41,169 | 15,832 | 57,878 |
| 1961 | 42,033 | 16,443 | 59,306 |
| 1962 | 43,771 | 17,089 | 61,697 |
| 1963 | 45,246 | 18,432 | 64,516 |
| 1964 | 47,567 | 19,470 | 67,901 |
| 1965 | 50,206 | 19,935 | 71,104 |
| 1966 | 53,220 | 20,416 | 74,623 |
| 1967 | 55,007 | 21,673 | 77,693 |
| 1968 | 58,413 | 23,482 | 82,938 |
| 1969 | 62,325 | 24,727 | 88,122 |
| 1970 | 65,649 | 25,600 | 92,328 |
| 1971 | 69,213 | 27,086 | 97,547 |
| 1972 | 73,121 | 30,718 | 105,062 |
| 1973 | 77,619 | 31,615 | 110,473 |
| 1974 estimate | 71,972 | 33,585 | 106,832 |

Note: All motor vehicles includes fuel consumed by buses and motorcycles.

Source: U.S. Federal Highway Administration and Motor Vehicle Manufacturers Association of the U.S. Inc.

In mid-October 1973, the Organization of Petroleum Exporting Countries (OPEC) imposed an export embargo which quadrupled the price of imported crude oil. A large portion of this crude oil is used by the transportation sector, i.e., approximately 25 percent of the total primary energy produced in the United States is used for propulsion power (*see* Table 2).

TABLE 2.—ENERGY INPUT TO THE U.S. ECONOMY, 1970 TO 1974, AND PROJECTIONS 1975 TO 2000, BY CONSUMING SECTOR AND ENERGY SOURCE

[In quadrillions of British thermal units, except percent. A B.t.u. is the quantity of heat required to raise the temperature 1 lb of water 1° F. at or near its point of maximum density]

| Item | 1974 (preliminary) | 1970 | 1971 | 1972 | 1973 | Projections 1975 | 1980 | 1985 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Total gross energy input | 73.2 | 67.1 | 68.7 | 71.9 | 74.7 | 80.3 | 96.0 | 116.6 | 191.9 |
| By consuming sector: | | | | | | | | | |
| Net energy consumption | 59.9 | 56.2 | 57.0 | 59.4 | 61.3 | 65.1 | 76.1 | 89.7 | 104.1 |
| Nonfuel uses [1] | 4.4 | 3.9 | 3.9 | 4.2 | 4.4 | 4.7 | 5.4 | 6.4 | 10.7 |
| Percent of total | 7 | 6 | 6 | 6 | 7 | 6 | 6 | 5 | 6 |
| Residential and commercial | 17.6 | 17.0 | 17.4 | 18.1 | 18.9 | 20.2 | 23.9 | 27.7 | 39.6 |
| Percent of total | 24 | 25 | 25 | 25 | 24 | 25 | 25 | 24 | 21 |
| Industrial | 24.1 | 22.5 | 22.3 | 23.2 | 24.3 | 25.9 | 29.4 | 34.9 | 57.8 |
| Percent of total | 33 | 34 | 32 | 33 | 33 | 32 | 31 | 30 | 30 |
| Transportation | 18.3 | 16.5 | 17.1 | 18.1 | 18.9 | 19.1 | 22.9 | 27.1 | 42.7 |
| Percent of total | 25 | 25 | 25 | 25 | 25 | 24 | 24 | 23 | 22 |
| Conversion losses [2] | 13.3 | 11.0 | 11.7 | 12.5 | 13.4 | 15.1 | 19.9 | 26.9 | 51.8 |
| Percent of total | 18 | 16 | 17 | 17 | 18 | 19 | 21 | 23 | 27 |
| By energy source: | | | | | | | | | |
| Coal | 13.2 | 12.7 | 12.0 | 12.4 | 13.3 | 13.8 | 16.1 | 21.5 | 31.4 |
| Petroleum | 33.5 | 29.5 | 30.6 | 33.0 | 34.2 | 36.1 | 42.2 | 50.7 | 71.4 |
| Domestic supply | 21.1 | 22.1 | 22.2 | 21.9 | 21.4 | 22.1 | 23.8 | 23.6 | 21.2 |
| Supplemental supply [3] | 12.4 | 7.4 | 8.4 | 11.1 | 13.5 | 13.0 | 18.4 | 27.1 | 50.2 |
| Percent of total | 37 | 25 | 27 | 34 | 39 | 37 | 44 | 53 | 70 |
| Natural gas | 22.2 | 22.0 | 22.8 | 23.0 | 22.7 | 25.2 | 27.0 | 28.4 | 34.0 |
| Domestic supply | 21.4 | 21.2 | 21.8 | 22.0 | 21.7 | 22.6 | 23.0 | 22.5 | 22.9 |
| Gas imports | .8 | .8 | 1.0 | 1.0 | 1.0 | 2.6 | 4.0 | 5.9 | 11.1 |
| Percent of total gas | 4 | 4 | 4 | 5 | 4 | 10 | 15 | 19 | 28 |
| Nuclear power | 1.2 | .2 | .4 | .6 | .9 | 2.6 | 6.7 | 11.8 | 49.2 |
| Hydropower | 3.1 | 2.6 | 2.9 | 2.9 | 3.0 | 3.6 | 4.0 | 4.3 | 6.0 |

[1] Primarily asphalt and road oil in the residential and commercial sector, chemical feedstocks in the industrial sector, and lubes and greases in the transportation sector.
[2] Losses caused by converting a primary energy source to a secondary energy source.
[3] From imports, shale oil, coal liquefaction, etc.

Source: U.S. Department of the Interior, "United States Energy Through the Year 2000" and U.S. Bureau of Mines "Minerals Yearbook and Mineral Industry Survey."

Our increasing consumption of fuel, our dependence upon the automobile, and the crisis resulting from the OPEC embargo precipitated several legislative actions, among these being the current legislation, H.R. 9174, the "Automotive Research and Development Act of 1975." It is the intent of this legislation to provide the means for a research and development effort on advanced alternatives that can meet the long-term goals of the Nation with respect to safety, environmental protection, and energy conservation.

The internal combustion engine now used has been improved to reflect the standards mandated in the Clean Air Act for reducing environmental pollution, and the automotive industry has pledged improvement in fuel economy before 1980. However, this improvement in fuel economy may not be sufficient to reduce our dependence on foreign imports, so other propulsion systems, which will not require the quantities of fuel now used, should be investigated again for possible use in the future. These propulsion systems include gas turbines (Brayton cycle), Stirling cycle, Diesel, steam (Rankine cycle), electric drive, stratified drive, lean burn, and others. Although industry has carried out research on the alternatives, apparently the incentives were not great enough to permit the large investments of time and/or money that were necessary to bring about fully developed models for some of these alternatives. A review of the literature of the late 19th and 20th centuries, as well as more recent studies of that literature and of that period does not indicate why the internal combustion engine was chosen over the other available types of engines. "At the time of its original selection as the engine of choice, the spark ignition engine had no overall intrinsic advantage over the other types of engines."[4] Therefore, it is possible that sufficient funding for research and development may result in an alternative propulsion system that meets the criteria set forth by the long-term goals of the Nation. The outflow of American dollars for petroleum to be used in our automobiles has made it necessary to provide the impetus for further research and development of alternative propulsion systems.

In view of the critical situation that exists, serious questions have been raised in the Congress about the role of the Federal Government in automotive research and development. One of the most important questions is whether the Federal Government should be involved, and if so, what funding will be appropriate to carry out this research and development? Also, will Government involvement lead to faster results? If so, how much funding will be necessary? Up to the present time, the Federal Government has not provided adequate funding or taken a very active role in automotive research and development, but H.R. 9174, the proposed legislation, will assist in improving this situation.

## IV. History of Federal Automotive Transport Research and Development

Prior to the energy crisis, Federal automotive research and development were carried out on a low level. For the period 1969–1974,

[4] U.S. Congress. Senate. Committee on Public Works. History and Future of Spark Ignition Engines. Report prepared for the Committee by the Environmental Policy Division of the Congressional Research Service, Library of Congress. Washington, U.S. Govt. Print. Off., September 1973. p. 1.



EPA funding for alternative automotive fuels and power systems R&D programs totaled $35.445 million. (See Table I.)[6]

*Table I.—Alternative automotive fuels and power systems research and development programs—fiscal summary—fiscal years 1969–74*

| Activity: | Obligation (in millions) |
|---|---|
| Rankine cycle systems | $17.267 |
| Brayton cycle systems | 10.169 |
| Diesel cycle systems | .060 |
| Stratified charge combustion process | .798 |
| Heat engine/flywheel systems | .642 |
| Heat engine/electric systems | 1.124 |
| Battery powered electric systems | 1.166 |
| Improved energy conversion and utilization subsystems | .423 |
| Alternative fuels program | 1.229 |
| Federal clean car incentive program | .050 |
| Annual status of technology documentation | .470 |
| Research grants | .848 |
| Engineering support | 1.189 |
| Total | 35.445 |

Beginning with fiscal year 1974, automotive R&D funding appeared in the budgets of several agencies that had not been involved previously in a significant way. For example, NASA (1974 fiscal year funding was $2 million); DOT (fiscal year funding was $1.8 million); NSF (has funded battery research since 1971, 1974 fiscal year funding was $1.7 million). DOD, Army Tank-Automotive Command, has provided technical support to other government agencies for developing ground propulsion engines (fiscal year 1974 funding in projects with military objectives but with a potential spin-off to civilian automotive energy application was $4.2 million).[6]

Under the Energy Reorganization Act of 1974 (42 U.S.C. 5787), there was a realignment of activities concerned with automotive R&D from other agencies to the new ERDA. For example, the Division of Electrical Systems was transferred from the Department of the Interior, while the Advanced Automotive Power Systems Division was transferred from the Environmental Protection Agency to ERDA. These two divisions, now the Electrical Energy Systems and Transportation Energy Conservation Divisions, respectively, have been reoriented and broadened in scope to interact more effectively with the total ERDA mission of creating new energy options for commercial use. The remaining programs in the ERDA Conservation programs have been created from non-existent or fragmented research and development activities from the AEC and the NSF.[7]

[5] U.S. Environmental Protection Agency, Office of Air and Waste Management. Mobile Source Air Pollution Control. Alternative Automotive Power Systems Division, Ann Arbor, Michigan. Alternative Automotive Fuels and Power Systems Research and Development Programs. Summary of Fiscal Obligations, June 30, 1974. p. A–7.

[6] U.S. Congress, House, Committee on Science and Astronautics, Subcommittee on Space Science and Application. Research on Ground Propulsion System. Hearings, 93rd Congress, 2d Session. Washington, U.S. Govt. Print. Off., February 1974; pp. 115–116.

[7] U.S. Congress. House. Committee on Science and Technology. Authorizing Appropriations for the Energy Research and Development Administration for Fiscal Year 1977. Report Together With Additional Views. 94th Congress, 2d Session. Washington, U.S. Govt. Print. Off., May 3, 1976. p. 131. House Report 94–1081, Part II.

Table II shows total funding for conservation R&D programs, including operating expenses for transportation and energy storage (includes electric vehicles) programs. (*See* underlined items in Table II.)[8]

TABLE II.—CONSERVATION RESEARCH AND DEVELOPMENT

[In thousands of dollars]

| Operating expenses | Actual fiscal year 1975 | | Estimated for fiscal year 1976 | | Requested for fiscal year 1977 | | Committee change | | Total fiscal year 1977 committee authorization | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Budget authority | Budget outlays | Budget authority | Budget outlays | Budget authority | Budget outlays | Budget authority | Budget outlays | Budget authority | Budget outlays |
| Electric energy systems and energy storage: | | | | | | | | | | |
| Electric energy system | 15,920 | 5,984 | 17,930 | 12,630 | 20,960 | 17,920 | 0 | 0 | 20,960 | 17,920 |
| Energy storage | 7,177 | 5,669 | 15,568 | 13,200 | 20,840 | 17,920 | 13,800 | 11,700 | 34,640 | 29,620 |
| Subtotal electric energy systems and energy storage | 23,097 | 11,653 | 33,498 | 25,830 | 41,800 | 35,840 | 13,800 | 11,700 | 55,600 | 47,540 |
| End-use and technologies to improve efficiency: | | | | | | | | | | |
| Buildings | 2,400 | 0 | 12,550 | 8,170 | 21,600 | 18,410 | 14,000 | 11,900 | 35,600 | 30,310 |
| Industry | 0 | 0 | 4,200 | 2,000 | 11,430 | 9,260 | 9,500 | 7,100 | 20,930 | 16,360 |
| Transportation | 8,142 | 8,443 | 12,540 | 10,000 | 23,170 | 20,190 | 9,500 | 9,500 | 32,670 | 29,690 |
| Improved conversion efficiency | 2,252 | 529 | 8,900 | 6,870 | 15,000 | 4,300 | 8,150 | 8,000 | 23,150 | 12,300 |
| Subtotal end-use and technologies to improve efficiency | 12,794 | 8,972 | 38,190 | 27,040 | 71,200 | 52,160 | 41,150 | 36,500 | 112,350 | 88,660 |
| Energy Extension Service | 0 | 0 | 0 | 0 | 0 | 0 | 10,000 | 8,000 | 10,000 | 8,000 |
| Price supports for MSW reprocessing | 0 | 0 | 0 | 0 | 0 | 0 | 5,000 | 200 | 5,000 | 200 |
| Total operating | 35,891 | 20,625 | 71,688 | 52,870 | 113,000 | 88,000 | 69,950 | 56,400 | 182,950 | 144,400 |
| Total capital equipment | 550 | 374 | 3,050 | 2,636 | 7,000 | 3,000 | 4,050 | 2,000 | 11,050 | 5,000 |
| Total plant | 0 | 0 | 0 | 0 | 0 | 0 | 8,500 | 1,700 | 8,500 | 1,700 |
| Total conservation | 36,441 | 20,999 | 74,738 | 55,506 | 120,000 | 1,000 | 82,500 | 60,100 | 202,500 | 151,100 |

ERDA has devised a Comprehensive Plan and Program (ERDA–48) which states that conservation is one of two actions which can have substantial positive impact before 1985 on the Nation's efforts to achieve energy independence. Now for the first time some estimates have been made regarding the potential impact of energy conservation R&D programs on our Nation's energy consumption. ERDA estimates that by 1980, there is a potential for saving 2.8–3.6 Quads (1Q=500,000 BPDE, barrels of petroleum equivalents per day) per year (1.4–1.8 million of barrels of oil per day) as a result of proposed ERDA conversion R&D programs. By 1985, the estimate rises to 12.8–17.8 Quads per year (6.3–8.8 million barrels of oil per day). For comparison, the Nation consumed 73 Quads of energy in 1974.[9] Table III[10] shows potential energy savings for the energy storage and transportation energy conservation programs.

[8] Ibid., p. 130.
[9] Ibid., p. 131.
[10] Ibid., p. 132.



TABLE III.—POTENTIAL ENERGY SAVINGS ERDA CONSERVATION

| Conservation programs | Potential energy savings, thousand barrels of oil per day—Fiscal year— | | | | |
|---|---|---|---|---|---|
| | 1977 | 1978 | 1979 | 1980 | 1985 |
| Electric energy systems | | 5–10 | 30–55 | 105–155 | 1,060–1,480 |
| Energy storage | 0–1 | 1–3 | 10–15 | 60–80 | 400–500 |
| Industry conservation | | | 0–1 | 60–100 | 1,800–2,700 |
| Building conservation | 25–40 | 100–150 | 350–500 | 1,000–1,200 | 2,000–2,800 |
| Transportation energy conservation | 10–15 | 45–50 | 80–90 | 150–180 | 480–710 |
| Improved conversion efficiency | | 1–2 | 5–10 | 25–35 | 560–610 |
| Estimated aggregate energy savings | 35–56 | 152–215 | 475–671 | 1,400–1,750 | 6,300–8,800 |

The report, "Conservation and Efficient Use of Energy," (Serial AA), issued in December 1974 as a result of joint hearings of the Committee on Science and Astronautics and the Committee on Government Operations concluded that—

> * * * by 1980, the compounded rate of energy growth must be reduced to 2 percent annually through energy conservation, and that a comprehensive, long-term effort to utilize energy more efficiently would be required to achieve this goal.

The report recommended placing high priority on research, development, and demonstration programs to achieve more energy efficiency in transportation systems, buildings, and industrial processes.

During consideration of the ERDA Authorization bill for fiscal year 1976, the House increased the authorization level for conservation R&D programs from the Presidential request of $38.4 million to $123.2 million: including $12.1 million for Electric Power Transmission, $23.5 million for Advanced Transportation Systems, $28.3 million for Energy Storage Systems, $53.0 million for End Use Energy Conservation, and $6.3 million for Improved Conversion Efficiency. The appropriated funds for these programs in FY 1976 were significantly less than the authorization levels.[11]

Funding for the Transportation Energy Conservation subprogram is shown in Table IV.[12]

TABLE IV.—TRANSPORTATION ENERGY CONSERVATION

[In thousands of dollars]

| Fiscal year 1977 | Budget authorizations | Budget outlays |
|---|---|---|
| Operating expenses | 32,670 | 29,690 |
| Capital equipment | 1,000 | 450 |

The Transportation Energy Conservation (TEC) subprogram, described in the recent House report,[13] has been set up to find the means to reduce the large consumption of energy in the transportation sector, to implement the means and to achieve maximum petroleum energy savings in the shortest possible time. The Transportation Sector consumes 25 percent of the total U.S. energy. In 1973, the sector consumed

[11] Ibid.
[12] Ibid., p. 149.
[13] Ibid., p. 149–152.

15.9 Quads and virtually all of this energy was derived from petroleum. This sector is the largest single consumer of petroleum amounting to more than half of the total petroleum used in the Nation annually.

Highway vehicles consume 75 percent of the total energy used in the sector. The 75 percent figure can be subdivided further into 54 percent consumed by automobiles, 20 percent by trucks, and 1 percent by buses. There is enormous leverage for petroleum savings and numerous targets of opportunity for savings in highway vehicles and specifically for autos and trucks. For example, a 1 mpg (mile per gallon) improvement in fuel economy for all autos on the road would result in a petroleum savings of 400,000 BPDE. A similar improvement in fuel economy for long haul Diesel trucks amounts to 83,000 BPDE. Priorities have been defined accordingly.

*Implementation*

Efforts will focus on implementation of the findings obtained in other categories of the transportation R&D program (including hardware) most desirable both for the consumer and industry. The development of marketing technology which emphasizes petroleum energy reductions in the shortest possible time is a vital part of the Transportation Energy Conservation (TEC) program. Understanding the process of commercialization and factors influencing that process along with defining strategies for implementing near-term energy saving devices and technology in the TEC program will be given emphasis.

Specific projects which can be accomplished with the Committee's recommended budget for fiscal year 1977 include:

Complete studies and define strategies for implementing energy savings devices such as: retrofit auto engine electronic computer, miles per gallon meter and retrofit auto engine stratification (clean burning) process;

Conduct cross country demonstrations of energy efficient, clean new auto engines—gas turbine and Stirling cycle systems in small fleets;

Complete evaluations of energy-emissions relationships and make recommendations regarding impact of current standard setting procedures;

Continue to pursue the truck drag reduction marketing work by industry, ensure that institutional barriers do not hinder success; and

Expand ongoing testing and demonstration of electric vehicles in urban environments.

*Heat engine highway vehicle systems*

Research and Development will focus on heat engine development for autos, non-petroleum base fuels utilization, and energy efficient propulsion system components. Expanding the scope of on-going work in gas turbine and Stirling engine development is given priority. These engines are potentially more energy efficient, quieter and cleaner with better performance than conventional systems and have greater multi-fuel capability. Component development includes new transmissions, accessory drive systems, and waste heat utilization which have potential for being introduced into the marketplace early relative to new engines. Successful development efforts will be applicable



to conventional as well as to alternative propulsion systems. The most promising alternative fuels in order of decreasing priority for study are methanol from coal, synthetic gasoline and distillate from coal and shale, and hydrogen.

With the committee's recommended budget in fiscal year 1977, the systems development work for the Stirling cycle system will continue the design work initiated in fiscal year 1976 and will proceed with hardware development. The past development work on the gas turbine will be brought together in fiscal year 1977 with road test of the complete system in three autos. The test results are expected to be highly publicized.

Starting in fiscal year 1977, the engine development activity will concentrate more on the turbine and the Stirling cycle systems. By the end of fiscal year 1977, it is expected that the turbine will be at the point where the mostly metallic turbine will have been proven to be energy efficient (6 percent better than ICE), clean and durable. The need for its continued development lies in fulfilling its potential for up to 50 percent improvement in fuel economy compared to the ICE and this will come mainly with use of ceramics to replace the metal in the high temperature rotating machinery. The successful ceramic heat exchanger development in fiscal year 1976 is one important step in the right direction; however, the more difficult task is to learn how to design components such as turbine wheels which rotate at high speed (60,000 rpm), while at high temperature (2300°F) and to fabricate the components out of ceramic materials with proven reliability and durability. The committee's recommended increase will also permit funding of innovative concepts for improving the ICE, and other components of the drive-train.

*Electric and hybrid highway systems*

Development efforts will focus on improving existing and developing new propulsion systems for autos, trucks and buses which employ complete or partial electrification as the energy source stored on-board the vehicle. The pace of work toward improving electric vehicle efficiencies and performance through systems and component R&D will be increased. Since only 17% of our Nation's electricity generation uses petroleum energy these new systems would permit the current major consumer of petroleum energy, the auto, to shift to a new fuel base and in effect to use any alternative energy source (solar, geothermal, etc.).

The overall plan for the electric systems development in fiscal year 1977 calls first for taking the current commercially available, limited range, electric vehicles as a baseline or reference point for the state of the art technology. Projected improvements above the baseline on a component and system basis form the performance and cost objectives for the electric vehicle program. Then, a set of electric vehicle specifications will result. As the development program proceeds toward meeting the objectives (or the spec) the improved components will be tested and performance verified on a baseline electric vehicle with vehicle performance continually upgraded. Not every improved component can be tested on the baseline vehicle. A system development effort will be conducted in parallel with the component development efforts to

ensure that the end product of the component improvements will result in a completely new electric vehicle of high performance and reliability, low life cycle costs and having the potential for low cost production. The completion of testing and initiation of demonstration of this advanced electric vehicle is planned for 1980. This same basic approach of using a baseline vehicle as a test bed for verifying component improvements while running a completely new system development in parallel is similar to that which has been successfully used on the TEC gas turbine program.

The plan for hybrid system development takes a different approach because the technologies needed for a practical hybrid system have not been developed and integrated into a reasonable baseline hybrid vehicle. As a result, the plan for fiscal year 1977 calls for a step-by-step development of certain key components (e.g. practical and efficient flywheels) and vertification testing before commitment is made to procure expensive system hardware.

Committee action, on the conservation budget, resulted in increased funding for various programs because it was pointed out that past funding levels had been insufficient. Now is the time to invest sufficient funds in conservation R&D to insure that each worthy project is adequately supported.[14]

For the Energy Storage subprogram, additional funding will be used for longer range ERDA objectives in the areas of electric cars, particularly in the area of advanced storage systems, including the lithium/metal sulfide battery, the sodium/sulfur battery, etc. Table V [15] shows the funding for this subprogram.

TABLE V.—ENERGY STORAGE

[In thousands of dollars]

| Fiscal year 1977 ERDA authorization | Operating expenses | | Plant and capital equipment | | Combined total | |
|---|---|---|---|---|---|---|
| | Budget authorization | Budget outlays | Budget authorization | Budget outlays | Budget authorization | Budget outlays |
| Fiscal year: | | | | | | |
| 1975 | 7,177 | 5,669 | 210 | 174 | 7,387 | 5,843 |
| 1976 | 15,568 | 13,200 | 750 | 591 | 16,318 | 13,791 |
| 1977 request | 20,480 | 17,920 | 1,500 | 600 | 22,340 | 18,520 |
| Committee increase | 13,800 | 11,700 | 1,200 | 600 | 15,000 | 12,300 |
| Total committee recommendation | 34,640 | 29,620 | 2,700 | 1,200 | 37,340 | 30,820 |

For the TEC subprogram, the Committee added $10 million to fund R&D efforts in a wide range of highway and nonhighway transportation programs efforts. For highway transportation programs, the funds will be used for the gas turbine engine, the Stirling cycle, electric vehicles, expansion of alternative fuels utilization work, including the addition of joint Federal-State demonstrations and hydrogen-use research, etc. Table VI [16] shows funding for this program.

[14] Ibid., p. 159.
[15] Ibid., p. 160.
[16] Ibid., p. 164.



TABLE VI.—TRANSPORTATION ENERGY CONVERSION

[In thousands of dollars]

| Fiscal year 1977 ERDA authorization | Operating expenses | | Plant and capital equipment | | Combined total | |
|---|---|---|---|---|---|---|
| | Budget authorizations | Budget outlays | Budget authorizations | Budget outlays | Budget authorizations | Budget outlays |
| Fiscal year: | | | | | | |
| 1975 | 8,142 | 8,443 | 0 | 0 | 8,142 | 8,443 |
| 1976 | 12,540 | 10,000 | 400 | 400 | 12,940 | 10,400 |
| 1977 request | 23,170 | 20,190 | 500 | 200 | 23,670 | 20,390 |
| Committee increase | 9,500 | 9,500 | 500 | 250 | 10,000 | 9,750 |
| Total committee recommendation | 32,670 | 29,690 | 1,000 | 450 | 33,670 | 30,140 |

## V. Legislative History

### A. Legislation Related to H.R. 9174

*Legislation in the 94th Congress*

In the 94th Congress, a variety of bills have been introduced that relate to research and development programs leading to advanced automotive prototypes, research and development of ground propulsion systems, and research, development, and demonstration of electric vehicles.

H.R. 9174 (Messrs. McCormack, Teague, Mosher, and Goldwater). Introduced July 31, 1975. Automotive Transport Research and Development Act of 1975. To establish a research and development program leading to advanced automobile prototypes. The bill authorizes $55,000,000 for fiscal year 1976; $20,000,000 for the transitional quarter ending September 30, 1976; and $100,000,000 for fiscal year 1977. (Referred to the House Committee on Science and Technology.)

Similar legislation, S. 1883, Title II, was introduced in the Senate on June 5, 1975, by Mr. Magnuson et al., and referred to the Senate Committee on Commerce.

In addition, S. 3267, was introduced in the Senate on April 7, 1976, by Mr. Tunney, and referred to the Senate Committee on Commerce.

Other legislative proposals, dealing with alternative propulsion systems for automobiles that have been introduced are:

H.R. 738 (Mr. Murphy (New York)). Introduced January 14, 1975. Authorizes and directs the National Aeronautics and Space Administration to conduct research and to develop ground propulsion systems which would serve to reduce the current level of energy consumption.

H.R. 891 (Mr. Price). Introduced January 14, 1975. Identical to H.R. 738.

H.R. 1109 (Mr. Teague). Introduced January 14, 1975. "Automotive Energy Research and Development Act of 1975."

H.R. 1111 (Mr. Teague). Introduced January 14, 1975. Authorizes the Administrator of the Energy Research and Development Administration to establish a grant program for research and development of guidelines to conserve energy by reducing air drag on trucks.

H.R. 1283 (Mr. Fish). Introduced January 14, 1975. Amends title

23 of the United States Code to authorize a grant program for research and development of alternative fuels for motor vehicles.

H.R. 1617, Title III (Mr. Moss (California), et al.) Introduced January 17, 1975. Amends the titles to the Federal Trade Commission Act and the Motor Vehicle Information and Cost Savings Act.

H.R. 3875 (Mr. Moss (California), et al.) Introduced February 27, 1975. Identical to H.R. 1617.

H.R. 5557 (Mr. Brown (California)). Introduced March 20, 1975. "Ground Propulsion Systems Research, Development, and Demonstration Act of 1975."

H.R. 6158 (Mr. Brown (California)). Introduced April 18, 1975. Authorizes the Administrator of the Energy Research and Development Administration to undertake, in cooperation with the National Aeronautics and Space Administration, and other Federal agencies, a program of research, development, and demonstration of ground propulsion systems which would serve to reduce the current level of energy consumption.

H.R. 6159 (Mr. Brown (California)). Introduced April 18, 1975. Identical to H.R. 6158.

H.R. 6354 (Mr. Corman). Introduced April 24, 1975. "Automotive Transport Research and Development Act of 1975."

H.R. 7231 (Mr. Emery). Introduced May 21, 1975. Amends the Federal Nonnuclear Energy Research and Development Act of 1974 for the purpose of authorizing research, development, and demonstration in the field of ground propulsion systems.

H.R. 7506 (Mr. Ottinger). Introduced June 2, 1975. "Alternative Vehicle Propulsion Systems Research and Development Act of 1975."

H.R. 8459 (Mr. Brown (California)). Introduced July 9, 1975. Identical to H.R. 6158.

S. 499 (Mr. Tunney). Introduced January 30, 1975. Amends the Motor Vehicle Information and Cost Savings Act.

S. 783 (Mr. Domenici, et al.). Introduced February 20, 1975. "Ground Propulsion Systems Research, Development and Demonstration Act of 1975."

S. 1115 (Mr. Domenici, et al.). Introduced March 7, 1975. Amends the Federal Non-nuclear Energy Research and Development Act of 1974, so as to authorize research, development, and demonstration in the field of ground propulsion systems.

S. 1149, Title XII (Messrs. Humphrey and Jackson). Introduced March 11, 1975. Provides for a national fuels and energy conservation policy, establishes a national energy conservation program.

S. 3145 (Mr. Church, et al.). Introduced March 16, 1976. Established energy conservation research, development, and demonstration institutes, creates a cooperative energy extension service, promotes a more adequate national program of research, development, and demonstration in technologies related to energy conservation, and for other purposes.

S. Con. Res. 37 (Mr. Scott). Introduced May 8, 1975. Institutes a program of research to develop a passenger car more efficient than existing alternatives for inter- and intra-city use.

In addition, the following legislation has been introduced on electric vehicles:



H.R. 8800 (clean bill for H.R. 5470 (Messrs. McCormack, Brown, (California), Teague, Mosher, and Goldwater)). Introduced July 22, 1975. The Electric Vehicle Research, Development, and Demonstration Act of 1975. To date, action on this bill has been as follows:

July 31, 1975—Reported to House from Committee on Science and Technology with Amendment, H. Rept. 94–439;

September 5, 1975—Measure called up by special rule in House;

September 5, 1975—Measure consider in House;

September 5, 1975—Measure passed House, amended, roll call No. 496 (308–60);

September 8, 1975—Referred to Senate Committee on Commerce.

Identical bills to H.R. 5470 (H.R. 8800) include H.R. 6031, H.R. 6198, H.R. 6315, H.R. 6531, H.R. 7961, and H.R. 8214.

*Legislation in Earlier Congresses*

Three bills authorizing a program of research and development of alternative propulsion systems for automotive vehicles in commerce were introduced in the 93rd Congress:

H.R. 5929 (Mr. Corman). Introduced March 21, 1973. This companion bill to S. 1055 was referred to the House Committee on Interstate and Foreign Commerce. The bill did not pass.

S. 1055 (Messrs. Tunney and Magnuson). Introduced February 28, 1973 and referred to the Senate Committee on Commerce. The bill did not pass.

H.R. 7382 (Mr. Moakley). Introduced May 1, 1973. Referred to the House Committee on Interstate and Foreign Commerce. The bill did not pass.

H.R. 10392 (Mr. Brown (California)) and companion bills to authorize NASA to conduct R&D to develop ground propulsion systems to reduce energy consumption. Referred to the Committee on Science and Astronautics. Hearings were held on June 11, 12, 13, and 18, 1974. No further action was taken.

In the 92d Congress, one bill, authorizing a program of research, development, and demonstration projects for non-polluting motor vehicles was introduced.

H.R. 6601 (Mr. Dellums). Introduced March 23, 1971. Referred to the House Committee on Interstate and Foreign Commerce. The bill did not pass.

No relevant bills were introduced in the 91st Congress.

In the 90th Congress, several bills were introduced that would authorize a program of research, development, and demonstration of electrically powered vehicles.

H.R. 2899 (Mr. Ottinger). Introduced January 18, 1967. Referred to the House Committee on Interstate and Foreign Commerce.

H.R. 6777 (Mr. Adams). Introduced March 8, 1967. Identical to H.R. 2899. The bill did not pass.

H.R. 7222 (Mr. Corman). Introduced March 15, 1967. Identical to H.R. 2899. The bill did not pass.

H.R. 8442 (Mr. Fino). Introduced April 12, 1967. Identical to H.R. 2899. The bill did not pass.

H.R. 4141 (Mr. Rogers [Fla]). Introduced January 30, 1967. Similar to H.R. 2899. The bill did not pass

H.R. 4254 (Mr. McCarthy). Introduced January 31, 1967. Similar to H.R. 2899. The bill did not pass.

H.R. 6136 (Mr. Brown). Introduced February 27, 1967. Identical to H.R. 2899. The bill did not pass.

H.R. 6987 (Mr. Minish). Introduced March 9, 1967. Identical to H.R. 2899. The bill did not pass.

H.R. 11055 (Mr. Conte). Introduced June 21, 1967. Identical to H.R. 2899. The bill did not pass.

In addition, hearings were held on two bills introduced in the Senate:

S. 451 (Messrs. Muskie, Gruening, and Magnuson). Introduced January 17, 1967, to authorize an investigation and study to determine means of propelling vehicles so as not to contribute to air pollution. The bill did not pass.

S. 453 (Messrs. Magnuson and Muskie). Introduced January 17, 1967 to authorize a program of research, development and demonstration projects for electrically powered vehicles. The bill did not pass.

In the 89th Congress, the first bills dealing with electric vehicles were introduced.

H.R. 17702 (Mr. Ottinger). Introduced September 13, 1966 to authorize a program of research, development and demonstration of electrically powered vehicles. Referred to the House Committee on Interstate and Foreign Commerce. The bill did not pass.

H.R. 18228 (Mr. Rogers [Fla.]). Introduced October 6, 1966. Referred to the House Committee on Interstate and Foreign Commerce. The bill did not pass.

S. 3785 (Mr. Magnuson). Introduced August 30, 1966. Companion bill to H.R. 18228. Referred to the Senate Committee on Commerce. The bill did not pass.

S. 3911 (Messrs. Muskie and Randolph). Introduced October 14, 1966 to amend the Clean Air Act in order to authorize an investigation and study to determine means of propelling vehicles so as not to contribute to air pollution. Referred to the Senate Committee on Public Works. The bill did not pass.

### B. INTRODUCTION OF H.R. 9174

On July 31, 1975, the "Automotive Transport Research and Development Act of 1975," was introduced by Mr. McCormack, Mr. Teague, Mr. Mosher, and Mr. Goldwater.

H.R. 1974 would have established within the Department of Transportation, a 4-year program to insure the development of one or more "production prototypes" of an advanced automobile or advanced automobiles with appropriate research and development techniques, and which use to the maximum extent practicable, nonpetroleum base fuels. The goals of the program are the development of the production prototypes of advanced automobiles, and the certification after testing of these prototypes which are likely to meet the Nation's long-term goals with respect to fuel economy, safety, environmental protection, and other objectives. The funding authorization is not to exceed $55 million for fiscal year ending June 30, 1976; $20 million for the transition quarter ending September 30, 1976; and $100 million for fiscal year ending September 30, 1977.



The bill, as introduced, stated that existing automobiles on the average fall short of meeting the long-term goals of the Nation with respect to safety, environmental protection, and energy conservation, but with a sufficient research and development effort, advanced alternatives to existing automobiles could meet these long-term goals and have the potential to be mass produced at reasonable cost. These automobiles could be operated with significantly less adverse environmental impact and fuel consumption than existing automobiles, while meeting all of the other requirements of the Federal law.

According to the bill, insufficient resources are being devoted to this endeavor by both the Federal Government and industry. An expanded research and development effort by the Federal Government into advanced automobiles and automobile components would complement and stimulate corresponding efforts by the private sector. Under H.R. 9174, the Secretary of Transportation would (1) make contracts and grants for research and development efforts which are likely to lead to or contribute to the development of an advanced automobile or advanced automobiles; (2) make obligation to guarantee loans for research and development efforts which show promise of leading or contributing to the development of advanced automobiles; and (3) establish and conduct new projects and accelerate existing projects within the Department of Transportation (DOT) which may contribute to the development of production prototypes. Testing and certification of the prototypes would have been carried out, and relevant information, data, and materials would have been collected, analyzed, and disseminated to the developers. New and improved technology leading to or contributing to the development of an advanced automobile would have been evaluated.

As introduced the bill provided that the Secretary of DOT would coordinate work being done by ERDA to prevent duplication. The Secretary of DOT and the Administrator of EPA would test or provide testing in facilities suitable to them, of each production prototype of an automobile developed in whole or in part with Federal assistance. A Vehicle Certification Board would certify such an automobile as an advanced automobile or issue a denial of such certification with the reasons therefor.

Title to inventions would vest in the United States, if the Secretary determined that the work was done with Federal funding. The exact conditions were spelled out.

Results of activities would be reported to Congress annually on or before July 1 of each year. The report would include, but not be limited to (1) the state of automobile research and development in the United States, (2) the number and amount of contracts and grants made and of obligations guaranteed; (3) the progress made in developing production prototypes of advanced automobiles within the shortest practicable time after the date of enactment of the title; and (4) suggestions for improvement in advanced automobile research and development and recommendations for legislation.

### C. HEARINGS ON H.R. 9174 AND RELATED LEGISLATION

Hearings on H.R. 9174 and related legislation—H.R. 1109, 5557, 6158, 6159, 6354, 6558, 7231, and 8459—were held on March 17 and 18,

1976. Testimony was presented by witnesses representing government agencies and universities, and supplementary statements were provided by vehicle manufacturers, small business, and individuals.

The witnesses who presented testimony during these hearings are listed below:

March 17: 9 to 11:00 a.m., rm. 2325, RHOB:

*Report on MIT Study, "The Role for Federal R&D on Alternative Automotive Power Systems":* Dr. Lawrence Linden, MIT Energy Laboratory, Massachusetts Institute of Technology, Cambridge, Massachusetts.

*Report on JPL Study "Should We Have a New Engine?":* Dr. Rhoads Stephenson, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California.

March 18: 10 a.m., rm. 2325, RHOB:

Mr. Hamilton Herman, Assistant Secretary for Systems Development and Technology, Department of Transportation, Washington, D.C.

Mr. Roll D. Ginter, Acting Assistant Administrator for Energy Programs, National Aeronautics and Space Administration, Washington, D.C.

Mr. Austin N. Heller, Assistant Administrator for Conservation, Energy Research and Development Administration, Washington, D.C.: Accompanied by Mr. John Brogan, Division of Transportation Energy Conservation.

In addition, written testimony was received from the following:

Mr. Richard D. Burtz, General Manager, Steam Power Systems, Inc., 7617 Convoy Court, San Diego, California.

General Motors Corporation, Detroit Michigan.

Mr. Jack I. Hope, General Manager, CFM56 Program Department, General Electric Company, Cincinnati, Ohio.

Mr. Rodney W. Markley, Jr., Vice President, Washington Staff, Ford Motor Company, 815 Connecticut Avenue, NW., Washington, D.C.

Dr. Phillip S. Meyers, Professor of Mechanical Engineering, College of Engineering, University of Wisconsin, 1513 University Avenue, Madison, Wisconsin.

Dr. Robert F. Sawyer, Professor, College of Engineering, Mechanical Engineering, University of California, Berkeley, California.

Mr. F. A. Stewart, Vice President, Government Affairs, American Motors Corporation, 14250 Plymouth Road, Detroit, Michigan.

Mr. Don Wildermuth, Vice President, Engineering, Lear Motors Corporation, P.O. Box 10600, Reno, Nevada.

Mr. J. D. Withrow, Jr., Director Research, Product Planning and Development Office, Chrysler Corporation, P.O. Box 1118, Detroit, Michigan.

One of the most important conclusions produced by these hearings was that there is a real need for Federal Government support of automotive research and development. The testimony also indicated that there is a need for cooperation between the Federal Government, industry, and academia. It was pointed out in the testimony that the Federal Government should fund at an adequate level, the long-term options, including basic research on ceramics, combustion, etc.



Witnesses also felt that the automotive research and development program should be started immediately, without waiting for the OTA or other study results and recommendations.

The need to coordinate the proposed program with on-going programs in ERDA and DOT was discussed. It was felt that another program was not needed, but that these programs should be expanded.

A number of witnesses felt that the Federal Government should not be involved in the development of a "production prototype." This would be accomplished better by the manufacturers who have the expertise to carry out the results of any research in this field. It was also pointed out that the time period allowed was inadequate for developing the production prototype.

Several witnesses indicated that in choosing alternatives to be developed, the Brayton (gas turbine engine) and the Stirling cycle engine would be satisfactory. Funding for these choices, i.e., the Brayton and the Stirling engines, as well as the total funding for automotive research and development, was on the order of $30 million per year for each engine, with the total funding ranging from $100 to $200 million over the next 5 to 10 years. Witnesses also indicated that there should be separate contractors for each engine. Witnesses also felt that increasing the funding for the research and development would not reduce the time in achieving the goal, i.e., of getting an advanced automobile faster.

Other issues identified by witnesses included consideration of the role of small business; using the knowledge obtained from aerospace technology, expertise and capability of NASA; modification of the patent policy; and others.

Testimony given at these hearings was in keeping with published comments from several sectors. For example, the JPL study [17] points out that—

> The industry could pay for this development program (leading to new sources of energy) and, from an analysis of the potential for increased profits, this level of expenditure seems warranted. However, it is not at all obvious that they *will* do so—given sales slumps, reduced budgets, and their historical interest in short-term-payoff R&D. It is in the national interest that these alternate engine development programs be successfully completed. Thus, government should provide incentives and/or share in the funding to ensure that this program *will* be accomplished. Ongoing automotive programs, sponsored by DOT and ERDA, provide ample precedent for governmental involvement. An appropriate government laboratory should monitor progress and participate in program direction at key decision points.

In a paper issued by the Federal Energy Administration (FEA),[18] it was recommended that "the government adopt a strong leadership position in this area (automotive research and development) in order

---

[17] California Institute of Technology. Jet Propulsion Laboratory. Should We Have a New Engine? An Automobile Power System Evaluation. Volume I. Pasadena, California, August 1975. p. 86–87. JPL SP 43–17.

[18] U.S. Federal Energy Administration. Energy Research and Development Office. The Role of the Federal Government in Automotive Research and Development. [Washington] November 6, 1974. p. 1.

to assure an adequate, but environmentally benign personal transportation system for the Nation during the period out to the year 2000 and beyond." The FEA paper also indicated that—

> * * * To generate the necessary new technology, a national R. & D. investment of $150 million per year for the next 25 years or so will be required. Private industry is (prior to the current economic squeeze) investing on the order of one-third of this amount, concentrated in the near-term aspects of development. Furthermore, the integration of the national objectives of energy efficiency, alternatives to petroleum, and minimum environment impact into a coherent long-term program in R. & D. requires perspectives and responsibilities well beyond those of the private automobile companies, whose objectives are rooted in the market place. * * * [19]

The automobile companies in hearings [20] last year, indicated the need for Government assistance. For example, Sydney L. Terry of the Chrysler Corporation,[21] indicated that—

> The most effective way of achieving an automobile—or a variety—that is clean, efficient, and economical is a thoughtful division of research and development work between Government and industry. We do not want to compete with NASA. We like the working relationship we have with the EPA for research and development, and we hope, that if NASA is empowered to do automotive research our relationship with NASA will be as friendly and productive as it has been for more than a decade in the manned space program.

Earnest S. Starkman of General Motors Corporation, in these same hearings, [22] pointed out that—

> In searching for the best role that Government could play in automotive powerplants R. & D., it appears to us that there has been a neglect of two areas in the present EPA program. First, we believe Government research should concentrate more in fundamental areas. There is a real need today for more work to be done in such areas as combustion, materials, heat exchange, electrochemistry, catalysts and hydrogen generation, and storage. Progress must be made in these areas before competitive alternative powerplants can be built to survive in the marketplace.
>
> We question the need for the Government to develop prototypes of products for ultimate sale in a competitive market. Private industry is better equipped and sufficiently motivated to respond to that phase of the problem. Government research of a basic type, in areas which now represent critical bottlenecks in the industry's efforts on advanced powerplants, would supplement rather than duplicate the efforts of industry and thus make real contributions to progress.

[19] Ibid., p. ii.
[20] U.S. Congress. House. Committee on Science and Astronautics. Subcommittee on Space Science and Applications. Research on Ground Propulsion Systems. Hearings. 93rd Congress, 2d Session. Washington, U.S. Gov't Print. Off., 1974.
[21] Ibid., p. 250.
[22] Ibid., p. 318.



The Ford Motor Company representative, Donald A. Jensen, indicated that "we feel very strongly that the Government has a role in this field. We do not know exactly what the role should be in relation to the private sector. . . ." [23] Jensen also indicated that "there needs to be some coordination and prioritization of research and development programs of ground propulsion systems." [24]

*Funding*

In addition to the proposed Federal expenditures of $150,000,000 per year for 25 years or so suggested by the FEA report, other proposals for Federal funding suggest "$30,000,000 or $40,000,000 or more, if it can be effectively administered." This funding was proposed by Dr. David Ragone, Dean of the University of Michigan Engineering School, and Head of the Advisory Committee to the Advanced Automotive Power Systems, in a recent letter to Dr. Russell Peterson, Chairman of the Council on Environmental Quality.[25]

Dr. Ragone also stated that—

> * * * the Committee believes that a program expanding to an annual level of $100 million is both desirable and possible within the next 3 or 4 years.

Dixy Lee Ray, past Chairman of the Atomic Energy Commission in a report for President Nixon entitled the Nation's Energy Future, estimated that funding for advanced propulsion systems should be $53 million in fiscal year 1975 and a total of $300 million for fiscal year's 1975 through 1979.

In the M.I.T. study on the role of the Federal Government,[26] it is indicated that—

> There is therefore convincing justification for Federal support for R & D on alternative automotive powerplants. Some alternative engine technologies are not receiving adequate attention within the automobile industry for sound reasons which are unlikely to change; a government program can support projects which are justifiable from a public standpoint but not a private one. Such a program can make substantial contributions to national air pollution abatement and fuel conservation goals by advancing the state-of-the-art of selected engine technologies and by producing the technical data necessary for developing regulations and other policies.

As far as funding is concerned, the M.I.T. report concluded that "a rough estimate of number of projects and project costs suggest that a two- to five-fold increase above current alternative powerplant funding—to between $15 and $35 million annually—would be required." [27]

[23] Ibid., p. 285.
[24] Ibid., p. 284.
[25] U.S. Congress. Senate. Committee on Commerce. Automobile Fuel Economy and Research and Development Act of 1975. 94th Congress, 1st Session. Washington, U.S. Govt. Print. Off., June 5, 1975. p. 15. Senate Report 94-179.
[26] Massachusetts Institute of Technology. The Role for Federal R & D on Alternative Automotive Power Systems. by John B. Heywood, et al. Cambridge, Massachusetts, November 1974. p. iv.
[27] Ibid.

## VI. Committee Actions

### A. Subcommittee Actions

The Subcommittee on Energy Research, Development and Demonstration met on May 4, 5, and 6, 1976 to mark up H.R. 9174, and related bills. During the mark up sessions a number of changes to H.R. 9174 were adopted and were incorporated into a clean bill, H.R. 13365. The major changes made in H.R. 9174 are described below.

In H.R. 13365, the program is established in the Energy Research and Development Administration while in H.R. 9174 the program was in the Department of Transportation. In H.R. 13365, the program is directed to the development of advanced automobile propulsion systems, whereas H.R. 9174 called for development of an entire advanced automobile. H.R. 9174 called for production prototypes of advanced automobiles in four years, whereas H.R. 13365 is a research and development program established for five years to develop advanced propulsion systems. H.R. 9174 contained a $175 million loan guarantee program; H.R. 13365 has none. H.R. 9174 patent policy is extensively laid out, whereas H.R. 13365 utilizes the patent policy in the Federal Nonnuclear Research and Development Act of 1974.

#### Major differences between H.R. 9174 and H.R. 13365

*Section 1*

H.R. 13365 calls for a five year research and development program leading to advanced automobile propulsion systems; H.R. 9174 does not limit the time of the overall program, and establishes a research and development program leading to production prototypes. H.R. 13365 stands separately; H.R. 9174 amends and becomes part of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 *et seq.*).

*Section 2*

Findings of H.R. 13365 are parallel to those of H.R. 9174, except that the findings pertain to automotive propulsion systems rather than the whole automobile.

The purpose of H.R. 13365 is to establish a five year program for research and development leading to advanced automobile propulsion systems. H.R. 9174 has the stated purpose of authorizing contracts and grants for, and support through loan guarantees, research and development leading to production prototypes of advanced automobiles within 4 years from the date of enactment.

*Section 3*

Definitions are similar except that H.R. 13365 defines "advanced automobile propulsion system," but does not define nor make use of the term "production prototype."

*Section 4*

Under H.R. 13365 the Administrator of the Energy Research and Development Administration would establish a five year research and development program aimed at developing advanced automobile propulsion systems. Under H.R. 9174, the Secretary of Transportation



would establish in the Department of Transportation, a program to develop production prototypes of advanced automobiles within 4 years of enactment.

H.R. 13365 calls for the Administrator to conduct an active industry-government fellowship program providing for exchange of governmental and industrial scientists involved in research and development relating to advanced automotive propulsion systems.

*Section 5*

H.R. 13365 sets forth testing and information dissemination duties of the Secretary of Transportation which are similar to those in H.R. 9174. H.R. 13365 further instructs the Secretary to evaluate the posture of the automotive industry in meeting societal needs by the utilization of current technology, and recommend incentive measures to the Congress on an annual basis.

*Section 6*

Requirements for coordination between the ERDA Administrator and the DOT Secretary are different in H.R. 13365, due to the different roles of the Administrator and Secretary in the two bills.

*Section 7*

H.R. 13365 calls for ERDA (rather than DOT) to make reports as part of its updated annual plan and program. The reporting requirements are similar, but H.R. 13365 requires a program definition for implementing the program.

*Section 8*

H.R. 13365 contains an amendment to the National Aeronautics and Space Act authorizing NASA participation in the development of advanced automobile propulsion systems. The original bill, H.R. 9174, contained no such provision.

*Section 9*

This section contains a provision that the program on electric vehicle research and development shall be transferred to ERDA in case the program, during the legislative process ends up in some other agency. There is no comparable provision in H.R. 9174.

*Section 10*

This section specifies procedures for dissemination of information derived from the R&D program, including provisions for protection of proprietary information.

*Section 11*

As approved by the subcommittee, authorizations would have been: fiscal year 1977 $20 million; fiscal year 1978 $30 million; fiscal year 1979 $35 million; fiscal year 1980 $35 million, and fiscal year 1981 $30 million. H.R. 9174 would have authorized $55 million for fiscal year 1976 and $100 million for fiscal year 1977.

*Other Differences*

H.R. 9174 contained a loan guaranty section which would have allowed the Secretary of Transportation to make loan guarantees. Outstanding indebtedness guaranteed under Section 608 were limited to $175,000,000. There is no loan guaranty program in H.R. 13365.

H.R. 9174 contains extensive discussion (Sec 609) on testing production prototypes. H.R. 13365 has none since there would be no production prototypes produced under it.

H.R. 9174 contains an extensive patent policy section (Sec. 610). H.R. 13365 has none, since patents are covered under Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93–577).

H.R. 9174 contains (Sec. 611) a section on records, audits, and examinations. There is no comparable section in H.R. 13365, as ERDA will use its normal administrative procedures in implementing it.

### B. FULL COMMITTEE ACTIONS

The Committee on Science and Technology considered the clean bill H.R. 13365 (H.R. 9174, as amended by the Subcommittee on Energy Research, Development and Demonstration) on May 11, 1976. The committee approved the bill, with one amendment. That amendment removed specific funding level authorizations totaling $130 million for fiscal years 1978 through 1981 and replaced them with a requirement for annual authorizations for fiscal years subsequent to fiscal year 1977 in the annual authorization for nonnuclear programs in ERDA. A quorum being present, the bill, as recommended, was ordered reported by voice vote.

---

## VII. Section-By-Section Summary of the Bill As Reported

Section 1 of the bill provides that it may be cited by its short title—the "Automotive Transport Research and Development Act of 1976".

### SECTION 2. FINDINGS AND PURPOSES

Subsection (a) of this section sets forth the findings of Congress that—

(1) existing automobile propulsion systems generally fall short of meeting the Nation's long-term goals with respect to environmental protection and energy conservation;

(2) advanced alternatives to existing automobile propulsion systems could with sufficient research and development meet these goals and be mass produced at reasonable cost, and automobiles with advanced propulsion systems could be operated with significantly reduced adverse environmental impact and fuel consumption;

(3) insufficient public and private resources are being devoted to research on and development of these advanced systems;

(4) expanded Federal research and development in this area would stimulate corresponding private efforts and encourage automobile manufacturers to substitute advanced alternatives for existing propulsion systems; and

(5) advanced automobile propulsion systems should be developed, tested, and prepared for manufacture within the shortest practicable time.

Subsection (b) declares that it is the purpose of the bill to make contracts and grants under a 5-year research and development program leading to advanced automobile propulsion systems which are likely to help meet the Nation's long-term goals with respect to fuel economy and supply, environmental protection, and other objectives; to preserve and promote competition in research and development involving both existing and alternative automobiles, systems, and components; and to supplement (but not supplant) private industry's automotive research and development efforts.



### SECTION 3. DEFINITIONS

This section defines various terms used in the bill, including "advanced automobile", "advanced automobile propulsion system", "damage resistance", "fuel economy", "intermodal adaptability", "reliability", and "safety".

An "advanced automobile propulsion system" is an energy conversion system (including engine and drive train) which is used to propel an advanced automobile; and an "advanced automobile" is a fuel-propelled personal-use transportation vehicle which is energy efficient, safe, reliable, damage resistant, and environmentally sound, and which requires the least total amount of energy consumption, can be mass produced at low cost, has a first-owner cost comparable with that of conventional automobiles, operates safely and performs adequately, is capable (to the extent practicable) of intermodal adaptability, and can be produced, distributed, operated, and disposed of in compliance with Federal requirements (particularly those with respect to fuel economy, exhaust emissions, noise control, safety, and damage resistance).

### SECTION 4. DUTIES OF THE ADMINISTRATOR

This section directs the Administrator of the Energy Research and Development Administration to establish within ERDA a 5-year program aimed at the development of advanced automobile propulsion systems which have maximum flexibility in the type of fuel used. For this purpose the Administrator is directed—

(1) to make contracts and grants, with public or private agencies, nonprofit and other institutions and organizations, and other persons, for research and development efforts on advanced automobile propulsion systems which are likely to lead or contribute to the development of advanced automobiles;

(2) to establish within ERDA a research, development, and demonstration program for the development of advanced automobile propulsion systems or advanced automobiles;

(3) to intensify research in key areas of basic science which limit development of these systems;

(4) to utilize the capabilities of Federal laboratories in the conduct of these activities (with up to 60 percent of the funds authorized by the bill being available for this purpose), and to make available facilities and expertise at such laboratories for developing and proof-testing promising components and subsystems;

(5) to conduct an industry-government fellowship program with provision for exchange of governmental and industrial scientists, and to establish procedures for periodic consultation with representatives of science, industry, and other groups having

special expertise in automotive research, development, and technology;

(6) to consider new or improved technologies which could lead or contribute to the development of advanced automobile propulsion systems or their components;

(7) to establish procedures for utilizing the Office of Energy Related inventions at the National Bureau of Standards;

(8) to utilize the capabilities of NASA, the Defense Department, and other Federal agencies and coordinate with them in the conduct of research, development, and demonstration programs, and consult with the Administrator of the Environmental Protection Agency;

(9) to prepare and submit studies as required by the bill; and

(10) to insure that activities under the bill supplement but do not supplant the automotive research and development efforts of private industry.

SECTION 5. DUTIES OF THE SECRETARY

This section directs the Secretary of Transportation to make available facilities and expertise for testing any prototypes which may be developed under the Administrator's contracts, grants, and research, development, and demonstration programs, and to secure certification as advanced automobiles for those which meet applicable requirements. It also directs the Secretary to collect, analyze, and disseminate information, data, and materials relevant to the development of advanced automobile propulsion systems or advanced automobiles, and to evaluate the posture of the automotive industry in meeting societal needs through current technology and annually recommend incentive measures to the Congress.

SECTION 6. COORDINATION BETWEEN THE SECRETARY AND THE ADMINISTRATOR

This section directs the Secretary and the Administrator to consult and cooperate in carrying out their respective duties and responsibilities and to coordinate their respective activities in areas of shared concern, in order that such duties and responsibilities may be performed in a way that will lead to the most effective results under the program in an efficient manner. Such consultation, cooperation, and coordination is not to alter the Administrator's specifically assigned responsibilities under other provisions of the bill, or to reduce his responsibilities for automotive research, development, and demonstration under the Energy Reorganization Act of 1974 and the Federal Nonnuclear Energy Research and Development Act of 1974.

SECTION 7. REPORTS

This section directs the Administrator to submit to Congress an annual report of activities under the bill. Such report is to be submitted as a separate part of the annual report required by section 15(a) of the Federal Nonnuclear Energy Research and Development Act of 1974, and is to include—



(1) a current comprehensive program definition for implementing the bill;

(2) an account of the state of automobile research and development in the United States;

(3) the number and amount of contracts and grants made under the bill;

(4) the progress which has been made in developing advanced automobile propulsion systems and their components; and

(5) suggestions for improvements in advanced automobile research and development, including legislative recommendations.

SECTION 8. AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT

This section amends section 102 of the National Aeronautics and Space Act of 1958 to include an express declaration that the general welfare of the United States requires NASA's unique competence in scientific and engineering systems to be directed toward the development (for the purposes set forth in section 2(b) of the bill) of advanced automobile propulsion systems.

SECTION 9. INFORMATION DISSEMINATION AND PROTECTION OF PROPRIETARY INFORMATION

This section requires that the information maintained by the Administrator under the bill be made available to the public, and to other government agencies, in a manner that will facilitate its dissemination. The Administrator is prohibited, however, from disclosing information which would, if made public, divulge trade secrets or other proprietary information; although he would upon request provide such information to specified Federal officials when necessary for them to carry out their duties and responsibilities (with such officials being prohibited in turn from releasing the information to the public). The section is not to be considered authority to withhold information from Congress or from any committee of Congress upon request of the chairman thereof.

SECTION 10. TRANSFER OF FUNCTIONS

This section provides that, within 60 days after the enactment of the law creating the electric vehicle research, development, and demonstration program (now pending in Congress), all of the authorities and functions of that program (along with related items, to the extent necessary or appropriate) shall be transferred to the Administrator of ERDA in accordance with OMB regulations and exercised by the Administrator as part of the program established by the bill.

SECTION 11. AUTHORIZATION OF APPROPRIATIONS

Subsection (a) of this section authorizes the appropriation of up to $20,000,000 to carry out the bill for the fiscal year 1977, and requires that the sums necessary for that purpose in each subsequent fiscal year be included in the annual authorizations for ERDA's nonnuclear programs.

Subsection (b) requires that any request for these appropriations specify the relationship between the research, development, and demonstration to be supported with such appropriations and any related programs for which appropriations are also requested and which are being supported under the authority of other Federal laws.

## VIII. Vote of the Committee on the Bill

A quorum being present, the Committee, by voice vote, approved the bill as amended.

## IX. Effect of Legislation on Inflation

In accordance with rule XI, clause 2(1)(4) of the Rules of the House of Representatives, this legislation is assessed to have a minimal inflationary effect on prices and costs in the operation of the national economy. The total estimated budget outlays for fiscal year 1977 will not exceed $20 million compared to total budget outlays for ERDA of more than $5 billion in fiscal year 1977. The latter amount represents about 1% of estimated total Federal fiscal year 1977 outlays. For following fiscal years the budget outlays will be on the order of $30 million per year. These amounts represent a small percentage of the anticipated budgets for ERDA and all Federal programs.

Since ERDA activities are conducted by government laboratories, industries, colleges, and universities located throughout the United States and representing various segments of the economy, it is estimated that the increased fiscal year 1977 ERDA outlays would not have a significant inflationary impact on any one particular segment of the economy. Since the capacity of the nation's scientific research and development institutions is not fully utilized at the present time, the funds provided under this bill would not materially contribute to competition for manpower and materials which might contribute to inflation.

The results of the automotive research and development supported by ERDA should contribute to the development of a new industry which should foster competition in the automotive industry with attendant pressures on existing automobile manufacturers to maintain or reduce prices. Technical improvements and breakthroughs as a result of the research and development supported under this act may have an impact on productivity and prices in the auto industry.

## X. Agency Communications

National Aeronautics and Space Administration,
*Washington, D.C., October 23, 1975.*

Hon. Olin E. Teague,
*Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.*

Dear Mr. Chairman: This is in further reply to Mr. John L. Swigert's request for the comments of the National Aeronautics and Space Administration on the bill H.R. 738, "To amend the National Aeronautics and Space Act of 1958 to authorize and direct the National Aeronautics and Space Administration to conduct research and to develop ground propulsion systems which would serve to reduce the current level of energy consumption."



The bill would amend the National Aeronautics and Space Act to authorize and direct NASA to develop ground propulsion systems, including alternative energy sources, which are energy conserving, have clean emission characteristics, and are capable of being mass-produced at a reasonable cost. The bill would authorize $30 million in the aggregate to NASA for fiscal years 1975 through 1978 for this effort.

The Energy Research and Development Administration (ERDA) was established last year for purposes such as those envisioned for NASA in H.R. 738. Congress gave ERDA the responsibility for directing Federal activities relating to research and development on energy. It is recognized that greater efficiency in ground transportation will bring about energy savings, and thus it seems that it would be appropriate to designate ERDA as the lead agency for the responsibilities contained in H.R. 738 so that it can properly coordinate the Federal energy effort and set priorities for the many areas of overlapping concern. However, we would expect ERDA to make use of NASA's existing capabilities in this field.

In view of the foregoing, NASA does not recommend enactment of this bill.

As a technical matter, it is noted that section 2 of the bill would amend the National Aeronautics and Space Act by adding new section 207. There is already a section 207 in the Space Act; therefore, this should be changed to new section 208 (H.R. 738, page 3, line 4, change "207" to "208").

The Office of Management and Budget has advised that, from the standpoint of the Administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

Joseph P. Allen,
*Assistant Administrator for Legislative Affairs.*

Office of the Secretary of Transportation,
*Washington, D.C., October 20, 1975.*

Hon. Olin E. Teague,
*Chairman, Committee on Science and Technology, U.S. House of Representatives, Washington, D.C.*

Dear Mr. Chairman: This letter is in response to your request for the views of the Department of Transportation on H.R. 738, a bill

"To amend the National Aeronautics and Space Act of 1958 to authorize and direct the National Aeronautics and Space Administration to conduct research and to develop ground propulsion systems which would serve to reduce the current level of energy consumption."

The act would authorize and direct the National Aeronautics and Space Administration (NASA) to develop ground propulsion systems which are energy conserving, have clean emission characteristics, and are capable of being produced in large numbers at a reasonable mass

production per unit cost. It further defines "ground propulsion system" to mean the engine, transmission or drive, and associated controls necessary to power automobiles, trucks, trains, buses, and selected light marine vehicles. The act would also authorize appropriations not to exceed $30,000,000 in the aggregate for the fiscal years 1975 through 1978 to carry out its purposes.

The Department of Transportation, in its several agencies, supports R&D on propulsion systems for most major ground transportation systems in order to understand what is technologically feasible, economically reasonable, and most effective generally. The R&D sponsored by this Department supports directly its ongoing mission responsibilities.

Research and Development on highway vehicles conducted by the Office of the Secretary (OST), the National Highway Traffic Safety Administration (NHTSA), and the Urban Mass Transportation Administration (UMTA) is coordinated with, and complementary to, the program of the Energy Research and Development Administration (ERDA) to develop advanced propulsion systems for cars and trucks.

The Federal Railroad Administration (FRA) sponsors R&D on propulsion systems for railroad engines and tracked systems of various kinds for intercity transportation. The UMTA sponsors R&D on propulsion systems for buses, para-transit vehicles, and rail vehicles used for passenger transportation in urban areas.

This bill is virtually identical to H.R. 10392, introduced in the 93rd Congress, about which this Department testified in hearings before the Committee on Science and Astronautics on February 5, 1974. A copy of the testimony is enclosed for your reference. This Department's views have not changed substantially in the meantime. They may be summarized as follows:

This Department recognizes and endorses the principle that a certain level of R&D on propulsion systems is appropriately sponsored by the Federal Executive agencies in support of their mission responsibilities. Substantial Federal programs that address propulsion for ground transportation systems are being conducted by Federal agencies with particular mission responsibilities. These mission-oriented agencies are examining needs from a "systems" point of view—R&D and propulsion being sub-functions and sub-systems of the overall system. The R&D on propulsion systems should be guided by appropriate transportation system authorities since the utility of any given propulsion system depends upon many factors other than the propulsion system itself.

This Department opposes enactment of H.R. 738 since it would lead to duplication of existing R&D authority and programs. It would also sever the necessary relations between R&D projects and the application of the results of those projects. Moreover, this Department believes that the existing Federally sponsored R&D projects on propulsion systems for ground transportation systems are adequate to meet current requirements in the civilian sector, assuming, of course, that the Congress acts favorably on the Administration's currently proposed programs.



The Office of Management and Budget advises that, from the standpoint of the Administration, there is no objection to the submission of this report.

Sincerely,

JOHN HART ELY.

---

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
*Washington, D.C., April 9, 1976.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology,*
*House of Representatives.*

DEAR MR. CHAIRMAN: The Energy Research and Development Administration (ERDA) appreciates the opportunity to express its views on H.R. 1109, 94th Congress, a bill "[t]o authorize the Administrator of ERDA to undertake a program of research and development for demonstrating alternative propulsion systems for automotive vehicles."

We do not favor the enactment of H.R. 1109 for several reasons. First, Section 2 of H.R. 1109 would require ERDA to develop a low-emission vehicle engine within three years. Under present legislation, however, we are already authorized to develop "alternative power systems." Section 104(g) of the Energy Reorganization Act of 1974, approved October 11, 1974, Public Law No. 95-438, 88 Stat. 1238, 42 U.S.C. Section 5814, provides as follows:

"(g) There are hereby transferred to and vested in the Administrator such functions of the Environmental Protection Agency and the officers and components thereof as relate to or are utilized in connection with research, development, and demonstration, but not assessment or monitoring for regulatory purposes, of alternative power systems."

In our opinion, the authority of this provision is adequate to perform the work contemplated in H.R. 1109.

Our concern is also that the three-year time limit may be too short to allow sufficient time for necessary laboratory-scale investigations of alternative technology implicity required by this bill. Our current plan is to assist the private sector in funding research and development that can lead to more energy efficient and environmentally acceptable automobiles within the next ten years. The only engine system which stands even a slight chance of being produced so quickly are versions of the stratified charge engine (modified combustion process using the Otto cycle). Even this type of engine which is similar to design to current conventional hardware, probably could not be placed into mass production on all engine lines by all manufacturers within three years. There is also the time limitation placed on the Administrator in Section 5 of the bill requiring a report on the economic impact of placing a low-emission vehicle in all or substantially all new and existing motor vehicles within twelve months from enactment. It may not be feasible to make such a study report within a year's time, and the time limitation appears unnecessarily restrictive in view of the fact that three years are contemplated for the engine development.

In addition, we do not find consideration for the need to factor into this legislative requirement relevant automobile industrial experi-

ence. There are marketing constraints which should be considered since any new engines developed will be for manufacture and sale by the competitive auto industry.

The Office of Management and Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

HUDSON B. RAGAN,
*Acting General Counsel.*

---

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
*Washington, D.C., May 23, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to Mr. Swigert's letter of February 19, 1975, requesting our views on H.R. 1111, a bill "[t]o authorize the Administrator of the Energy Research and Development Administration to establish a grant program for research and development of guidelines to conserve energy by reducing air drag on trucks." Section 1(a) of the bill provides that the Administrator shall make grants to qualified persons for research and development for the reduction of air drag on trucks; Section 1(b) requires periodic reports to the Congress on work carried out under the bill; and Section 1(c) authorizes the appropriation of up to $2,000,000 to carry out the purposes of the bill.

We appreciate the potential energy savings which may be achieved through the proper design of motor vehicles, including trucks. Thus we support the objectives of the bill. We believe, however, that the bill is duplicative of existing legislation and therefore unnecessary. In this regard, Section 4(c) of the Federal Nonnuclear Energy Research and Development Act of 1974, Public Law 93-577, already authorizes the Administrator to advance nonnuclear energy research through grants and other means for research, development and demonstration. Section 6(b)(3)(A)(iii) of the same Act directs the Administrator to conduct research and development on automobile design for increased efficiency as part of his overall energy program. Further, Section 103(8) of the Energy Reorganization and Development Act of 1974, Public Law 93-438, provides that the Administrator shall carry out an energy conservation research and development program, which would include work on motor vehicles.

We note, also, that the funds authorized under H.R. 1111 could be expended only through grants. In our opinion, this limitation on the manner in which the funds are to be expended unduly restricts the means by which the research objectives may be accomplished. Such restriction is inconsistent with the Section 4(c) of Public Law 93-577 which directs that the Administrator shall utilize "fund transfers, grants, or contracts," to conduct the research, development and demonstration activity contemplated by that Act.

In summary, while we strongly support the fundamental purpose of H.R. 1111, we view ERDA's present statutory authority as adequate for this purpose and H.R. 1111 to be both duplicative and unnecessarily restrictive. Accordingly, we recommend against further consideration of H.R. 1111.



The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

HUDSON B. RAGAN
(For R. Tenney Johnson, General Counsel).

---

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
*Washington, D.C., December 18, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology, U.S. House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: The Energy Research and Development Administration (ERDA) appreciates the opportunity to express its views on H.R. 5557, 94th Congress, a bill to authorize the Administrator of ERDA to undertake, in cooperation with the National Aeronautics and Space Administration, and other Federal agencies, a program of research, development, and demonstration of ground propulsion systems which would serve to reduce the current level of energy consumption.

We do not favor the enactment of H.R. 5557.

It appears that the primary thrust of this bill is to promote research and development in the field of ground propulsion systems. Although the Administrator of ERDA is given overall responsibility for the program, other Federal agencies including the National Aeronautics and Space Administration, are to cooperate in the effort. Section 104(g) of the Energy Reorganization Act of 1974, approved October 11, 1974, Public Law No. 93-438, 88 Stat. 1238, provides for the transfer of functions from the Environmental Protection Agency to ERDA in connection with research, development and demonstration of "alternative power systems." Section 6(b)(3)(A)(iii) of the Federal Nonnuclear Energy Research and Development Act of 1974, approved December 31, 1974, Public Law No. 93-577, 88 Stat. 1882, also authorizes ERDA studies in the improvement of automobile design and alternatives to the internal combustion engine and "systems of efficient public transportation." In addition, Section 104(i) of the Energy Reorganization Act of 1974, places the responsibility on the Administrator of ERDA to utilize the technical and management capabilities of other Federal agencies. Thus, in our opinion, ERDA has the requisite statutory authority to accomplish the purposes of this bill.

Furthermore we find the legislative emphasis on NASA participation in this program—particularly the requirement of utilizing NASA facilities in Section 7(1) of the bill—to be unnecessary. The Administrators of ERDA and NASA agreed to a Memorandum of Understanding which outlines a broad policy of cooperation between the two agencies. This agreement provides for the maximum utilization of NASA's capabilities by ERDA, while clearly defining ERDA's pro-

gram management responsibilities. The scope of this interagency agreement for cooperation is much broader than the proposed legislation, and, as a result, it sets the stage for extensive cooperation in the ground propulsion systems program as well as all other ERDA research and development programs.

For the above reasons, therefore, ERDA does not support H.R. 5557.

The Office of Management and Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

R. TENNEY JOHNSON,
*General Counsel.*

---

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
*Washington, D.C., November 7, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to the request of Mr. John L. Swigert, Jr., for the comments of the National Aeronautics and Space Administration on the bill H.R. 5557, "To authorize the Administrator of the Energy Research and Development Administration to undertake, in cooperation with the National Aeronautics and Space Administration, and other Federal agencies, a program of research, development, and demonstration of ground propulsion systems which would serve to reduce the current level of energy consumption."

The bill would authorize the Energy Research and Development Administration (ERDA) to undertake "the overall responsibility for providing effective management and coordination in connection with ground propulsion systems research, development, and demonstration, including the initiation and carrying out of research, development, and demonstration programs for the purpose of developing ground propulsion systems which are energy conserving, have clean emission characteristics, and are capable of being mass-produced at a reasonable per unit cost." The study of alternative energy sources for ground propulsion systems would also be a required consideration.

ERDA would be directed to utilize the facilities and capabilities of NASA, to the maximum extent feasible, in carrying out the purposes of the bill. The bill would amend the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) by adding new subsection 102(d) which would require that the "unique competence in scientific and engineering systems" of NASA be directed toward ground propulsion systems research and development.

Further, the bill would provide ERDA with authority for contracts and grants; for utilization of other agencies' facilities and personnel; and, finally, would require reports to the Congress every six months.

The bill would authorize $300 million to ERDA for fiscal years 1976 through 1979.

The intent of this legislation is commendable and Congressional support of research, development and demonstration of ground propul-



sion is most certainly needed. NASA has testified over the past several months in support of this need.

It is NASA's belief, however, that the National Aeronautics and Space Act of 1958 contains sufficient authority for NASA to participate with ERDA in ground propulsion research and development. In fact, NASA is actively supporting both ERDA and Department of Transportation (DOT) ground propulsion research and development programs in several important areas. Specifically, NASA is responsible for a major portion of the ERDA gas turbine automobile engine program and is cooperatively working with ERDA to demonstrate the hydrogen injection automobile engine concept. Work with DOT includes experimental projects for the reduction of truck and automobile drag and determination of lean engine operating characteristics.

In view of the foregoing, we believe that the amendment to the National Aeronautics and Space Act broadening our authority is unnecessary. However, regarding substantive comments on, or the need for H.R. 5557, NASA defers to ERDA as the agency primarily responsible for the conduct of the program envisioned by this legislation.

The Office of Management and Budget has advised that, from the standpoint of the Administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

JOSEPH P. ALLEN,
*Assistant Administrator for Legislative Affairs.*

---

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
*Washington, D.C., December 11, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology*
*U.S. House of Representatives.*

DEAR MR. CHAIRMAN: The Energy Research and Development Administration (ERDA) appreciates the opportunity to express its views on H.R. 6354, 94th Congress, a bill to establish a research and development program leading to advanced automobile prototypes. The bill is to be known as the "Automotive Transport Research and Development Act of 1975."

We do not favor the enactment of H.R. 6354.

The purpose of this bill is to direct the Administrator of ERDA to ensure the development within four years, or the shortest practicable time, of at least one prototype automobile which could be mass produced and which would meet certain energy and environmental considerations. In our opinion, it would not be advisable for ERDA to enter into the automotive field with the responsibility for the development of a prototype automobile. The complex production, distribution, marketing, and research considerations involved in the designing of a prototype are already being performed by the established auto manufacturers.

Rather than conducting an innovatice program of research, development and demonstration of alternative power systems already required by Section 104(a) of the Energy Reorganization Act of 1974, ap

proved October 11, 1974, Public Law No. 93-438, 88 Stat. 1238, 42 U.S.C. 5814 and Section 6(b)(3)(A)(iii), of the Federal Nonnuclear Energy Research and Development Act of 1974, approved December 31, 1974, Public Law No. 93-577, 88 Stat. 1880, 42 U.S.C. 5903, this bill would severely limit our alternatives.

Accordingly, we cannot support H.R. 6354.

The Office of Management and Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

R. TENNEY JOHNSON,
*General Counsel.*

---

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
*Washington, D.C., November 7, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to Mr. John L. Swigert's request for the comments of the National Aeronautics and Space Administration on the bill H.R. 7231, "To amend the Federal Nonnuclear Energy Research and Development Act of 1974 for the purpose of authorizing research, development, and demonstration in the field of ground propulsion systems."

The bill would amend the Federal Nonnuclear Energy Research and Development Act of 1974 by establishing within the Energy Research and Development Administration a Division of Ground Propulsion Systems. This new Division would develop ground propulsion systems which are energy conserving, have clean emission characteristics, and are capable of being mass-produced at reasonable per unit cost. In addition, ERDA would be directed to utilize the existing scientific and engineering resources of the United States with close cooperation from NASA, other interested Federal agencies and the private sector. Furthermore, ERDA would be directed to make continuing comparative assessments of all ground propulsion systems presently in use, or in a conceptual or development stage and, as part of this effort, to conduct annual patent searches for more efficient and economical designs. Also, ERDA would be directed to establish an appropriate advisory board to encourage private sector participation in the conduct of this program.

Finally, the bill would authorize to ERDA for these activities $360 million, in the aggregate, for fiscal years 1976 through 1980.

NASA is actively supporting both ERDA and the Department of Transportation in ground propulsion research and development programs in several important areas. Specifically, NASA is carrying out portions of the ERDA gas turbine automobile engine program and is cooperatively working with ERDA to prepare definitions of programs in several other areas such as electric vehicles and general comparative analysis of propulsion systems. Work with DOT includes experimental projects for the reduction of truck and automobile drag and determination of lean engine operating characteristics.



Since ERDA would be the agency directly involved with the project envisioned by H.R. 7231, the National Aeronautics and Space Administration defers to ERDA for substantive comments on the desirability, or the need for, that bill.

The Office of Management and Budget has advised that, from the standpoint of the Administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

JOSEPH P. ALLEN,
*Asistant Administrator for Legislative Affairs.*

---

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
*Washington, D.C., October 21, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology, U.S. House of Representatives.*

DEAR MR. CHAIRMAN: The Energy Research and Development Administration (ERDA) appreciates the opportunity to express its views on H.R. 7231, a bill "[t]o amend the Federal Nonnuclear Energy Research and Development Act of 1974 for the purpose of authorizing research, development, and demonstration in the field of ground propulsion systems."

We do not favor the enactment of H.R. 7231.

It appears that the primary thrust of the bill is to establish within ERDA a Division of Ground Propulsion Systems through which all research, development, and demonstration activities regarding ground propulsion systems would be required to be conducted. Additionally, H.R. 7231 would amend Section 6(b) of the Federal Nonnuclear Energy Research and Development Act of 1974 to authorize ERDA to conduct these activities.

In our view, Section 6(b)(3)(A)(iii) of that Act already clothes ERDA with the requisite statutory authority. Moreover, Congress intended in the Energy Reorganization Act of 1974 that the Administrator of ERDA have maximum flexibility below the level of the six program Assistant Administrators in organizing the agency in such a manner as in his judgment would best accomplish ERDA's statutory missions. We believe that this flexibility should be preserved.

The Office of Management and Budget has advised that there is no objection to the submission of this report from the standpoint of the Administration's program.

Sincerely,

R. TENNEY JOHNSON,
*General Counsel.*

---

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
*Washington, D.C., November 25, 1975.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to Mr. John L. Swigert's request for the comments of the National Aeronautics and Space Ad-

ministration on the bill H.R. 7506, "To authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote nongasoline powered vehicles, and to demonstrate the commercial feasibility of such vehicles, and other purposes."

The bill would direct the Energy Research and Development Administration (ERDA) to establish the Alternative Vehicle Research and Development Project. The Project would demonstrate the commercial feasibilty of all steam, electric, hybrid, and other alternative propulsion systems for vehicles for urban and rural, individual and business use. ERDA would have overall responsibility for the management of the Project but would be authorized to enter into agreements with other federal agencies, including NASA, as is necessary or appropriate for the conduct of the Project.

ERDA would have the specific responsibility for promoting research and development of hardware and technology applicable to alternative vehicles, for conducting demonstrations of alternative vehicle feasibility, for ascertaining consumer needs and desires, and for promoting research on planning, traffic management, maintenance facilities, tax policies and utility rate structures. In addition, ERDA would conduct studies to determine whether governmental or institutional factors would bias transportation systems against alternative vehicles and to determine the environmental impact of the various alternatives.

Finally, the bill would authorize to be appropriated to ERDA for this Project not to exceed $50 million for each of fiscal years 1976, 1977 and 1978.

NASA is actively supporting both ERDA and the Department of Transportation in ground propulsion research and development programs in several important areas. Specifically, NASA is responsible for a major portion of the ERDA gas turbine automobile engine program and is cooperatively working with ERDA to demonstrate the hydrogen injection automobile engine concept. Work with DOT includes experimental projects for the reduction of truck and automobile drag and determination of lean engine operating characteristics.

We have had recent discussions with ERDA in which the possibility of NASA assuming increased responsibilities in the ground propulsion area has been explored. Such efforts could be carried out under a recently signed ERDA/NASA Memorandum of Understanding which sets the framework for close cooperation with ERDA in this and other areas of mutual interest.

Since ERDA would be the agency directly involved with the Project envisioned by H.R. 7506, the National Aeronautics and Space Administration defers to ERDA for substantive comments on the desirability, or the need for, that bill.

The Office of Management and Budget has advised that, from the standpoint of the Administration's program, there is no objection to the submission of this report to the Congress.

Sincerely,

JOSEPH P. ALLEN,
*Assistant Administrator for Legislative Affairs.*



U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
*Washington, D.C., March 24, 1976.*

Hon. OLIN E. TEAGUE,
*Chairman, Committee on Science and Technology,*
*U.S. House of Representatives.*

DEAR MR. CHAIRMAN: In response to your request for comments on H.R. 9174, 94th Congress, we are pleased to advise that such comments were provided in the testimony of Mr. Austin N. Heller, Assistant Administrator for Conservation of the Energy Research and Development Administration, on March 18, 1976 before the Subcommittee on Energy Research, Development, and Demonstration of the House Committee on Science and Technology. A copy of this testimony is attached.

We appreciate the opportunity to provide our views on this bill.

Sincerely,

R. TENNEY JOHNSON,
*General Counsel.*

Attachment as noted.

STATEMENT OF AUSTIN N. HELLER, P.E., ASSISTANT ADMINISTRATOR FOR CONSERVATION, ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Thank you, Mr. Chairman and members of the Committee, for this opportunity to provide testimony on H.R. 9174, a Bill to establish a research and development program leading to advanced automobile prototypes and on related Bills. I am accompanied today by Dr. Gene G. Manella, Deputy Assistant Administrator and by Mr. John J. Brogan, Acting Director, Division of Transportation Energy Conservation.

The five research and development Bills under examination, H.R. 9174, 1109, 5557, 6354, and 7231 have several similar as well as dissimilar aspects which become key issues when viewed from the perspective of the Energy Research and Development Administration (ERDA). I will first address these similarities and dissimilarities.

Each Bill has a similar objective which, in essence, is to authorize the conduct of a research and development program necessary to provide energy efficient, clean, safe, practical and quiet means for automotive ground transport. Two of the Bills (H.R. 9174 and 6354) would authorize development of new automobiles, two Bills (H.R. 7231 and 5557) would authorize development of propulsion systems, rather than a complete ground transport vehicle, but included in these two Bills is the responsibility to develop alternate fuels for use in the new propulsion systems. Lastly, one Bill (H.R. 1109) would authorize only engine development (the engine being part of the propulsion systems).

The automobile development Bills provide for four-year development leading to a production prototype. The propulsion system development Bills leave the time frame open whereas the engine development Bill provides a three-year span to conduct the work.

The language used in each Bill either clearly states or suggests that the end product of the research and development program is a production prototype ready for/or capable of being mass produced. In particular, H.R. 1109 (engine development) requires that the resulting

engine be capable of being retrofitted into existing vehicles and of being placed into new vehicles.

Each Bill with the exception of H.R. 9174 would have ERDA manage the program. H.R. 9174 would provide the Department of Transportation (DOT) with this overall responsibility with ERDA conducting the program. Each Bill would require that in conducting the program the ERDA use existing technical capabilities in the the Federal government wherever possible. H.R. 5557 specifically would direct ERDA to seek out the National Aeronautical and Space Administration (NASA) for conducting the necessary R&D.

In summary, these Bills have generally similar purposes, each with different limitations in that either the engine alone, the propulsion system or the complete vehicle would be developed in each proposed program. We have carefully reviewed each Bill and we have compared their different features and approaches with those of two ongoing Federal programs intended to accomplish the same end product.

The two Federal programs I refer to are the Research Safety Vehicle Program which is the responsibility of the Department of Transportation and our Highway Vehicle Systems Program in ERDA's Office of Conservation. We find that the proposed legislation would not offer a new and better program. Thus, these Bills are not necessary in order to arrive at energy efficient, clean, safe and quiet automotive ground transport. The DOT program is focusing mainly on development and demonstration of 3000 lb. automotive vehicles which can provide maximum built-in safety at this weight. The ERDA program focuses on development and demonstration of energy efficient, virtually pollution free, propulsion systems and alternative fuels for vehicles of approximately the same weight class.

Other aspects of the DOT Research Safety Vehicle Program have been presented today by our colleagues in DOT. I will now summarize our program and, with your permission, I will submit a more detailed description for the Record.

### ERDA HIGHWAY VEHICLE SYSTEMS (HVS) PROGRAM

The HVS Program is a part of the Transportation Energy Conservation Program which supports a primary National Energy Goal of improving end-use efficiency in energy consuming sectors, in this case in the Transportation Sector. The short range objective is to reduce petroleum energy consumption by highway vehicles and the long range objective is to eliminate the dependence of highway vehicles on petroleum energy.

Major elements of the HVS Program include: Heat engine systems, electric and hybrid systems, alternative fuels, and vehicular systems.

The Heat Engine Systems activities focus on hardware development of the engine systems that offer the highest potential of being energy efficient, virtually pollution free, quiet and capable of using any combustible substance as fuel. The two engines which are the prime candidates under development are the gas turbine and the Stirling cycle systems.

The Electric and Hybrid Systems activities emphasize the development of battery powered electric vehicles and of powerplants which



are capable of dual-mode operation and others which operate when powered by a combination of heat engine with stored energy devices.

The Alternative Fuels activities are directed toward understanding and solving the practical problems associated with use of nonpetroleum base fuels. Methanol, synthetic gasoline and distillate from coal and shale, and hydrogen are the primary candidate fuels under contention.

The Vehicular Systems activities aim for hardware development of energy efficient propulsion system components other than the engine. Examples of development projects underway include: continuously variable transmissions, accessory drive systems and waste heat recovery systems.

As stated earlier, in our judgment essentially all of the work that would be required for new propulsion or engine systems is covered in this ongoing program.

Before concluding I would like to address two points that require clarification because they touch on aspects of the proposed legislation. The first concerns the Federal role and the second concerns funding.

### FEDERAL ROLE

The current ERDA development program is proceeding with the development of propulsion systems through to where several prototype systems can be demonstrated in vehicles on the road. This particular phase is commonly called the Advanced Development Phase. Government funds are not being used to proceed into the next phase—Engineering Phase—wherein production prototypes are to be produced, as the proposed Bills would have it. We believe that a Federal R, D&D program should not be involved in this next phase because the industry has the skills and incentive to proceed from there without significant expenditures of Federal funds.

### FUNDINGS

On the subject of funding the current ERDA program, we are in the process of reassessing the current development schedules and milestones and corresponding costs to determine whether significant changes in development timing are possible and cost effective with increases in funds in future years. The assessment will be completed before submittal of the FY 78 budget.

### CONCLUSIONS

In conclusion it is our judgment that while we agree with the intent of the proposed legislation, none of this legislation is needed. Ongoing ERDA and DOT programs are designed to accomplish the same objective as the proposed legislation and we believe these programs will do so in a cost-effective way. In addition, one Bill (H.R. 9174) would disrupt the ongoing ERDA program with its requirement to change agency responsibilities for management of the development work.

Lastly, the current ERDA ground propulsion and fuels program is being reassessed to determine whether increased funding could noticeably affect development schedules. If it is found that increased levels

of funding could be used effectively then use of the normal agency budgeting processes is recommended rather than the enactment of special legislation such as those considered today.

---

## XI. Changes in Existing Law Made by the Bill, As Reported

In compliance with clause 3 of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

### Section 102 of the National Aeronautics and Space Act of 1958

DECLARATION OF POLICY AND PURPOSE

SEC. 102. (a) * * *

* * * * * * *

(c) The aeronautical and space activities of the United States shall be conducted so as to contribute materially to one or more of the following objectives:

(1) The expansion of human knowledge of phenomena in the atmosphere and space;

(2) The improvement of the usefulness, performance, speed, safety, and efficiency of aeronautical and space vehicles;

(3) The development and operation of vehicles capable of carrying instruments, equipment, supplies, and living organisms through space;

(4) The establishment of long-range studies of the potential benefits to be gained from, the opportunities for, and the problems involved in the utilization of aeronautical and space activities for peaceful and scientific purposes;

(5) The preservation of the role of the United States as a leader in aeronautical and space science and technology and in the application thereof to the conduct of peaceful activities within and outside the atmosphere;

(6) The making available to agencies directly concerned with national defense of discoveries that have military value or significance, and the furnishing by such agencies, to the civilian agency established to direct and control nonmilitary aeronautical and space activities, of information as to discoveries which have value or significance to that agency;

(7) Cooperation by the United States with other nations and groups of nations in work done pursuant to this Act and in the peaceful application of the results thereof; and

(8) The most effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States in order to avoid unnecessary duplication of effort, facilities, and equipment.



*(d) The Congress declares that the general welfare of the United States requires that the unique competence in scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the developement of advanced automobile propulsion systems. Such development shall be conducted so as to contribute to the achievement of the purposes set forth in section 2(b) of the Automotive Transport Research and Development Act of 1976.*

[(d)](*e*) It is the purpose of this Act to carry out and effectuate the policies declared in subsections (a), (b), [and (c)] (*c*) *and* (*d*).

---

## XII. Congressional Budget Act Information

CONGRESSIONAL BUDGET OFFICE—PRELIMINARY COST ESTIMATE, MAY 13, 1976

1. Bill number: H.R. 13655.

2. Bill title: Automotive Transport Research and Development Act of 1976.

3. Purpose of bill: The main purpose of this bill is to establish a five-year research and development program within the Energy Research and Development Administration (ERDA) to promote advances for automobile propulsion systems. The bill also provides for Department of Transportation and National Aeronautics and Space Administration participation in the program. The bill provides authorization and is subject to appropriation action.

4. Cost estimate: The bill has no budget effects for FY 1976 or the transition quarter. The estimate of the overall budget effect for fiscal years 1977 to 1981 follows:

| | Fiscal year— | | | | |
|---|---|---|---|---|---|
| | 1977 | 1978 | 1979 | 1980 | 1981 |
| Authorization level [1] | 20.0 | 21.2 | 22.4 | 23.6 | 24.7 |
| Outlays [1] | 15.0 | 20.9 | 22.1 | 23.3 | 24.4 |

[1] The only authorization directly stated in the bill is $20,000,000 for fiscal year 1977, the other levels are estimated because the bill establishes a 5-year program. See basis of estimate for a more detailed discussion.

5. Basis of estimate:

The obligations for each fiscal year are assumed to equal the authorization. The authorization levels for the post-FY 1977 period are based on providing the same allocation of real resources in each of those years. The inflation adjustments are based on CBO's economic projections.

This program is judged to be similar to other ERDA non-nuclear activity. Assuming that the major costs would be for operating expenses, a spendout rate of 75 percent for the first fiscal year of an obligation and 25 percent for the second year is used. Although a slightly slower payout rate might be expected for the first year of the program, the same rates are used because the program would be related to ongoing ERDA and National Aeronautics and Space Administration (NASA) R&D. NASA's activity is relevant because NASA's support is provided for in the bill.

6. Estimate comparison: None.

7. Previous CBO estimate: A preliminary cost estimate of H.R. 9174 dated May 10, 1976 addressed the cost of this bill in an earlier form.

8. Estimate prepared by: William F. Hederman (225–5275).

9. Estimate approved by: James L. Blum, Assistant Director for Budget Analysis.

### A. NEW BUDGET AUTHORITY

In response to the requirement of section 308(a)(1)(B) of the same Act, the Committee approved new budget authority associated with this bill as follows:

| | *Millions* |
|---|---|
| Fiscal year 1977 | $20 |

### B. ESTIMATE OF COSTS

In accordance with section 252(a) of the Legislative Reorganization Act of 1970 (Public Law 91–510), the Committee has prepared a 5-year projection of the estimated operating expenses and plant and capital equipment costs.

The bill authorizes funds for fiscal year 1978 in the amount of $20 million. Annual authorizations are required for the four additional years of the program.

During the 5 years of the program, the Committee expects obligations for activities related to research and development under this legislation to be distributed as follows: to increase over the first 3 years and then reach a plateau or decrease over the remaining 2 years.

*Research and development program*

| Fiscal year: | *Committee's estimate (in millions)* |
|---|---|
| 1977 | $20 |
| 1978 | 30 |
| 1979 | 35 |
| 1980 | 35 |
| 1981 | 30 |

## XIII. Oversight Findings and Recommendations

No oversight findings and recommendations pursuant to clause 2(1)(3)(A), rule XI, under the authority of rule X, clause 2(b)(1) of the Rules of the House of Representatives are included, inasmuch as the bill provides for a new program.

### COMMITTEE ON GOVERNMENT OPERATIONS

No findings or recommendations on oversight activity pursuant to clause 2(b)(2), rule X, and clause 2(1)(3)(D), rule XI, of the Rules of the House of Representatives have been submitted by the Committee on Government Operations for inclusion in this report.

## XIV. Individual Views

## INDIVIDUAL VIEW OF HON. BARRY M. GOLDWATER, JR. ON H.R. 13655

### Summary

I strongly oppose H.R. 13655 for two basic reasons. First, I am convinced that there is no justification for this automotive R. & D. legislation at this time, because:

1. it primarily is a make-work type bail-out for Federal labs (NASA labs) and NASA;
2. the R. & D. program is undefined;
3. industry R. & D. in these areas is adequate;
4. ERDA already has an existing program in this R. & D.;
5. the H.R. 13655 relationship to the existing ERDA program is undefined and potentially damaging;
6. there is *no* justification to act now;
7. there is justification to *not* act now, in order to get input from major Executive branch and OTA studies in progress;
8. the ERDA annual authorization is the better way to handle this R. & D.

Second, I am convinced that the passage of H.R. 13655 is not simply passage of this objectionable, but limited $20 million R. & D. bill. Rather, passage will probably lead to a conference bill with close to $130 million in direct funding and $55 million in Federal loan guarantees for auto R. & D., and a series of objectionable provisions. The higher funding, loan guarantees and provisions are all contained in the companion Senate bill, which the House, in effect, has defeated by a vote of 300–103.

I urge my colleagues to join with me in opposition to H.R. 13655.

### Background

H.R. 13655 and this report are before the House of Representatives, in part, because of the action of the House last December during consideration of the S. 622 conference report on the Energy Policy and Conservation Act of 1975, the so-called oil deregulation bill. The S. 622 Conference Committee reported a bill which included a major automotive R. & D. program as part of the conversion title in the bill. That program had been originally considered and passed by the Senate earlier in the session as Title II of S. 1883, but S. 1883 had not been considered or acted on by the House. I strongly opposed that program and the way in which the Conference Committee attempted to impose its will on the House of Representatives by including it in the conference bill.

The program in the bill was clearly within the sole jurisdiction of this Committee. A similar bill, H.R. 9174, had been introduced by

Messrs. Teague, Mosher, McCormack and myself, the leadership, respectively, of the Science and Technology Committee and the Energy Research, Development and Demonstration Subcommittee to validate our jurisdiction. It was referred to this Committee, but no further action was taken. Consequently, the House had not had any chance to consider the program and hold hearings on it, nor argue the merits of any amendments.

The mandated automotive R. & D. program would have authorized $130 million in direct funding over two years and $55 million in loan guarantees for the research in the program. There were also a number of problems with the specific provisions in the program. The program was placed in the Department of Transportation, not in the Energy Research and Development Administration (ERDA). ERDA has the statutory authority for such R. & D. under section 104(g) of the Energy Reorganization Act and section 6(b)(3)(A)(iii) of the Federal Nonnuclear Energy Research and Development Act. There was no clear restriction on the size of the recipients of these funds, so that one of the big four automobile corporations could be funded under the bill. There was no restriction on nationality of recipients, so funds could go to Volkswagen or Toyota or Datsun. There was no restriction on where the research was done, so that it could be done overseas. The program was directly geared to production line technology and production prototypes, just the area where industry has the greatest expertise and the greatest economic incentive in light of foreign competition. That is also the area, conversely, in which the Federal government is least capable of affecting meaningful research and development. These were some of my concerns with the program brought back by the S. 622 Conference Committee.

After a series of unsuccessful attempts to resolve this issue with the conference committee and the Senate, I chose to oppose the auto R. & D. part of the conference report. A point of order under Rule XXVIII that that auto R. & D. part was not germane to the conference bill was sustained and, pursuant to that rule, I offered a motion to strike that part from the bill. I am proud to say that 300 Members of the House joined with me in knocking the program out of the Conference bill. I do want to acknowledge the support of Subcommittee Chairman McCormack and many other Members of the Science and Technology Committee in that effort.

As we all know, President Ford eventually signed that bill after bitter debate within the administration. Had we not acted so resolutely in opposition to the program then, it too would have been law today. Had we not acted, the American taxpayer would once again have been burdened with yet another, what I consider to be, expensive, unjustified, and ill-conceived program. Unfortunately, as I will discuss below, those same effects may result from this bill.

The bill H.R. 13655 now reported by the Science and Technology Committee actually represents the further consideration of that same automotive R. & D. program after the successful effort to strike it out of the S. 622 conference bill. It, in effect, is the companion legislation to Title II of S. 1883, passed by the Senate in the last session. Consequently, House passage of H.R. 13655 would most probably result in a conference on the two bills. It is critically important in considering H.R. 13655 to recognize this companion relationship of H.R. 13655 and Title II of S. 1883.



Consideration of this bill, therefore, should necessarily involve two elements. The first element is the bill on its face, as reported by the Committee, and its merit, or lack thereof, as reported. The second element is the companion relationship with Title II of S. 1883 and the fact that, under Rule XXVIII, the differences between the two bills will define the scope of the conference on them. Therefore, the potential conference bill could closely resemble the earlier rejected Title II of S. 1883. Both of these elements should be fully considered in making a decision on this bill. The following discussion will examine each element in detail.

## H.R. 13655, As Reported

H.R. 13655, on its face, appears to be innocuous enough. Basically, the bill establishes an advanced automotive propulsion research program in the Energy Research and Development Administration (ERDA). Funding for the program is set at $20 million for fiscal year 1977 and subsequent fiscal years will require annual authorization. The program will be done with contracts, grants, and in government laboratories, with as much as 60% directly expended in the Federal laboratories. The Federal laboratories most involved probably would be those of the National Aeronautics and Space Administration (NASA) which have developed an initial expertise in such propulsion systems. The bill also provides for the Department of Transportation to conduct certain studies and to make available its capability for testing and certifying systems which were developed by ERDA.

### Objectionable provisions

I strongly opposed in Subcommittee several aspects of the bill, which still appear in the reported bill. I oppose the obviously strong emphasis on NASA and the Federal Labs (most likely, NASA Labs) in the bill. The limitation on direct expenditures in the labs was the subject of lengthy debate, which clearly indicated that the proponents intend to place the program largely in the labs,. The 60% limit applies to "direct" expenditures, so conceivably even more could "pass through" the labs to supporting contractors, but still be subject to lab control. In effect, NASA and its lab(s) then would have real control over the program.

That control is objectionable for several reasons. If the objective truly is to advance the automotive propulsion technology in use by the motoring public, then private industry must play a prominent role. Private industry has to participate to ensure that the technology is compatible with all the requirements of an assembly line, mass production, distribution and servicing industry. We don't need another Federal lab-developed technology "toy". There must be a partnership with private industry. That obviously is not the intent of the proponents who argued successfully to give more than half the program to the Federal Labs and effectively place the program in NASA.

I also am seriously concerned thatt he bill will generate a continuing, long term requirement for funds for NASA, as part af its re-direction and search for new missions. While I have high respect for NASA and its capabilities, attempting to "bail it out" of its current difficulties with an ill-conceived, make-work program in auto R. & D. is a disservice to the nation and to NASA. If we need Federal auto

R. & D., it should be done in a way that will produce a commercialized technology, and that means a partnership with industry, not a NASA Lab program. And, if NASA requires redirection, it should be done directly in the NASA bill, not with make-work, bail-out bills.

Symptomatic of the whole unfortunate tone of this bill is the requirement in section 5 (3). The section requires the Secretary of Transportation to "evaluate the posture of the automotive industry in *meeting societal needs* by utilization of current technology" and to annually recommend incentive measures. That requirement is plain and simply an invitation for a recommendation for further regulation in one form or aother. The term "societal needs" is undefined, but it certainly will be a subjectively-determined standard. I do not believe that such requirements have any place in an R. & D. bill. Further, those judgments should be made by the Congress, not the Department of Transportation or any other bureaucracy. I also strongly object to the "cheap shot" nature of the implication about the automotive industry. It serves no purpose other than to introduce emotionalism and irrationality into what is advertised to be an R. & D. issue.

## "Staff Draft"

The reported bill was based on an original staff draft in Subcommittee which included an additional $110 million for direct R. & D. spread out over fiscal years '78–'81, a $75 million loan guarantee program for related efforts under this bill and several other provioisns struck in Subcommittee or Committee. Specifically, amendments which I offered were accepted in Subcommittee to require that the program under the bill supplement, but not supplant, similar R. & D. under way in the automotive industry; added a requirement that consideration be given to all other Federal agencies with related programs, such as the Department of Defense, rather than just NASA; set a 60% limit on the funding which could be expended directly in Federal laboratories; clarified that ERDA's responsibility for this type of research under existing law was not modified by this act; struck the $75 million loan guarantee section; added a requirement in budget requests under this bill for a statement of the relationships of appropriations under this bill to those under other ERDA bills; added a requirement for a comprehensive plan and program to specifically define the program and its relationship to other ongoing activities; and added specific provisions for the protection of proprietary information. Also, an amendment which I offered was accepted in full committee which removed specific funding authorizations for the fiscal years 78–81 (which totaled $130 million) and substituted a requirement for an annual authorization for those years. I note, however, that the Committee report estimates that costs for those years probably will still total as much as $130 million over those years. As a result of those amendments the reported bill is a substantially reduced and, hopefully, a far less offensive piece of legislation. There remain, however, several significant concerns with the reported bill.

## Undefined Program

A major concern is the failure of the proponents of this bill to clearly define exactly what type of program the bill is creating. Discussion of



this point in the subcommittee mark-ups certainly did not clarify that intent. Neither the bill nor the report specifically states what new or different R&D will be done under this bill. For instance, it is not clear if one new engine, two new engines, several competing versions of a specific engine type, etc. would be undertaken in ERDA's resulting R&D program. Further, the testimony on the specific details of such a program indicated that there is no general agreement among the automotive R. & D. community, industry or government, as to what should be undertaken in the program. Some witnesses argued for a program focused on a diesel engine, others disagreed and argued for the Stirling engine, and others supported the Brayton engine. Some argued that focusing on the existing Otto engine (the internal combustion engine) could achieve the most significant and practical near-term results.

Also, one of the salient aspects of the Subcommittee discussion on this bill was the apparent lack of agreement among the Chairman, the leading proponents, and the staff regarding the exact nature of the program included in the bill. In fact, it was this very lack of agreement in the testimony received by the Subcommittee which convinced the Subcommittee not to specify these efforts, but to allow ERDA to independently do so on the basis of its technical evaluations. That is the thrust of the Committee report. So, it is not at all clear where this program will lead us, and, as a result, whether or not this program is needed to get us wherever that is.

## Industry R. & D.

Consideration of this amorphously defined program also must include the fact that there is a substantial and continuing industry effort to develop advanced automotive propulsion systems. In fact, one or more of the major industry corporations or their suppliers are currently engaged in research and development on the very same advanced propulsion systems which were the subject of testimony before the committee. Further, some of the concepts proposed for this program have not only been the subject of intense auto industry R. & D. effort, but already have been rejected as being not acceptable or feasible for further development for the projected market. The following tables and discussion give some indication of the magnitude of the ongoing industry program.

AUTOMOTIVE POWERPLANT R. & D. EXPENDITURES

[In millions of dollars; calendar years]

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternative powerplants: | | | | | | | | | | |
| GM | 1.6 | 4.7 | 8.5 | 11.3 | 18.9 | 20.8 | 23.7 | 22.4 | 22.5 | 22.3 |
| Ford | 4.8 | 4.9 | 6.6 | 8.0 | 13.0 | 20.3 | 26.5 | NR | NR | NR |
| Chrysler | NR | NR | NR | .1 | .3 | .8 | 3.9 | 6.0 | NR | NR |
| Industry total | 6.0+ | 10.0+ | 15.0+ | 19.4 | 32.2 | 41.9 | 54.1 | 53.0+ | NR | NR |
| Government AAPS program (predecessor of existing ERDA program) | .3 | 2.2 | 4.3 | 9.1 | 9.8 | | 12.3 | 7.0 | | |
| For comparison: | | | | | | | | | | |
| Industry ICE—Emissions control | 35.0+ | 40.0+ | 60.0+ | 89.4 | 154.0 | 210.4 | 282.0 | 299.6 | 300.0+ | 300.0+ |
| Total, Government and civilian automotive powerplant | | | | | | 19.9 | 22.8 | 25.7 | | |

NOTES

1. Industry expenditure data is from each company's "Application for Suspension of the 1976 Motor Vehicle Emission Standards," May, 1973, reprinted in "Research on Ground Propulsion Systems." Hearings before the Subcommittee on Space Science and applications of the Committee on Science and Astronautics, U.S. House of Representatives, Feb., 1974 (No. 26).
2. Industry figures for 1967–72 are actual expenditures, 1973–76 were projected as of May, 1973. Some skepticism has been expressed concerning the magnitude of the Ford and GM figures. The auto industry profit crunch of 1974 may have seriously affected 1974 planned expenditures.
3. Industry figures are "direct expenditures," which include "salaries, wages, premiums and related benefits, applicable to the personnel working directly on the project ... (and) ... the material costs, outside services and other miscellaneous direct costs connected with the project," at least as defined by GM (attachment to letter from F.W. Bowditch to J.B. Heywood, Aug. 7, 1974).
4. Industry work included relates to alternative powerplants as defined in this report, except only emission-related expenditures on the Wankel are included.
5. NR means not reported.
6. Industry figures are reported by calendar year, Government figures by fiscal year. Government figures are listed ½ yr behind calendar year heading.
7. AAPS figures were obtained from EPA except for fiscal year 1975 where we have shown expected result of the appropriations legislation still in Congress. Total U.S. Government civilian automotive powerplant expenditures were obtained from various sources.
8. It should be noted that a fraction of AAPS expenditures are not related to alternative powerplants, and there have been some U.S. Government expenditures on alternative powerplants by programs other than AAPs.

Source: "The Role For Federal R. & D. on Alternative Automotive Power Systems", Heywood, et al. M.I.T. Energy Laboratory Report No. MIT-EL-74-013. November, 1974, Table 4.1.



The three largest domestic automobile manufacturers, Chrysler, Ford and General Motors, have expended $422.6 million in 1972 and $737.3 million in 1973 (estimated) on emissions control research and development or a total of $1.16 billion in the last two years. The largest portion of this amount was expended for capital items, equipment and facilities, needed for the production and assembly of emissions control devices, especially catalytic converters. In addition, expended test and research facilities for emissions control were included in the capital expenditures. Table 1 summarizes the emmissions-related expenditures by the largest domestic manufacturers and compares them with total research and development expenditures. It shows that capital expenditures were 29% and 46% of total emissions expenditures in 1972 and 1973, respectively.

Over $19 million in 1972 and $30 million in 1973 were reported by the manufacturers specifically for catalytic converter research. The actual amount is much higher than that, however, because most of the money expended by Ford on engineering development of the catalyst was included in 1975/76 control system development and the catalyst portion cannot be separated from the total.

Emissions expenditures were utilized for projects relating to: (1) equipment and engine development directed towards meeting the statutory standards for hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NO); (2) basic emissions research, (3) testing and certification of production vehicles; (4) research on advanced emission components, including catalytic converters; and (5) research on alternate power sources. Detailed listing of expenditures by individual projects are attached for each of the three major domestic manufacturers; the exhibits are from the manufacturers' Application for Suspension of the 1976 Automobile Exhaust Emissions Standards.

TABLE 1.—SUMMARY OF EMISSIONS EXPENDITURES

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 [1] | Total 1967–73 | Percent |
|---|---|---|---|---|---|---|---|---|---|
| Total emissions expenditures (millions of dollars) (includes capital spending): | | | | | | | | | |
| General Motors | 51.2 | 39.7 | 65.0 | 119.9 | 181.6 | 237.9 | 350.7 | 1,047 | 53 |
| Ford | 50.7 | 35.6 | 52.7 | 67.0 | 131.9 | 164.9 | 340.1 | 843 | 42 |
| Chrysler | 2.9 | 4.4 | 6.6 | 9.0 | 14.4 | 19.8 | 46.5 | 104 | 5 |
| Total | 104.8 | 79.7 | 124.3 | 195.9 | 327.9 | 422.6 | 737.3 | 1,994 | |
| Capital expenditures (millions of dollars): | | | | | | | | | |
| General Motors | 27.2 | 6.5 | 13.9 | 39.8 | 44.9 | 90.0 | 203.7 | 437.0 | |
| Ford | 27.3 | 9.3 | 16.4 | 15.5 | 41.6 | 33.0 | 131.1 | 274.2 | |
| Chrysler | [2] | [2] | [2] | 9.3 | 1.0 | 1.2 | 3.4 | [3] 17.7 | |
| Total emissions as a percent of total R. & D.: [4] | | | | | | | | | |
| General Motors | 3.6 | 4.5 | 5.9 | 9.8 | 14.0 | 15.6 | 15.0 | | |
| Ford | 7.2 | 7.2 | 8.5 | 11.5 | 17.5 | 21.1 | 26.3 | | |
| Chrysler | 4.0 | 4.7 | 6.3 | 10.6 | 14.9 | 15.0 | 20.9 | | |
| Total R. & D. (millions of dollars): | | | | | | | | | |
| General Motors | 664 | 768 | 852 | 808 | 900 | 945 | 970 | | |
| Ford | 325 | 359 | 423 | 453 | 513 | 621 | 996 | | |
| Chrysler | 76 | 84 | 95 | 82 | 90 | 124 | 150 | | |

[1] 1973 expenditures are estimated.
[2] Not available.
[3] 1970–73.
[4] Does not include capital expenditures.

TABLE 2.—ALTERNATIVE POWER SOURCE RESEARCH DIRECT EXPENDITURES

[In millions of dollars]

| | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | Total 1967–73 |
|---|---|---|---|---|---|---|---|---|
| General Motors | 1.64 | 4.74 | 8.46 | 11.33 | 18.92 | 20.80 | 23.69 | 89.58 |
| Ford | 4.81 | 4.87 | 6.56 | 7.97 | 12.99 | 20.19 | 24.53 | 81.92 |
| Chrysler | NA | NA | NA | .10 | .30 | .80 | 3.5 | 4.70 |
| Total | | | | | | | | |

TYPES OF ALTERNATIVE POWER SYSTEMS

1. *GM.*—Rankine cycle (steam), stratified, electric, gas, turbine, Stirling, rotary, and Honda CVCC evaluation. "GM's expenditures for emissions control applicable to the rotary engine *do not* include the approximately $50 million forecast to be paid over the period 1970–1975 for the rights to produce this engine."

2. *Ford.*—Stratified charge (PROCO and flash burn), diesel, Rankine cycle, Stirling, rotary, turbine, pre-chamber spark-ignited, and auxiliary power units (APU).

3. *Chrysler.*—Gas Turbine, Rankine cycle, TCCS evaluation, Brayton cycle, rotary, and Honda CVCC evaluation.

Source: E.P.A. additional information for the record, Hearings on Research on Ground Propulsion Systems, Subcommittee on Space Science and Application, February 6, 1974.

Additionally, I understand that the American Motors Corporation currently is spending an average of $30 to 35 million per year for advanced automotive propulsion research. As these tables and discussion demonstrate, any consideration of a new government program should first address the threshold issue of whether or not industry is already doing the required research. Although one of the amendments accepted in Subcommittee requires that the Federal program not supplant private industry's efforts, but rather supplement them, it is not at all clear how ERDA would discharge this direction, since industry already is so heavily involved.

## EXISTING ERDA PROGRAM

These difficulties are materially worsened by the fact that ERDA is already doing this type of research. In fact, the engines which were the subject of much of the discussion in the hearings and are discussed in the Committee report already are included in the ERDA program. A portion of the description of the ERDA automotive program for fiscal year 1977 included in H.R. 13350, the ERDA Authorization Bill follows. The description is in the report on that bill. Also included is the Committee justification from the report for a $10 million increase in the Administration request for that program. The discussion clearly indicates that the increase is intended to support an expansion of ERDA's focus on advanced automotive propulsion systems.

## DESCRIPTION

*Heat engine highway vehicle systems*

Research and Development will focus on heat engine development for autos, non-petroleum base fuels utilization, and energy efficient propulsion system components. Exanding the scope of on-going work in gas turbine and Stirling engine development is given priority. These engines are potentially more energy efficient, quieter and cleaner with better performance than conventional systems and have greater multi-fuel capability. Component development includes new transmissions, accessory drive systems, and waste heat utilization which have potential for being introduced into the marketplace early relative to new engines. Successful development efforts will be applicable to conventional as well as alternative propulsion systems. The most promising alternative fuels in order of decreasing priority for study are methanol from coal, synthetic gasoline and distillate from coal and shale, and hydrogen.



With the committee's recommended budget in fiscal year 1977 the systems development work for the Stirling cycle system will carry forth the design work initiated in fiscal year 1976 and will proceed with hardware development. The past development work on the gas turbine will be brought together in fiscal year 1977 with road test of the complete system in three autos. The test results are expected to be highly publicized.

Starting in fiscal year 1977 the engine development activity will concentrate more on the turbine and the Stirling cycle systems. By the end of fiscal year 1977 it is expected that the turbine will be at the point where the mostly metallic turbine will have been proven to be energy efficient (6 percent better than ICE), clean and durable. The need for its continued development lies in fulfilling its potential for up to 50 percent improvement in fuel economy compared to the ICE and this will come mainly with use of ceramics to replace the metal in the high temperature rotating machinery. The successful ceramic heat exchanger development in fiscal year 1976 is one important step in the right direction; however, the more difficult task is to learn how to design components such as turbine wheels which rotate at high speed (60,000 rpm), while at high temperature (2300° F) and to fabricate the components out of ceramic materials with proven reliability and durability. The committee's recommended increase will also permit funding of innovative concepts for improving the ICE, and other components of the drive-train.

## JUSTIFICATION

TRANSPORTATION ENERGY CONVERSION

[In thousands of dollars]

| Fiscal year 1977 ERDA authorization | Operating expenses | | Plant and capital equipment | | Combined total | |
|---|---|---|---|---|---|---|
| | Budget authorizations | Budget outlays | Budget authorizations | Budget outlays | Budget authorizations | Budget outlays |
| Fiscal year: | | | | | | |
| 1975 | 8,142 | 8,443 | 0 | 0 | 8,142 | 8,443 |
| 1976 | 12,540 | 10,000 | 400 | 400 | 12,940 | 10,400 |
| 1977 request | 23,170 | 20,190 | 500 | 200 | 23,670 | 20,390 |
| Committee increase | 9,500 | 9,500 | 500 | 250 | 10,000 | 9,750 |
| Total committee recommendation | 32,670 | 29,690 | 1,000 | 450 | 33,670 | 30,140 |

The committee's addition of 10 million dollars will fund R&D efforts in a wide range of highway and non-highway transportation program efforts. Primarily the funds will provide for expansion of the gas turbine auto engine technology and hardware development; initiation of additional starting tasks—design, component technology, systems hardware, and baseline vehicle development—in the Stirling cycle auto engine development effort; carrying parallel electric vehicle systems efforts through fiscal year 1977 and acceleration of component development; expansion of alternative fuels utilization work including the addition of joint Federal-State demonstrations and hydrogen use research; and expansion of analyses of energy savings opportunities in the non-highway modes.

This substantial increase is due in part to results of recent analyses and recommendations which have been made since the ERDA budget

was formulated last year. These give evidence to the significant potential for shortening the time to availability of the alternative automotive propulsion system technologies through higher funding levels in earlier years. Also, candidate areas with high energy savings potential have been identified in the non-highway modes which require further analyses before development efforts are initiated.

Comparison of these excerpted paragraphs with the discussion in the committee report, clearly indicates that the amorphously described program envisioned under this bill simply restates, to the extent that it is clear, the ongoing ERDA automotive research and development program.

### Existing Program vs. H.R. 13655 Program

This conclusion leads to the next serious deficiency in the bill, and that is its failure to clearly define the relationship of the program under this bill to the ongoing ERDA program. Again, in the Subcommittee discussion of the bill during mark up, there was disagreement as to whether the two programs are totally separate, whether this bill merely expands ERDA effort already under way, or whether this bill expands the effort while adding the special provisions with emphasis on the laboratories and NASA. Depending upon the relationship which results from the bill, it is possible that real damage could be done to the ongoing program by requiring it to conform to the new provisions of this bill. The strong emphasis on NASA and the Federal Labor, for instance, may disrupt ERDA's plans to use other researchers, including private industry. Conversely, if this bill sets up a wholly independent program, albeit to apparently do the same things, then ERDA will be placed in the position of having two existing programs attempting to achieve the same goal but operating under different ground rules. This introduced the very real threat of duplication, and possibly even competition between programs within ERDA.

### Why Act Now?

As noted, the bill basically adds nothing positive to the ongoing program. But, as just discussed, the bill may very well introduce the potential for serious negative impact on that program. What then, is the justification for acting to put this program in place with $20 million in fiscal year 1977 and making it subject to annual authorization thereafter. That appears to be a central issue in the consideration of the bill.

There appears to be no justification, based on testimony or other information made available to the Committee, for acting now on this or any other auto R. & D. bill. Since the program is undefined, its relationship to the existing ERDA program is undefined and the funding provided does not make any substantial far-reaching impact, it is not at all clear what the urgency requiring legislation is today. As mentioned, the only clearly definable result of the program may very well be damage to the ongoing efforts of ERDA.

### Don't Act Now

A much better case can be made for *not* acting now. The requirement for annual authorizations after the coming year suggests that



this program could be handled entirely in the regular budget cycle as part of the annual ERDA authorization. None of the provisions added by the bill to the ERDA program appear to justify separate legislation. If any of them are of importance at all, they could be included in the authorization bill, either directly as provisions in that bill, or as amendments to the Federal Nonnuclear Research and Development Act of 1974, the basic authority for nonnuclear energy R. & D. in ERDA.

Additionally, several key studies which might clarify the situation on the direction of any expanded program will be available by the end of this year. They could be considered in the regular budget process for fiscal year 1978 and later years. Of primary importance is the Interagency Task Force Study on Motor Vehicle Goals Beyond 1980, the so-called Department of Transportation "300 Day Study". This Interagency effort will include specific recommendations for Federal efforts for future motor vehicles, according to the testimony received during our hearings. Those recommendations will include any required additional legislative authority, as well as funding levels, and specific research goals. The Office of Technology Assessment is currently engaged in a major assessment of changes in the use and characteristics of automobiles. This assessment will be available by the end of the year and is intended to focus directly on the issue of not only required changes in advanced automotive propulsion systems, but also the best method for achieving those changes, e.g., by regulation, by incentive to industry, by direct federal research, etc.

Both of these studies will have a major impact on the consideration of federal research and development in the automotive area. Passing this bill now, in the absence of the critical inputs from those studies, I believe, would be wholly irresponsible and completely unjustified in the light of the preceding discussion. Placing the Federal government in a major automotive research role should not to be done lightly. Both the short and long term ramifications of such an action could be of major consequences to our entire free enterprise system. The House, therefore, should be fully informed, with the best possible inputs such as these studies will provide, before it does act. The agencies who testified indicated that these various studies would have a heavy impact on their decisions on what to do. I believe the Congress should similarly await the benefit of the results of these efforts.

If Congress were to pass this bill, we would, in effect, be simply saying to the Appropriations Committee that they should make the decisions on the ERDA automotive research program, since we had failed to do so in this authorization bill. I make that point because it is apparent to me, in light of all of the above problems, that all we will be doing other than potentially damaging the existing ERDA program will be to add $20 million for fiscal year 1977 program and apply the non-funding provisions of the bill to later year funds.

### ERDA Annual Authorization

As should be apparent at this point, I strongly believe that the correct posture, for Congress to take on automotive research and development is to rely exclusively on the ERDA annual authorization, rather than to enact this bill. It is important to note that *each* of the witnesses

who appeared before the Committee agreed with this conclusion. Dr. Linden of the Massachusetts Institute of Technology and Dr. Stephenson of the Jet Propulsion Laboratory both agreed that annual authorizations were the preferred way to go in any acceleration or expansion of the existing ERDA program. In fact, Dr. Linden stated quite categorically that he saw no need for a new bill for any acceleration or expansion. These comments were based on their collective agreement that the difficulties identified above regarding the specific focus and direction of the program should not be intensified by premature legislation. The agency witnesses who testified in our hearings agreed. Although some of the witnesses clearly favored acceleration and expansion of the ongoing program, they all agreed that annual authorization was the better way to accomplish that objective.

Annual authorization clearly strengthens Congressional oversight generally, and provides an opportunity for Congress to control the direction and size of the program. It also provides an opportunity to take into account inputs such as are anticipated from the pending studies. The authorization process is particularly adapted to making sure, as required by amendment to this bill, that the Federal activities do not supplant or materially duplicate those of industry. We can ensure that there is minimal duplication of effort and maximum coordination between the various Federal agencies engaged in these programs. Further, careful consideration can be given to the relative mix of direct federal laboratory activity versus private contract research and development in best meeting the objectives of the programs. This is a particularly important factor when the ultimate goal of the research and development is the commercialization of the new technology in a highly sophisticated, mass production and distribution industry, such as the automobile industry. An active partnership of government and industry researchers is mandatory to ensure that the developed technology has a realistic application and relevance to the requirements of the marketplace. Absence of this close monitoring and control can only lead to yet another white elephant Federal government technology that cannot be utilized in the general economy.

All of these factors add up to one conclusion. There is absolutely no justification for this legislation at this time. Further, passing it at this time can only lead to damage, in one form or another, to the existing ERDA program. I urge my colleagues to take the above factors, which lead to this conclusion into account in considering this legislation. These factors are particularly important in light of the apparently innocuous nature of the bill on its face as reported by the Committee. The relatively small level of funding and general provisions of the bill nearly hide what could be a very counter-productive action by the Congress. If one is convinced that there is a legitimate and responsible role for the Federal government in automotive R&D, it should be apparent that that role is best authorized in the currently existing ERDA annual authorization process, rather than by passage of this bill.

## H.R. 13655–S. 1883, Title II Conference

H.R. 13655 is perhaps equally objectionable for what it could become, as well as for what it is as reported. That is the key to the second



element, the eventual H.R. 13655–S. 1883, Title II conference, if this bill is passed by the House. Members should not consider this as a vote on a mere $20 million R&D bill, but rather as a vote on a bill probably leading to a Conference bill with close to $130 million direct funding and $75 million in loan guarantees, i.e. S. 1883.

If H.R. 13655 is passed by the House, it most probably will go to conference with the companion bill, S. 1883, Title II, and possibly one or more other bills. As I'm sure all my colleagues appreciate, the new Rule XXVIII provides both a scope and germaneness test now for reviewing conference bills. Assuming that the conference committee only reports a bill which meets the test of Rule XXVIII, rather than attempting to exceed it as was done in the S. 622 Conference, the boundaries on the scope of the conference bill would be set by the differences between H.R. 13655 and, at a minimum, S. 1883, Title II. Any other bills included in the conference could, of course, broaden its scope.

The conference bill, therefore, conceivably could include loan guarantees of up to $55 million, as provided in S. 1883. The specific provisions associated with such guarantees could be as unacceptable as those in the S. 1883. Additionally, the conference bill conceivably could include as much as $130 million in direct research and development grants. Again, the specific provisions associated with the grant funding could be as unacceptable as those in S. 1883. The program could be placed in the Department of Transportation rather than in ERDA, notwithstanding the provisions of existing energy research and development statutes. Such placement of the program would further exacerbate the continuing problem of coordinating our nation's energy research and development efforts for maximum effectiveness and efficiency, as well as further undermine the intent of Congress as expressed in the Energy Reorganization Act of 1974.

Passage of H.R. 13655 at the very least, then, creates the distinct and very real possibility that the House will be presented with a subsequent and resulting conference bill with up to $130 million in direct research and development and $55 million in loan guarantees, with less than acceptable provisions, and all placed in the wrong agency of the federal government. In suggesting this distinct and very real possibility, I am merely reflecting the parliamentary and procedural ground rules and limitations place on any conference committee under Rule XXVIII. I do not in any way intend to directly or indirectly or by implication impugn the prospective integrity of any potential House conferee. I am certain that my colleagues on the Science and Technology Committee, who will likely be the House conferees in such a conference, would fully discharge their responsibilities to the House in the conference by negotiating in good faith from the basis of H.R. 13655 as it might pass the House in the future.

I do think, however, that it is fair and significant to note that the reported bill is a greatly attenuated version of a staff draft originally proposed in Subcommittee by the proponents of a major Federal automotive R&D program. Again, I do not intend in any way to impugn the integrity of my colleagues. But, it is a fact that the staff draft fashioned by the proponents included provision for $75 million in federal loan guarantees, albeit, in all fairness, with far more acceptable limitations than applied to the loan guarantees in S. 1883. It is noteworthy

that the $75 million actually exceeds the $55 million loan guarantee provision in S. 1883. Of course, since the $75 million is out of the current H.R. 13655, the maximum figure from any future conference would be the S. 1883, $55 million for loan guarantee.

The staff draft also included a total of $150 million for research and development over a five year period, which of course would be in addition to that funding separately authorized for the ERDA advanced automotive systems research included in ERDA's annual authorization. The figure in the recently reported fiscal year 1977 ERDA authorization for that program was $30 million. The intention stated by proponents in Subcommittee was to create a program with combined funding, that from H.R. 13655 plus that in the annual ERDA authorization, of approximately $50 million per year, or $250 million over five years.

S. 1883 includes $50 million for fiscal year 1976 and $80 million for fiscal year 1977, or a total of $130 million over two years for auto R. & D. in the Department of Transportation. As these figures cleanly indicate, programs represented by the staff draft fashioned by the proponents and by S. 1883 include comparable levels of funding for direct auto R. & D. It, therefore, appears that the respective proponents of both bills envision programs of relatively the same size, albeit placed in different agencies.

Admittedly, the House at this point does not have the staff draft before it in the reported bill, but rather has the greatly attenuated, amended version included in H.R. 13655. Also, it would be pure speculation to suggest that any future House conferee would not seriously attempt to represent the House position as established in the bill as passed by the House, notwithstanding any strong personal conviction regarding an aggressive Federal auto R. & D. program. But, I do think it is important and it is fair for the House to know fully how this legislation has been fashioned and its comparison with S. 1883 at the various stages in its progression through the legislative process. I think that this full knowledge is critical so that each Member can give complete consideration to the direction in which this legislation may eventually lead. And that, I firmly believe, is a direct responsibility of each Member in making the final decision on whether or not to support this legislation.

BARRY M. GOLDWATER, Jr.

○

94TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 94–1199

# PROVIDING FOR THE CONSIDERATION OF H.R. 13655

MAY 26, 1976.—Referred to the House Calendar and ordered to be printed

Mr. PEPPER, from the Committee on Rules, submitted the following

## REPORT

[To accompany H. Res. 1222]

The Committee on Rules, having had under consideration House Resolution 1222, by a nonrecord vote, report the same to the House with the recommendation that the resolution do pass.

O

[STAFF WORKING PAPER]
JULY 15, 1976

94TH CONGRESS 2d Session | SENATE | REPORT No. 94–1043

# AUTOMOTIVE TRANSPORT RESEARCH AND DEVELOPMENT ACT OF 1976

JULY 21, 1976.—Ordered to be printed



Mr. TUNNEY, from the committee of conference, submitted the following

## CONFERENCE REPORT

[To accompany H.R. 13655]

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the text of the bill (H.R. 13655) to establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes, having met, after full and free conference, have agreed to recommend and do recommend to their respective Houses as follows:

That the House recede from its disagreement to the amendment of the Senate to the text of the bill and agree to the same with an amendment as follows:

In lieu of the matter proposed to be inserted by the Senate amendment, insert the following:

*That this Act may be cited as the "Automotive Transport Research and Development Act of 1976".*

*FINDINGS AND PURPOSES*

*SEC. 2. (a) The Congress finds that—*

*(1) existing automobiles, on the average, fall short of meeting the long-term goals of the Nation with respect to environmental protection, safety, and energy conservation;*

*(2) advanced alternatives to existing automobiles could, with sufficient research and development effort, meet these long-term goals, and have the potential to be mass produced at reasonable cost; and advanced automobiles could operate with significantly less adverse environmental impact and fuel consumption*

than existing automobiles, while meeting all of the other requirements of Federal law;

(3) insufficient resources are being devoted to both research on and development of advanced automobile technology;

(4) an expanded research and development effort with respect to advanced automobile technology would complement and stimulate corresponding efforts by the private sector and would encourage automobile manufacturers to consider seriously the incorporation of such advanced technology into automobiles and automobile components; and

(5) the Nation's energy, safety, and environmental problems are urgent, and therefore advanced automobile technology should be developed, tested, demonstrated, and prepared for manufacture within the shortest practicable time.

(b) It is therefore the purpose of the Congress in this Act to—

(1)(A) direct the Energy Research and Development Administration to make contracts and grants for research and development leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years of the date of enactment of this Act, or within the shortest practicable time consistent with appropriate research and development techniques, and (B) evaluate and disseminate information with respect to advanced automobile technology.

(2) preserve, enhance, and facilitate competition in research, development, and production with respect to existing and alternative automobiles, automobile propulsion systems, and automobile components; and

(3) supplement, but neither supplant nor duplicate, the automotive research and development efforts of private industry.

DEFINITIONS

SEC. 3. As used in this Act, the term—

(1) "Administrator" means the Administrator of the Energy Research and Development Administration;

(2) "advanced automobile" means a personal-use transportation vehicle which is fuel-propelled and is energy-efficient, safe, reliable, damage-resistant, and environmentally sound, and which—

(A) requires, consistent with environmental requirements, the least total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing automobiles with respect to such factors;

(B) to the extent practicable, is capable of utilizing different types of fuel;

(C) can be mass produced at the lowest possible cost consistent with the requirements of this Act;

(D) has a projected ownership cost to the first owner which is competitive with automobiles of the same size and class which are produced using standard technology, taking into account the other features of such advanced automobile which



may justify costs different than those associated with standard technology;

(E) operates safely and with sufficient performance with respect to acceleration, cold weather starting, cruising speed, and other performance factors;

(F) to the extent practicable, is capable of intermodal adaptability; and

(G) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any requirement of Federal law, including requirements for fuel economy, exhaust emissions, noise control, safety, and damage resistance;

(3) "advanced automobile propulsion system" means an energy conversion system, including engine and drive train, which utilizes advanced technology and is suitable for use in an advanced automobile;

(4) "advanced automobile subsystem" means a subsystem which impacts materially the performance of the automobile in terms of fuel economy, environmental impact, safety, damageability, or reliability, and for which there is promise of technological improvement in such performance through research and development;

(5) "damage resistance" refers to the ability of an automobile to withstand physical damage when involved in an accident;

(6) "developer" means any person engaged in whole or in part in research or other efforts directed toward the development of advanced automobile technology;

(7) "fuel" means any energy source capable of propelling an automobile;

(8) "fuel economy" refers to the average distance traveled in representative driving conditions by an automobile per unit of fuel consumed, as determined by the Administrator of the Environmental Protection Agency in accordance with test procedures which shall be established by rule and shall require that fuel economy tests be conducted in conjunction with the exhaust emissions tests mandated by section 206 of the Clean Air Act (42 U.S.C. 1857f–5);

(9) "integrated test vehicle" means a vehicle which incorporates an advanced automobile propulsion system and other advanced automobile subsystems and which is used to determine, when functioning in an integrated manner, the compatibility and performance characteristics of these advanced subsystems over their useful life, (A) consistent with the Nation's need to increase substantially automobile fuel economy, to reduce substantially environmental impact, to conform to Federal requirements, including safety and damageability standards, and otherwise to provide automobiles satisfactory to consumers without unduly compromising the advanced automotive propulsion system and other subsystems; and (B) compatible with the criteria for an advanced automobile;

(10) "intermodal adaptability" refers to any characteristics of an automobile which enable it to be operated or carried, or which facilitate its operation or carriage, by or on an alternative mode or other system of transportation;

(11) "reliability" refers to (A) the average time and distance over which normal automobile operation can be expected without significant repair or replacement of parts, and (B) the ease of diagnosis and repair of an automobile, its systems, and parts in the event of failure during use or damage from an accident;

(12) "safety" refers to the performance of an automobile or automobile system or equipment in such a manner that the public is protected against unreasonable risk of accident and against unreasonable risk of death or bodily injury in case of accident;

(13) "Secretary" means the Secretary of Transportation; and

(14) "State" means any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, or any other territory or possession of the United States.

DUTIES OF THE ADMINISTRATOR

SEC. 4. (a) The Administrator shall establish, within the Energy Research and Development Administration, a program to insure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years after the date of enactment of this Act, or within the shortest practicable time, consistent with appropriate research and development technique. In conducting such program, the Administrator shall—

(1) establish and conduct new projects and accelerate existing projects which may contribute to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles;

(2) give priority attention to the development of advanced propulsion systems with appropriate attention to those advanced propulsion systems which are flexible in the type of fuel used, except that in integrating the various features of an automobile or the purpose of constructing integrated test vehicles, the Administrator shall incorporate advanced technology with respect to safety, damagability, and the other features of an integrated test vehicle in a manner which recognizes the automobile as a personal transportation system; and

(3) insure that research and development under this Act supplements, but neither supplants nor duplicates, the automotive research and development efforts of private industry.

(b) The Administrator shall, in fulfilling his responsibilities under this Act, make contracts and grants with any Federal agency, laboratory, university, non-profit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual for—

(1) research and development leading to advanced automobile propulsion systems which are likely to help meet the Nation's long-term goals with respect to fuel economy, environmental protection, and other objectives;

(2) research and development on other automobile subsystems in which possible improvements can be identified and which are suitable for inclusion in an integrated test vehicle; and

(3) the integration of advanced automobile propulsion systems developed under this program, with other advanced automobile



subsystems developed under this program or elsewhere, into integrated test vehicles, which will be fully tested to determine the characteristics of such advanced propulsion system and other subsystems when integrated.

(c) In providing financial assistance under this Act, the Administrator shall give full consideration to the capabilities of Federal laboratories, except that not more than 60 per centum of the funds appropriated pursuant to the authorization under section 12 shall be directly expended in Federal laboratories. In accordance with section 7, such laboratories shall be available for testing components and subsystems which, in the Administrator's judgment, is likely to contribute to the development of advanced automobiles.

(d) The Administrator shall conduct evaluations, arrange for tests, and disseminate information pursuant to section 7 and submit reports required under section 10.

(e) The Administrator shall intensify research in key basic science areas in which the lack of knowledge limits development of advanced automobile propulsion systems.

DUTIES OF THE SECRETARY

SEC. 5. The Secretary, in furtherance of the purposes of this Act, shall evaluate the extent to which the automobile industry utilizes advanced automotive technology which is or could be made available to it. The Secretary shall submit a report to the Congress each year on the results of such evaluation including any appropriate recommendations which may encourage the utilization of advanced automobile technology by the automobile industry.

COORDINATION AND CONSULTATION

SEC. 6. (a) The Administrator shall have overall management responsibility for carrying out the program under section 4. In carrying out such program, the Administrator, consistent with such overall management responsibility—

(1) shall utilize the expertise of the Department of Transportation to the maximum extent practicable in the areas of safety and damageability research and development and, to the extent deemed appropriate by the Administrator, in other areas of research and development on automobile technology; and

(2) may utilize any other Federal agency (except as provided in paragraph (1)) in accordance with subsection (c), in carrying out any activities under this Act, to the extent that the Administrator determines that any such agency has capabilities which would allow such agency to contribute to the purposes of this Act.

(b) The Secretary, whenever the expertise of the Department of Transportation is utilized in accordance with subsection (a), may exercise the powers granted to the Administrator under subsection (c) and shall enter into contracts and make grants for such purpose, subject to the overall management responsibility of the Administrator.

(c) The Administrator may, in accordance with subsection (a), obtain the assistance of any department, agency, or instrumentality of the executive branch of the Federal Government upon written request, on a reimbursable basis or otherwise and with the consent of

*such department, agency, or instrumentality. Each such request shall identify the assistance the Administrator deems necessary to carry out any duty under this Act.*

*(d) The Administrator shall consult with the Administrator of the Environmental Protection Agency and the Secretary, and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in the area of automobile research, development, and technology. The Administrator may establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under this Act.*

*(e) Nothing contained in this Act shall be construed to reduce in any way the responsibilities of the Administrator for automotive research, development, and demonstration under the Energy Reorganization Act of 1974 (42 U.S.C. 5801 et seq.) and the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901 et seq.)*

*EVALUATION, TESTING, AND INFORMATION DISSEMINATION*

*SEC. 7. (a) The Administrator shall, for the purposes of performing his responsibilities under this Act, consider any reasonable new or improved technology, a description of which is submitted to the Administrator in writing, which could lead or contribute to the development of advanced automobile technology.*

*(b) The Administrator of the Environmental Protection Agency shall test, or cause to be tested, in a facility subject to Environmental Protection Agency supervision, each integrated test vehicle developed in whole or in part with Federal financial assistance under this Act, or referred to the Administrator of the Environmental Protection Agency for such purpose by the Administrator, to determine whether such vehicle complies with any exhaust emission standards or any other requirements promulgated or reasonably expected to be promulgated under any provision of the Clean Air Act (42 U.S.C. 1857 et seq.), the Noise Control Act of 1972 (42 U.S.C. 4901 et seq.), or any other provision of Federal law administered by the Administrator of the Environmental Protection Agency. In conjunction with any test for compliance with exhaust emission standards under this section, the Administrator of the Environmental Protection Agency shall also conduct tests to determine the fuel economy of such vehicle. The Administrator of the Environmental Protection Agency shall submit all test data and the results of such tests to the Administrator.*

*(c) The Secretary shall test, or shall cause to be tested in a facility subject to supervision by the Secretary, each type of integrated test vehicle developed in whole or in part with Federal financial assistance under this Act, or referred to the Secretary for such purpose by the Administrator, to determine whether such vehicle complies with any standards promulgated as of the date of such testing, or reasonably expected to be promulgated in the future, under any provision of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1381 et seq.), the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.), the Automobile Information Disclosure Act (15 U.S.C. 1232), and any other statute enacted by Congress and whose provisions are applicable to automobiles where testing would be*



*appropriate. All test data and the results of all tests conducted by the Secretary shall be submitted to the Administrator.*

*(d) The Administrator shall collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of advanced automobile technology.*

*PATENTS*

*SEC. 8. Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908) shall apply to any contract (including any assignment, substitution of parties, or subcontract thereunder) or grant, entered into, made, or issued by the Administrator under this Act.*

*COMPTROLLER GENERAL AUDIT AND EXAMINATION*

*SEC. 9. Section 306 of the Energy Reorganization Act of 1974 (42 U.S.C. 5876) shall apply with respect to the authority of the Comptroller General to have access to and rights of examination of books, documents, papers, and records of recipients of financial assistance under this Act; except that for the purposes of this Act, the term "contract" (as used in section 166 of the Atomic Energy Act (42 U.S.C. 2206), insofar as it relates to such section 306) means "contract or grant".*

*REPORTS*

*SEC. 10. (a) As a separate part of the annual report submitted under section 15(a) of the Federal Nonnuclear Energy Research and Development Act of 1974 with respect to the comprehensive plan and program then in effect under section 6 (a) and (b) of such Act, the Administrator shall submit to Congress an annual report of activities under this Act. Such report shall include—*

*(1) a current comprehensive program definition for implementing this Act;*

*(2) an evaluation of the state of automobile research and development in the United States;*

*(3) the number and amount of contracts and grants made under this Act;*

*(4) an analysis of the progress made in developing advanced automobile technology; and*

*(5) suggestions for improvements in advanced automobile research and development, including recommendations for legislation.*

*(b) The Administrator shall conduct a survey of developers, lending institutions, and other appropriate persons or institutions and shall otherwise make a study for the purpose of determining whether, and under what conditions, research, development, demonstration, and commercial availability of advanced automobile technology may be aided by the guarantee of financial obligations by the Federal Government. The Administrator shall report the results of such survey and study to the Congress within 1 year after the date of enactment of this Act. Such report shall include an examination of those stages of advanced automobile technology research, development, demonstration,*

*and commercialization for which financial obligation guarantees may be useful or appropriate and shall contain such legislative recommendations as may be necessary.*

*AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT*

*SEC. 11. (a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended by redesignating subsection (d) as subsection (e), and by inserting immediately after subsection (c) the following new subsection:*

*"(d) The Congress declares that the general welfare of the United States requires that the unique competence in scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the development of advanced automobile propulsion systems. Such development shall be conducted so as to contribute to the achievement of the purposes set forth in section 2(b) of the Automotive Transport Research and Development Act of 1976.".*

*(b) The subsection of section 102 of such Act redesignated as subsection (e) by subsection (a) of this section is amended by striking out "and (c)" and inserting in lieu thereof "(c), and (d)".*

*AUTHORIZATION FOR APPROPRIATION*

*SEC. 12. There are authorized to be appropriated to carry out the purposes of this Act—*

*(1) not to exceed $25,000,000 for the fiscal year ending September 30, 1977, and*

*(2) not to exceed $75,000,000 for the fiscal year ending September 30, 1978.*

*(b) Any budget request for appropriations pursuant to the authority in subsection (a) shall specify the relationship between the research, development, and demonstration to be supported with such appropriations and any related requests for appropriations for programs of the Federal Government concerning automobile research and development.*

WARREN G. MAGNUSON,
FRANK E. MOSS,
JOHN V. TUNNEY,
HOWARD H. BAKER, JR.,
TED STEVENS,
*Managers on the Part of the Senate.*

OLIN E. TEAGUE,
DON FUQUA,
MIKE MCCORMACK,
GEORGE E. BROWN, JR.,
RAY THORNTON,
CHARLES A. MOSHER,
BARRY M. GOLDWATER, JR.,
*Managers on the Part of the House.*

# JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF CONFERENCE

The managers on the part of the House and the Senate at the conference on the disagreeing vote of the two Houses on the amendment of the Senate the bill (H.R. 13655) to establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes, submit the following joint statement to the House and the Senate in explanation of the effect of the action agreed upon by the managers and recommended in the accompanying conference report:

The Senate amendment struck out all after the enacting clause and inserted a substitute text. The differences between the House bill and the Senate amendment, and the substitute agreed to in conference, are noted below. Minor technical and clarifying changes are not discussed.

## SUMMARY

The Automotive Transport Research and Development Act is the result of a committee of conference designated to reconcile the differences between the House and Senate versions of H.R. 13655.

The substitute reported by the committee of conference establishes a program within the Energy Research and Development Administration (ERDA) for advanced automobile research and development. A 5-year program is provided to ensure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles (which is a new term resulting from the compromise by the committee of conference).

The Administrator of ERDA would establish in-house programs and provide grants and contracts outside ERDA. The Administrator is to utilize other Federal agencies to the extent that they have expertise appropriate to the R. & D. program.

The Administrator would be responsible for testing and evaluating new technology, as well as establishing a capability for information collection, analysis, and dissemination.

The Administrator would submit reports on the research and development activities within the United States, as well as prepare a report on the need for a loan guarantee authority in order to perform research and development activities in automobile technology and commercialization thereof.

## MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT

*House bill*

The House bill was not structured as an amendment to existing law.

*Senate amendment*

The Senate amendment was structured as an amendment to the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.).

*Conference substitute*

The conference substitute is not structured as an amendment to an existing law.

FINDINGS AND PURPOSES

*House bill*

The House bill contains findings of the Congress that existing automobile propulsion systems do not meet national goals but that, with the aid of research and development, advanced alternatives could meet long-term goals while conforming to all Federal requirements.

Insufficient resources are now being devoted to advanced automobile propulsion systems and their components. An expanded R. & D. program would complement and stimulate private efforts and encourage manufacturers to substitute advanced propulsion systems and their components for existing technology.

The findings also state that the Nation's energy, safety, and environmental problems are urgent and that advanced propulsion systems should be developed, tested, and prepared for manufacture in the shortest practical time.

A statement of Congressional purposes is also provided. The provisions state that it is the purpose of Congress in this Act to (1) make contracts and grants under a 5-year program leading to an advanced automobile propulsion system which is likely to meet the Nation's long-term goals, (2) preserve, enhance, and facilitate competition in R. & D. and (3) supplement, but not supplant, the automotive research and development efforts of private industry.

*Senate amendment*

The Senate amendment is similar to the House provision, except that the Senate provision reflects the Senate goal of preparing production prototypes of automobiles, whereas the House provision confines itself primarily to propulsion systems. Moreover, the purposes are modified in the Senate amendment to reflect the goal of preparing production prototypes of advanced automobiles within 4 years of the date of enactment, or within the shortest practicable time consistent with appropriate research and development techniques.

*Conference substitute*

The conference substitute is similar to both the House bill and the Senate amendment, but with differences which reflect the conference agreement concerning the scope of the program. The conference substitute declares the purpose of Congress in this program is to make grants and contracts for R. & D. leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years of the date of enactment of this Act, or within the shortest practicable time consistent with appropriate research and development techniques.

The conference substitute states that the program is "to supplement, but not supplant nor duplicate, the automobile research and development efforts of private industry".

The conference substitute includes three basic elements in placing this requirement on the Federal program. First, the program must



supplement the automotive R. & D. efforts of industry. While ERDA is not limited merely to "adding to" or "building on" projects initiated by the private sector, the Federal R. & D. should be supportive of the private sector's R. & D. and formulated to produce advanced technology which can be ultimately refined for incorporation in mass production vehicles. This also means that ERDA should make reasonable attempts to learn from the private sector's R. & D. successes and failures, and not "reinvent the wheel" in formulating its program. For example, if considerable R. & D. effort has been put into a new system and it has been decided for good reason that the system cannot be satisfactorily refined for mass production vehicles, ERDA should not attempt, in the absence of a new technological advancement or other significant consideration, to conduct Federal R. & D. on the system. Certainly, in any situation where ERDA does launch such a program, it should have the burden to justify to Congress why there should be such Federal R. & D.

Second, the ERDA program should not be formulated in a manner which will supplant private sector R. & D. The program should not result in any displacement or lessening of industry's R. & D. commitment. The program, therefore, should be focused on R. & D. which the private sector has not and will not include in its normal program. Of course, ERDA will not be precluded from engaging in a project because the private sector may conduct it in the future or will conduct it, but at a time sufficiently distant so that the benefits resulting will not be available at a time which will achieve the goals of this Act.

Third, the program should not duplicate private R. & D. While there may be some necessary duplication of effort in the conduct of related R. & D., ERDA should not include R. & D. projects in the Federal program if the private sector is engaged in similar development. ERDA, however, can conduct R. & D. on advanced generations of automobile technology and on advanced refinements to automobile technology in use or under development by the private sector. Additionally, as required by section 4(e), ERDA shall intensify research in basic science areas, such as combustion and advanced materials research, which limits the development of advanced automobile propulsion systems.

The combined effect of the three elements of this requirement is intended to sharply define a Federal automotive R. & D. program which ultimately will advance the overall pace of development and state-of-the-art of advanced automotive technology. This cumulative advance will be accomplished not by wasting Federal R. & D. funds through unnecessary duplication and not by displacing or supplanting private efforts by having ERDA do the R. & D. for the private sector, but rather by establishing a Federal program which will supplement private R. & D. and be supportive of the private sector's ultimate development and design responsibility for transfer of the advanced technology into mass production vehicles. The conferees intend that the Federal automotive R. & D. program under this Act will be formulated and implemented in a manner which is consistent with each element of this requirement and with the overall combined effect of the three elements in advancing automotive technology.

DEFINITIONS

*House bill*

Terms used throughout the House bill are defined.

Of particular interest is the definition of "advanced automobile propulsion system" as the program envisioned by the House bill centers around a 5-year program aimed at the development of such systems. The term is defined to mean "an energy conversion system, including engine and drive train, which is used to propel an advanced automobile".

*Senate amendment*

Under the Senate amendment, the definition of an "advanced automobile" is important as the development of production prototypes of advanced automobiles is the goal. The term is defined to mean a personal use transportation vehicle which requires, consistent with environmental requirements, the least total amount of energy to be consumed during its fabrication, operation, and disposal, and must represent a substantial improvement over existing automobiles with respect to energy consumed. The vehicle must be capable of mass-production at the lowest possible cost consistent with the requirements of this title (the Senate amendment adds a new title VI to the Motor Vehicle Information and Cost Savings Act). It must operate safely and perform sufficiently with respect to acceleration, cold weather starting, cruising speed, and other performance factors. It must be, to the extent practicable, capable of intermodal adaptability, and comply with any requirement of Federal law.

The definition differs from the comparable definition of the House bill in that the Senate version does not include the requirement that projected ownership costs to the first owner be comparable to standard automobiles.

The Senate amendment does not include a definition of "advanced automobile propulsion system".

The Senate amendment includes a definition of "production prototype" whose construction is the goal of the R. & D. program. It is defined to mean an automobile which is in its final stage of development and is capable of being placed into production for retail sale in quantities exceeding 10,000 automobiles per year.

*Conference substitute*

The conference substitute includes definitions common to both the House bill and the Senate amendment.

In addition, the conference substitute defines "integrated test vehicle" which are to be developed under the 5-year program envisioned by the conference substitute along with advanced propulsion systems and advanced automobile subsystems. Integrated test vehicles incorporate advanced propulsion systems and other advanced automobile subsystems and are used to determine, when functioning in an integrated manner, the performance of such integrated systems and vehicles over their useful life. Integrated test vehicles must substantially increase automobile fuel economy and substantially reduce environmental impact and conform with all applicable Federal requirements. Integrated test vehicles must otherwise be satisfactory (concerning factors such as acceleration and handling) without unduly compromising the advanced automobile propulsion system, which is the heart of the vehicle. The vehicles must also perform sufficiently in different types of climatic conditions. Finally, the vehicle is to be compatible with criteria for an advanced automobile. In other words, it may not be developed in a way which will preclude subsequent development as an advanced automobile. This means that the integrated test vehicle need not satisfy each criterion comprising an advanced automobile. Rather, the technology must be developed, integrated, and tested in a manner that will support further engineering development and tooling for use in a mass produced vehicle. For example, the vehicle may not be of such an exotic nature that the technology cannot be incorporated into a mass-producable vehicle. Nor can the technology, when incorporated into mass produced vehicles, be extraordinarily costly to the consumer.



As the integrated test vehicle is defined to include advanced propulsion systems and other automobile subsystems, the definition of "advanced automobile subsystems" is important. It is defined to mean a subsystem of an automobile which materially impacts the performance of the automobile in terms of fuel economy, environmental impact, safety, damageability, or reliability and for which there is a promise of technological improvement in such performance through research and development.

The definition of "advanced automobile" contained in the conference substitute adopts the ownership cost criterion of the House bill with slight modification. The ownership cost consideration to be taken into account to the first owner must be "competitive with automobiles of the same size and class which are produced using standard technology taking into account the other features of such automobile which justify costs different than those associated with standard technology". Ownership cost refers not only to purchase cost but also operating and maintenance costs to the first owner.

In several places in the conference substitute, the term "advanced automobile technology" is used. So that there is no confusion over the use of this term, it is meant to include advanced propulsion systems, advanced automobile subsystems, and integrated test vehicles.

The definition of "advanced propulsion system" used in the House bill is incorporated in the conference substitute.

DUTIES OF THE ADMINISTRATOR

*House bill*

The House bill requires the Administrator to establish a 5-year program aimed at the development of advanced automobile propulsion systems which, to the maximum extent practicable, are flexible in the type of fuel used. In doing so, the Administrator would make grants and contracts for R. & D. and establish a research, development, and demonstration program within ERDA. The Administrator would intensify research in key basic science areas and give full consideration to the capabilities of Federal laboratories, except that not more than 60 percent of the funds authorized could be directly expended in Federal laboratories. The Administrator would conduct an active industry-Government fellowship program for scientists involved in automobile R. & D.

The Administrator would consider any reasonable new or improved technology and to make Federal laboratories available for developing and prooftesting components and subsystems.

Procedures would be established for utilizing the Office of Energy-Related Inventions at the National Bureau of Standards.

Consideration would be given to the capabilities of other Federal agencies in the conduct of the programs under this authority. The Administrator would consult with EPA and establish procedures for periodic consultation with representatives of science, industry, and other groups. The Administrator would establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under this Act and to ensure that the R. & D. efforts supplement, but not supplant, the R. & D. efforts of the private industry.

*Senate amendment*

The Senate amendment requires that production prototypes of an advanced automobile be developed within 4 years after the date of enactment or within the shortest time practicable consistent with appropriate R. & D. technique. Non-petroleum based fuel would be utilized by the automobile to the maximum extent practicable.

In furtherance of the program, the Administrator would make contracts, grants, and loan guarantees for R. & D. efforts and establish new projects and accelerate existing projects within the Agency.

The Administrator would test or direct the testing of production prototypes and secure certification for Government procurement purposes (discussed later).

The Administrator would collect, analyze, and disseminate to developers information, data, and materials relevant to the development of advanced automobiles and evaluate any reasonble new or improved technology submitted to the Administrator.

Finally, the Administrator could not construct production prototypes if the Administrator found that such effort would duplicate efforts outside the Federal Government. A report of such finding would be submitted to relevant committees of Congress 60 days prior to making the finding.

*Conference substitute*

The conference substitute requires the Administrator to establish in ERDA a program to ensure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years, or within the shortest practicable time consistent with appropriate research and development techniques. No authority exists to finance the construction of production prototypes.

The Administrator is to establish and conduct new projects and accelerate existing projects in furtherance of the goals, and to give priority attention to the development of advanced propulsion systems, with appropriate attention to those which are flexible in the type of fuel used. Moreover, the Administrator is to ensure that R. & D. under this Act supplements, but does not supplant nor duplicate, the automotive research and development efforts by private industry. Again, the committee of conference intends the same interpretation of the latter requirement as that discussed earlier under "Findings and Purposes".



Thus, the conference substitute draws a middle-ground between the House and Senate versions of the legislation. Whereas the House version authorized a program only with respect to advanced propulsion systems, the Senate envisioned the preparation of production prototypes, defined in the Senate amendment to mean "an automobile which is in its final stage of development and which is capable of being placed into production, for sale at retail, in quantities exceeding 10,000 automobiles a year.

The conference substitute authorizes and requires the development of advanced automobile propulsion systems, other advanced automobile subsystems and "integrated test vehicles." Integrated test vehicles are complete, fully-tested vehicles, yet which have not gone through production engineering and made fully ready for mass production. It is clear that the heart of the vehicle to be produced is the propulsion system, and most of the effort, at least in the initial stages of the program should be directed toward the propulsion system. The committee of conference anticipates that perhaps two-thirds to three-fourths of the funds available over the life of the program would be devoted to advanced automobile propulsion systems. At the same time, it is extremely difficult to place an advanced propulsion system into existing automobiles and expect them to work properly without further R. & D. Problems of engine compartment size, chassis construction, weight distribution and other factors require that the vehicle produced be an integrated whole.

The vehicle must comply with all Federal standards affecting automobiles. Thus, in constructing the integrated vehicle, the ERDA Administrator must insure that standards relating to safety, damageability, and other requirements be complied with. It is expected that the Administrator will utilize advanced technology with respect to these factors in constructing the integrated text vehicle.

Provision is made (see "Coordination and Consultation") for the Administrator to coordinate his activities with the Secretary of Transportation and to utilize, to the maximum extent practicable, the expertise of the Department of Transportation (DOT) with respect to safety and damageability, in conducting the program under this Act. The conferees are of the opinion that the Administrator should use DOT for those areas of research and development in which it is the most appropriate Federal agency to perform the task. Other Federal agencies which have special expertise, such as the National Aeronautics and Space Administration with its propulsion system expertise, will participate as well.

Nonetheless, with respect to integrated test vehicles, new, advanced and innovative technology will be utilized to comply with applicable Federal standards.

In providing financial assistance, the Administrator is to give full consideration to the capabilities of Federal laboratories. The House provision providing that not more than 60 percent of the funds authorized to be appropriated shall be expended in Federal laboratories is incorporated. The 60 percent limitation is to be viewed not as a goal, but as a limitation. A lesser percentage is desirable.

The committee of conference discussed the question of how many integrated test vehicles should be constructed under the conference substitute. While it is difficult to predict the precise number of inte-

grated test vehicles that will be necessary for full and adequate testing, as required under the conference substitute, it is clearly the conferees' intention that the vehicles produced may number twenty or thirty, but not in the hundreds or thousands. Nonetheless, a sufficient number should be produced which will conform with the requirement that the vehicle will be tested over its useful life, and that the test data generated be reliable. Of course, accelerated testing will take to eliminate the necessity of testing for 5 or 10 years, or longer.

The substitute also requires the Administrator to intensify research in basic science areas, such as combustion and advanced materials research which limit the development of advanced propulsion systems.

DUTIES OF THE SECRETARY

*House bill*

The House bill requires the Secretary to make available facilities and expertise for testing prototypes which are developed based on activities related to the programs under this Act and to collect, analyze, and disseminate to developers information, data, and materials that may be relevant.

The Secretary is to evaluate the extent to which the automobile industry utilizes current technology and to recommend incentive measures to the Congress.

*Senate amendment*

No comparable provision.

*Conference substitute*

The conference substitute requires the Secretary to evaluate the extent to which the automobile industry utilizes advanced automotive technology and shall report to the Congress on an annual basis on the results of this continuing study and shall include in such report any recommendations that may be appropriate to encourage utilization of advanced automobile technology by the automobile industry. The other duties of the Secretary referred to in the House bill have been incorporated in other provisions of the conference substitute.

COORDINATION AND CONSULTATION

*House bill*

The House bill requires the Secretary and Administrator to consult and cooperate with respect to their duties and responsibilities so that the duties and responsibilities of both would be performed in the most meaningful and effective way. Nothing contained in the bill is to affect the assigned duties of the Administrator under the Energy Reorganization Act of 1974, or the Federal Non-Nuclear Energy Research and Development Act.

*Senate amendment*

The Senate amendment requires the Administrator to utilize DOT to the maximum extent practicable and to utilize other Federal agencies to the extent that the other agencies have capabilities which would allow them to contribute to the attainment of the purposes of this title.

The Secretary of Transportation, when utilized, would be authorized to exercise powers granted to the Administrator with respect to grants and contracts, loan guarantees, and other matters.



The Administrator would be authorized to obtain the assistance of other Federal agencies on a reimbursable basis or otherwise, with the consent of the assisting agency.

*Conference substitute*

The Administrator of ERDA will have overall management responsibility for carrying out the program, but shall, to the maximum extent practicable, utilize the expertise of DOT in the areas of safety and damageability, and other areas as the Administrator deems appropriate. The Administrator may also utilize other Federal agencies, such as NASA, to the extent that other agencies have appropriate capabilities.

The committee of conference is aware of ongoing research programs within DOT concerning motor vehicle safety and damageability and other programs supporting the Department's administration of the motor vehicle fuel economy standards program. It is also aware of the Memorandum of Understanding between DOT and ERDA, dated April 26, 1976, concerning working relationships between the two agencies relating to energy conservation in transportation. Among other things, the memorandum establishes a steering group to coordinate the activities of the two agencies.

While the responsibility for this program lies with the ERDA Administrator, the role of other agencies is recognized and there is considerable flexibility in the conference substitute as to how he discharges those responsibilities.

There is nothing contained in the conference substitute which would preclude the Administrator's discharging his duties in the manner outlined in the Memorandum of Understanding. Nonetheless, as the responsibility for the R. & D. program under the conference substitute is assigned to the Administrator, he is the accountable official.

The Secretary is authorized to utilize the grants and contracts authority when the expertise of DOT is utilized. Of course, nothing contained in the provision will affect the authority of other agencies to make grants and contracts as well to the extent that they are otherwise authorized.

The ERDA Administrator is to consult with the Administrator of the Environmental Protection Agency (EPA) and DOT and to consult with representatives of science, industry, and other groups. The ERDA Administrator may establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under the Act.

Nothing contained in the Act affects the responsibilities of the Administrator under the Energy Reorganization Act or the Federal Non-Nuclear Energy Research and Development Act. Of course, the responsibilities of other Federal agencies are also unaffected.

POWERS OF THE ADMINISTRATOR

*House bill*

No provision.

*Senate amendment*

The Senate amendment specifically authorizes the Administrator to appoint personnel to carry out the program, procure temporary intermittent services, enter into contracts, leases, cooperative agreements,

and other transactions to carry out this duties, and to acquire, deal in and with, and dispose of property.

*Conference substitute*

The conference substitute deletes the Senate amendment as being duplicative of authority already possessed by the Administrator under other statutes.

CONTRACTS AND GRANTS

*House bill*

The House bill contains no separate provision dealing with contracts and grants as the authority was specifically provided under "Duties of the Administrator", discussed above.

*Senate amendment*

The Senate provides specific provision for contracts and grants in support of the program and requires the Administrator to consult with EPA, DOT, and other groups as may be appropriate.

Contracts and grants would be made in accordance with rules of the Administrator.

*Conference substitute*

As the provisions of the Senate amendment were duplicative of other provisions of the conference substitute, the provisions of the Senate amendment were deleted.

OBLIGATION GUARANTEES

*House bill*

No provision.

*Senate amendment*

The Senate amendment authorizes the Administrator to guarantee financial obligations for the purpose of financing programs which would be likely to lead to the development of production prototypes and to the availability of advanced automobiles. The Administrator is authorized to guarantee obligations up to a total amount of $175 million.

*Conference substitute*

While loan guarantees may provide needed capital for the development of advanced automobile technology, there is sufficient question about what kinds of projects should be financed in this manner and at what stage of development. Consequently, the committee of conference deleted the loan guarantee provision in favor of a 1-year study of loan guarantees and their applicability which will be discussed under "Reports" below.

EVALUATION, TESTING, AND INFORMATION DISSEMINATION

*House bill*

The House bill has no specific provision dealing with this subject, although the functions of evaluation, testing and information dissemination are referred to under "Duties of the Administrator", discussed above.

*Senate amendment*

The Senate amendment requires the Administrator of EPA to perform tests for compliance with standards under EPA's authority and



for fuel economy. It also provides for the testing, under procedures specified by the Secretary of Transportation, of production prototypes for compliance with automobile standards under the jurisdiction of the Department of Transportation.

The Low Emission Vehicle Certification Board, established under section 212 of the Clean Air Act, would evaluate production prototypes for the purposes of Federal procurement, discussed below.

*Conference substitute*

The conference substitute requires the Administrator to consider any reasonable new or improved technology which could contribute to the development of advanced automobile technology and for testing by the EPA Administrator for compliance with statutes under EPA jurisdiction. EPA would also test for fuel economy.

The Secretary of Transportation is required to test integrated test vehicles constructed in whole or in part with financial assistance under this Act for the purpose of determining compliance with standards administered by DOT.

The conference substitute also requires the Administrator to collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of advanced automobile technology.

As the Government procurement provisions of the Senate amendment have been deleted, the provisions of the Senate amendment dealing with certification by the Low Emission Vehicle Certification Board have been deleted as well.

PATENTS

*House bill*

The House bill contains no provision, although section 9 of the Federal Non-Nuclear Energy Research and Development Act was deemed by the House to apply to any contract or grant entered into under this Act.

*Senate amendment*

The Senate amendment includes language concerning patents which is virtually identical to section 9 of the Federal Non-Nuclear Energy Research and Development Act. Under the provisions, title to inventions made or conceived under the program would be vested with the United States with appropriate waiver provision to assure the commercial availability of the technology.

Moreover, the Senate amendment provides compulsory patent licensing when the Administrator determines that it is reasonably necessary to the development, demonstration, or commercial application of any advanced automotive invention, process, or system. The district courts, when the necessary findings by the Administrator had been made, would be authorized to order that the patent be licensed at such reasonable royalty and on such reasonably nondiscriminatory terms and conditions as the court shall determine.

*Conference substitute*

The conference substitute explicitly provides that the patent policy of the Federal Non-Nuclear Energy Research and Development Act of 1974 will apply to any contract or grant entered into, made, or issued by the Administrator under this Act. In administering the

waiver provisions as they will be applicable to this Act, it is expected that the Administrator will take care to recognize the benefits of involving small business enterprises in the programs envisioned by this Act, and will grant waivers to the extent practicable in recognition of that policy.

AUDIT AND EXAMINATION

*House bill*

No specific provision is provided, although general authority for the Administrator and the Comptroller General to have access to records is provided under the Energy Reorganization Act.

*Senate amendment*

The Senate amendment requires recipients of financial assistance to keep such records as the Administrator prescribes.

Morever, the Administrator and the Comptroller General would have access for the purpose of audit and examination to any books, documents, papers, and records which, in the opinion of the Administrator or the Comptroller General, may be related to the financial assistance granted.

*Conference substitute*

The conference substitute does not include a record-keeping requirement because the authority currently exists under the Energy Reorganization Act.

The conference substitute states that with respect to the authority of the Comptroller General to conduct audit and examinations, section 306 of the Energy Reorganization Act will apply to recipients of financial assistance under this Act.

Under section 306 of the Energy Reorganization Act, contracts issued must contain a clause which gives the Comptroller General or his duly authorized representative, until the expiration of 3 years after final payment, access to and the right to examine any "directly pertinent books, documents, papers, and records of the contractor or any of his subcontractors". So that it is clear that the grant authority of this Act is included as well, the conference substitute specifies that the word "contract" means "contract or grant" insofar as this program is related.

The committee of conference deleted the expanded authority of the Comptroller General contained in the Senate amendment because of litigation which is currently being conducted over similar language to that contained in section 306 of the Energy Reorganization Act, concerning procurement by the Department of Defense. Until that litigation is concluded and the authority of the Comptroller General in these kinds of instances is more precisely defined, it is unwise to create yet another objective standard for GAO access.

REPORTS

*House bill*

The House bill requires, as a separate part of the annual report submitted under section 15(a) of the Federal Non-Nuclear Energy Research and Development Act of 1974, reports concerning a number of activities. They include (1) a current comprehensive program definition for implementing the Act, which is the planning document on how the goals of this Act are to be accomplished, (2) an account



of the state of automobile R. & D. in the United States, (3) the number and amount of contracts and grants made under this Act, (4) progress made in developing advanced automobile propulsion systems and their components, and (5) suggestions for improvements in the R. & D. program.

*Senate amendment*

The Senate amendment is similar, but without the requirement that a current comprehensive program definition for implementing the Act be included.

*Conference substitute*

The conference substitute adopts the House provision with technical changes.

In complying with the requirement that annual reports contain a comprehensive program definition, the Administrator shall include projections for funding over the life of the program, the number and types of propulsion systems and other technologies to be developed, the costs of program elements, and a schedule for accomplishing the goals of the program.

In lieu of the inclusion of the loan guarantees provisions of the Senate amendment, the conference substitute requires the Administrator to conduct a survey of developers, lending institutions, and others and to make a study for the purpose of determining whether, and under what conditions, research, development, and demonstration, and commercialization of advanced automotive technology may be aided by loan guarantees. Specific attention should be given to the considerations of small business and the various classes of potential recipients of loan guarantee assistance. The results are to be reported to Congress within 1 year and shall contain such legislative recommendations as may be necessary. It is expected that the amount of money spent by ERDA on this study will be small and will not significantly displace funds to be used for R. & D. purposes.

AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT

*House bill*

The House bill amends the National Aeronautics and Space Act to require that the unique competence in the scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the development of advanced automobile propulsion systems.

*Senate amendment*

No comparable provision.

*Conference substitute*

The conference substitute adopts the provision in the House bill. In doing so, it is intended that the provision is necessary only for the purpose of ensuring that the National Aeronautics and Space Administration has the authority to carry out programs assigned to it by the ERDA Administrator. NASA may not establish a separate program for such R. & D. under this new authority. The provision is thus to insure that NASA has the authority to be eligible for "pass through" funds from ERDA under the provisions of this Act. Of course, the inclusion of the amendments to the National Aeronautics and Space

Act does not effect the eligibility of any other Federal agency for funds on a "pass through" basis.

INFORMATION DISSEMINATION

*House bill*

The House bill requires that information maintained by the Administrator under this Act shall be subject to the provisions of section 552 of title V, United States Code, the "Freedom of Information Act". A prohibition on disclosure when the information, if made public, would divulge (1) trade secrets or (2) other proprietary information of such person is provided. Exceptions are made for furnishing such information to other Federal agencies, employees of ERDA, and to the Congress.

Any disclosure of the protected material would be punishable in accordance with the penalties contained in 18 U.S.C. 1905.

*Senate amendment*

No comparable provision. The provisions of existing law would apply.

*Conference substitute*

The conference substitute contains no reference to information dissemination. Thus, the provisions of existing law would apply.

TRANSFER OF FUNCTIONS

*House bill*

The House bill requires that within 60 days of the enactment of the law creating the electric vehicle research, development, and demonstration program, all the authorities of that program vested in other agencies shall be transferred to ERDA.

*Senate amendment*

No comparable provision.

*Conference substitute*

As the electric vehicle research, development, and demonstration program will be administered by the ERDA Administrator, no transfer is necessary. Consequently, the provision of the House bill was deleted.

GOVERNMENT PROCUREMENT

*House bill*

No provision.

*Senate amendment*

The Senate amendment requires that vehicles certified as advanced automobiles by the Low Emission Vehicle Certification Board be procured by all Federal agencies to the extent required under regulations prescribed jointly by the Vehicle Certification Board and the Administrator of General Services.

*Conference substitute*

The conference substitute deletes the provision in the Senate amendment. As the goal of the program is to produce "integrated test vehicles", which are not yet ready for production, the inclusion of a procurement provision is not appropriate.



RELATIONSHIP TO ANTITRUST LAWS

*House bill*

No provision. A disclaimer against any immunity from antitrust liability is provided under the Federal Non-Nuclear Energy Research and Development Act and applies to activities of ERDA.

*Senate amendment*

The Senate amendment specifically states that nothing in this title shall be deemed to convey any immunity from civil or criminal liability, or to create any defenses to actions under the antitrust laws.

*Conference substitute*

The conference substitute contains no provision as existing law applicable to ERDA already disclaims any intent to grant immunity.

AUTHORIZATION FOR APPROPRIATION

*House bill*

The House bill authorizes to be appropriated not to exceed $20 million for fiscal year 1977, and such sums as may be included in the annual authorization for the nonnuclear programs of the Energy Research and Development Administration for such subsequent fiscal year.

Any request for appropriations pursuant to this Act are to specify the relationship between the programs to be supported with such appropriations and any related programs which are being supported or are being proposed to be supported under other authorities.

*Senate amendment*

The Senate amendment provides authorization for appropriations of $55 million for fiscal year 1977 and $100 million for fiscal year 1978. The amounts authorized under this provision are for grants and contracts. Authorization for appropriations to pay defaulted loans is provided for under the loan guarantee provisions.

*Conference substitute*

The conference substitute authorizes not to exceed $25 million for the fiscal year 1977, and not to exceed $75 million for the fiscal year 1978.

The provisions of the House bill which require the Administrator to specify the relationship between budget requests for programs under this Act and other related requests under other programs are also included.

WARREN G. MAGNUSON,
FRANK E. MOSS,
JOHN V. TUNNEY,
HOWARD H. BAKER, Jr.,
TED STEVENS,
*Managers on the Part of the Senate.*

OLIN E. TEAGUE,
DON FUQUA,
MIKE MCCORMACK,
GEORGE E. BROWN, Jr.,
RAY THORNTON,
CHARLES A. MOSHER,
BARRY M. GOLDWATER, Jr.,
*Managers on the Part of the House.*

O

94TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 94–1351

# AUTOMOTIVE TRANSPORT RESEARCH AND DEVELOPMENT ACT OF 1976

JULY 21, 1976.—Ordered to be printed



Mr. MCCORMACK, from the committee of conference, submitted the following

## CONFERENCE REPORT

[To accompany H.R. 13655]

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the text of the bill (H.R. 13655) to establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes, having met, after full and free conference, have agreed to recommend and do recommend to their respective Houses as follows:

That the House recede from its disagreement to the amendment of the Senate to the text of the bill and agree to the same with an amendment as follows:

In lieu of the matter proposed to be inserted by the Senate amendment, insert the following:

*That this Act may be cited as the "Automotive Transport Research and Development Act of 1976".*

*FINDINGS AND PURPOSES*

*SEC. 2. (a) The Congress finds that—*

*(1) existing automobiles, on the average, fall short of meeting the long-term goals of the Nation with respect to environmental protection, safety, and energy conservation;*

*(2) advanced alternatives to existing automobiles could, with sufficient research and development effort, meet these long-term goals, and have the potential to be mass produced at reasonable cost; and advanced automobiles could operate with significantly less adverse environmental impact and fuel consumption*

57-006 O

than existing automobiles, while meeting all of the other requirements of Federal law;

(3) insufficient resources are being devoted to both research on and development of advanced automobile technology;

(4) an expanded research and development effort with respect to advanced automobile technology would complement and stimulate corresponding efforts by the private sector and would encourage automobile manufacturers to consider seriously the incorporation of such advanced technology into automobiles and automobile components; and

(5) the Nation's energy, safety, and environmental problems are urgent, and therefore advanced automobile technology should be developed, tested, demonstrated, and prepared for manufacture within the shortest practicable time.

(b) It is therefore the purpose of the Congress in this Act to—

(1)(A) direct the Energy Research and Development Administration to make contracts and grants for research and development leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years of the date of enactment of this Act, or within the shortest practicable time consistent with appropriate research and development techniques, and (B) evaluate and disseminate information with respect to advanced automobile technology.

(2) preserve, enhance, and facilitate competition in research, development, and production with respect to existing and alternative automobiles, automobile propulsion systems, and automobile components; and

(3) supplement, but neither supplant nor duplicate, the automotive research and development efforts of private industry.

DEFINITIONS

SEC. 3. As used in this Act, the term—

(1) "Administrator" means the Administrator of the Energy Research and Development Administration;

(2) "advanced automobile" means a personal-use transportation vehicle which is fuel-propelled and is energy-efficient, safe, reliable, damage-resistant, and environmentally sound, and which—

(A) requires, consistent with environmental requirements, the least total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing automobiles with respect to such factors;

(B) to the extent practicable, is capable of utilizing different types of fuel;

(C) can be mass produced at the lowest possible cost consistent with the requirements of this Act;

(D) has a projected ownership cost to the first owner which is competitive with automobiles of the same size and class which are produced using standard technology, taking into account the other features of such advanced automobile which



may justify costs different than those associated with standard technology;

(E) operates safely and with sufficient performance with respect to acceleration, cold weather starting, cruising speed, and other performance factors;

(F) to the extent practicable, is capable of intermodal adaptability; and

(G) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any requirement of Federal law, including requirements for fuel economy, exhaust emissions, noise control, safety, and damage resistance;

(3) "advanced automobile propulsion system" means an energy conversion system, including engine and drive train, which utilizes advanced technology and is suitable for use in an advanced automobile;

(4) "advanced automobile subsystem" means a subsystem which impacts materially the performance of the automobile in terms of fuel economy, environmental impact, safety, damageability, or reliability, and for which there is promise of technological improvement in such performance through research and development;

(5) "damage resistance" refers to the ability of an automobile to withstand physical damage when involved in an accident;

(6) "developer" means any person engaged in whole or in part in research or other efforts directed toward the development of advanced automobile technology;

(7) "fuel" means any energy source capable of propelling an automobile;

(8) "fuel economy" refers to the average distance traveled in representative driving conditions by an automobile per unit of fuel consumed, as determined by the Administrator of the Environmental Protection Agency in accordance with test procedures which shall be established by rule and shall require that fuel economy tests be conducted in conjunction with the exhaust emissions tests mandated by section 206 of the Clean Air Act (42 U.S.C. 1857f–5);

(9) "integrated test vehicle" means a vehicle which incorporates an advanced automobile propulsion system and other advanced automobile subsystems and which is used to determine, when functioning in an integrated manner, the compatibility and performance characteristics of these advanced subsystems over their useful life, (A) consistent with the Nation's need to increase substantially automobile fuel economy, to reduce substantially environmental impact, to conform to Federal requirements, including safety and damageability standards, and otherwise to provide automobiles satisfactory to consumers without unduly compromising the advanced automotive propulsion system and other subsystems; and (B) compatible with the criteria for an advanced automobile;

(10) "intermodal adaptability" refers to any characteristics of an automobile which enable it to be operated or carried, or which facilitate its operation or carriage, by or on an alternative mode or other system of transportation;

(11) "reliability" refers to (A) the average time and distance over which normal automobile operation can be expected without significant repair or replacement of parts, and (B) the ease of diagnosis and repair of an automobile, its systems, and parts in the event of failure during use or damage from an accident;

(12) "safety" refers to the performance of an automobile or automobile system or equipment in such a manner that the public is protected against unreasonable risk of accident and against unreasonable risk of death or bodily injury in case of accident;

(13) "Secretary" means the Secretary of Transportation; and

(14) "State" means any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, or any other territory or possession of the United States.

DUTIES OF THE ADMINISTRATOR

SEC. 4. (a) The Administrator shall establish, within the Energy Research and Development Administration, a program to insure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years after the date of enactment of this Act, or within the shortest practicable time, consistent with appropriate research and development technique. In conducting such program, the Administrator shall—

(1) establish and conduct new projects and accelerate existing projects which may contribute to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles;

(2) give priority attention to the development of advanced propulsion systems with appropriate attention to those advanced propulsion systems which are flexible in the type of fuel used, except that in integrating the various features of an automobile or the purpose of constructing integrated test vehicles, the Administrator shall incorporate advanced technology with respect to safety, damagability, and the other features of an integrated test vehicle in a manner which recognizes the automobile as a personal transportation system; and

(3) insure that research and development under this Act supplements, but neither supplants nor duplicates, the automotive research and development efforts of private industry.

(b) The Administrator shall, in fulfilling his responsibilities under this Act, make contracts and grants with any Federal agency, laboratory, university, non-profit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual for—

(1) research and development leading to advanced automobile propulsion systems which are likely to help meet the Nation's long-term goals with respect to fuel economy, environmental protection, and other objectives;

(2) research and development on other automobile subsystems in which possible improvements can be identified and which are suitable for inclusion in an integrated test vehicle; and

(3) the integration of advanced automobile propulsion systems developed under this program, with other advanced automobile



subsystems developed under this program or elsewhere, into integrated test vehicles, which will be fully tested to determine the characteristics of such advanced propulsion system and other subsystems when integrated.

(c) In providing financial assistance under this Act, the Administrator shall give full consideration to the capabilities of Federal laboratories, except that not more than 60 per centum of the funds appropriated pursuant to the authorization under section 12 shall be directly expended in Federal laboratories. In accordance with section 7, such laboratories shall be available for testing components and subsystems which, in the Administrator's judgment, is likely to contribute to the development of advanced automobiles.

(d) The Administrator shall conduct evaluations, arrange for tests, and disseminate information pursuant to section 7 and submit reports required under section 10.

(e) The Administrator shall intensify research in key basic science areas in which the lack of knowledge limits development of advanced automobile propulsion systems.

DUTIES OF THE SECRETARY

SEC. 5. The Secretary, in furtherance of the purposes of this Act, shall evaluate the extent to which the automobile industry utilizes advanced automotive technology which is or could be made available to it. The Secretary shall submit a report to the Congress each year on the results of such evaluation including any appropriate recommendations which may encourage the utilization of advanced automobile technology by the automobile industry.

COORDINATION AND CONSULTATION

SEC. 6. (a) The Administrator shall have overall management responsibility for carrying out the program under section 4. In carrying out such program, the Administrator, consistent with such overall management responsibility—

(1) shall utilize the expertise of the Department of Transportation to the maximum extent practicable in the areas of safety and damageability research and development and, to the extent deemed appropriate by the Administrator, in other areas of research and development on automobile technology; and

(2) may utilize any other Federal agency (except as provided in paragraph (1)) in accordance with subsection (c), in carrying out any activities under this Act, to the extent that the Administrator determines that any such agency has capabilities which would allow such agency to contribute to the purposes of this Act.

(b) The Secretary, whenever the expertise of the Department of Transportation is utilized in accordance with subsection (a), may exercise the powers granted to the Administrator under subsection (c) and shall enter into contracts and make grants for such purpose, subject to the overall management responsibility of the Administrator.

(c) The Administrator may, in accordance with subsection (a), obtain the assistance of any department, agency, or instrumentality of the executive branch of the Federal Government upon written request, on a reimbursable basis or otherwise and with the consent of

such department, agency, or instrumentality. Each such request shall identify the assistance the Administrator deems necessary to carry out any duty under this Act.

(d) The Administrator shall consult with the Administrator of the Environmental Protection Agency and the Secretary, and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in the area of automobile research, development, and technology. The Administrator may establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under this Act.

(e) Nothing contained in this Act shall be construed to reduce in any way the responsibilities of the Administrator for automotive research, development, and demonstration under the Energy Reorganization Act of 1974 (42 U.S.C. 5801 et seq.) and the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901 et seq.)

EVALUATION, TESTING, AND INFORMATION DISSEMINATION

SEC. 7. (a) The Administrator shall, for the purposes of performing his responsibilities under this Act, consider any reasonable new or improved technology, a description of which is submitted to the Administrator in writing, which could lead or contribute to the development of advanced automobile technology.

(b) The Administrator of the Environmental Protection Agency shall test, or cause to be tested, in a facility subject to Environmental Protection Agency supervision, each integrated test vehicle developed in whole or in part with Federal financial assistance under this Act, or referred to the Administrator of the Environmental Protection Agency for such purpose by the Administrator, to determine whether such vehicle complies with any exhaust emission standards or any other requirements promulgated or reasonably expected to be promulgated under any provision of the Clean Air Act (42 U.S.C. 1857 et seq.), the Noise Control Act of 1972 (42 U.S.C. 4901 et seq.), or any other provision of Federal law administered by the Administrator of the Environmental Protection Agency. In conjunction with any test for compliance with exhaust emission standards under this section, the Administrator of the Environmental Protection Agency shall also conduct tests to determine the fuel economy of such vehicle. The Administrator of the Environmental Protection Agency shall submit all test data and the results of such tests to the Administrator.

(c) The Secretary shall test, or shall cause to be tested in a facility subject to supervision by the Secretary, each type of integrated test vehicle developed in whole or in part with Federal financial assistance under this Act, or referred to the Secretary for such purpose by the Administrator, to determine whether such vehicle complies with any standards promulgated as of the date of such testing, or reasonably expected to be promulgated in the future, under any provision of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1381 et seq.), the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.), the Automobile Information Disclosure Act (15 U.S.C. 1232), and any other statute enacted by Congress and whose provisions are applicable to automobiles where testing would be



appropriate. All test data and the results of all tests conducted by the Secretary shall be submitted to the Administrator.

(d) The Administrator shall collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of advanced automobile technology.

PATENTS

SEC. 8. Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908) shall apply to any contract (including any assignment, substitution of parties, or subcontract thereunder) or grant, entered into, made, or issued by the Administrator under this Act.

COMPTROLLER GENERAL AUDIT AND EXAMINATION

SEC. 9. Section 306 of the Energy Reorganization Act of 1974 (42 U.S.C. 5876) shall apply with respect to the authority of the Comptroller General to have access to and rights of examination of books, documents, papers, and records of recipients of financial assistance under this Act; except that for the purposes of this Act, the term "contract" (as used in section 166 of the Atomic Energy Act (42 U.S.C. 2206), insofar as it relates to such section 306) means "contract or grant".

REPORTS

SEC. 10. (a) As a separate part of the annual report submitted under section 15(a) of the Federal Nonnuclear Energy Research and Development Act of 1974 with respect to the comprehensive plan and program then in effect under section 6 (a) and (b) of such Act, the Administrator shall submit to Congress an annual report of activities under this Act. Such report shall include—

(1) a current comprehensive program definition for implementing this Act;

(2) an evaluation of the state of automobile research and development in the United States;

(3) the number and amount of contracts and grants made under this Act;

(4) an analysis of the progress made in developing advanced automobile technology; and

(5) suggestions for improvements in advanced automobile research and development, including recommendations for legislation.

(b) The Administrator shall conduct a survey of developers, lending institutions, and other appropriate persons or institutions and shall otherwise make a study for the purpose of determining whether, and under what conditions, research, development, demonstration, and commercial availability of advanced automobile technology may be aided by the guarantee of financial obligations by the Federal Government. The Administrator shall report the results of such survey and study to the Congress within 1 year after the date of enactment of this Act. Such report shall include an examination of those stages of advanced automobile technology research, development, demonstration,

*and commercialization for which financial obligation guarantees may be useful or appropriate and shall contain such legislative recommendations as may be necessary.*

*AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT*

*SEC. 11. (a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended by redesignating subsection (d) as subsection (e), and by inserting immediately after subsection (c) the following new subsection:*

*"(d) The Congress declares that the general welfare of the United States requires that the unique competence in scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the development of advanced automobile propulsion systems. Such development shall be conducted so as to contribute to the achievement of the purposes set forth in section 2(b) of the Automotive Transport Research and Development Act of 1976.".*

*(b) The subsection of section 102 of such Act redesignated as subsection (e) by subsection (a) of this section is amended by striking out "and (c)" and inserting in lieu thereof "(c), and (d)".*

*AUTHORIZATION FOR APPROPRIATION*

*SEC. 12. There are authorized to be appropriated to carry out the purposes of this Act—*

*(1) not to exceed $25,000,000 for the fiscal year ending September 30, 1977, and*

*(2) not to exceed $75,000,000 for the fiscal year ending September 30, 1978.*

*(b) Any budget request for appropriations pursuant to the authority in subsection (a) shall specify the relationship between the research, development, and demonstration to be supported with such appropriations and any related requests for appropriations for programs of the Federal Government concerning automobile research and development.*

OLIN E. TEAGUE,
DON FUQUA,
MIKE MCCORMACK,
GEORGE E. BROWN, JR.,
RAY THORNTON,
CHARLES A. MOSHER,
BARRY M. GOLDWATER, JR.,
*Managers on the Part of the House.*

WARREN G. MAGNUSON,
FRANK E. MOSS,
JOHN V. TUNNEY,
HOWARD H. BAKER, JR.,
TED STEVENS,
*Managers on the Part of the Senate.*

## JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF CONFERENCE

The managers on the part of the House and the Senate at the conference on the disagreeing vote of the two Houses on the amendment of the Senate the bill (H.R. 13655) to establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes, submit the following joint statement to the House and the Senate in explanation of the effect of the action agreed upon by the managers and recommended in the accompanying conference report:

The Senate amendment struck out all after the enacting clause and inserted a substitute text. The differences between the House bill and the Senate amendment, and the substitute agreed to in conference, are noted below. Minor technical and clarifying changes are not discussed.

### SUMMARY

The Automotive Transport Research and Development Act is the result of a committee of conference designated to reconcile the differences between the House and Senate versions of H.R. 13655.

The substitute reported by the committee of conference establishes a program within the Energy Research and Development Administration (ERDA) for advanced automobile research and development. A 5-year program is provided to ensure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles (which is a new term resulting from the compromise by the committee of conference).

The Administrator of ERDA would establish in-house programs and provide grants and contracts outside ERDA. The Administrator is to utilize other Federal agencies to the extent that they have expertise appropriate to the R. & D. program.

The Administrator would be responsible for testing and evaluating new technology, as well as establishing a capability for information collection, analysis, and dissemination.

The Administrator would submit reports on the research and development activities within the United States, as well as prepare a report on the need for a loan guarantee authority in order to perform research and development activities in automobile technology and commercialization thereof.

### MOTOR VEHICLE INFORMATION AND COST SAVINGS ACT

*House bill*

The House bill was not structured as an amendment to existing law.

*Senate amendment*

The Senate amendment was structured as an amendment to the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.).

*Conference substitute*

The conference substitute is not structured as an amendment to an existing law.

FINDINGS AND PURPOSES

*House bill*

The House bill contains findings of the Congress that existing automobile propulsion systems do not meet national goals but that, with the aid of research and development, advanced alternatives could meet long-term goals while conforming to all Federal requirements.

Insufficient resources are now being devoted to advanced automobile propulsion systems and their components. An expanded R. & D. program would complement and stimulate private efforts and encourage manufacturers to substitute advanced propulsion systems and their components for existing technology.

The findings also state that the Nation's energy, safety, and environmental problems are urgent and that advanced propulsion systems should be developed, tested, and prepared for manufacture in the shortest practical time.

A statement of Congressional purposes is also provided. The provisions state that it is the purpose of Congress in this Act to (1) make contracts and grants under a 5-year program leading to an advanced automobile propulsion system which is likely to meet the Nation's long-term goals, (2) preserve, enhance, and facilitate competition in R. & D. and (3) supplement, but not supplant, the automotive research and development efforts of private industry.

*Senate amendment*

The Senate amendment is similar to the House provision, except that the Senate provision reflects the Senate goal of preparing production prototypes of automobiles, whereas the House provision confines itself primarily to propulsion systems. Moreover, the purposes are modified in the Senate amendment to reflect the goal of preparing production prototypes of advanced automobiles within 4 years of the date of enactment, or within the shortest practicable time consistent with appropriate research and development techniques.

*Conference substitute*

The conference substitute is similar to both the House bill and the Senate amendment, but with differences which reflect the conference agreement concerning the scope of the program. The conference substitute declares the purpose of Congress in this program is to make grants and contracts for R. & D. leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years of the date of enactment of this Act, or within the shortest practicable time consistent with appropriate research and development techniques.

The conference substitute states that the program is "to supplement, but not supplant nor duplicate, the automobile research and development efforts of private industry".

The conference substitute includes three basic elements in placing this requirement on the Federal program. First, the program must



supplement the automotive R. & D. efforts of industry. While ERDA is not limited merely to "adding to" or "building on" projects initiated by the private sector, the Federal R. & D. should be supportive of the private sector's R. & D. and formulated to produce advanced technology which can be ultimately refined for incorporation in mass production vehicles. This also means that ERDA should make reasonable attempts to learn from the private sector's R. & D. successes and failures, and not "reinvent the wheel" in formulating its program. For example, if considerable R. & D. effort has been put into a new system and it has been decided for good reason that the system cannot be satisfactorily refined for mass production vehicles, ERDA should not attempt, in the absence of a new technological advancement or other significant consideration, to conduct Federal R. & D. on the system. Certainly, in any situation where ERDA does launch such a program, it should have the burden to justify to Congress why there should be such Federal R. & D.

Second, the ERDA program should not be formulated in a manner which will supplant private sector R. & D. The program should not result in any displacement or lessening of industry's R. & D. commitment. The program, therefore, should be focused on R. & D. which the private sector has not and will not include in its normal program. Of course, ERDA will not be precluded from engaging in a project because the private sector may conduct it in the future or will conduct it, but at a time sufficiently distant so that the benefits resulting will not be available at a time which will achieve the goals of this Act.

Third, the program should not duplicate private R. & D. While there may be some necessary duplication of effort in the conduct of related R. & D., ERDA should not include R. & D. projects in the Federal program if the private sector is engaged in similar development. ERDA, however, can conduct R. & D. on advanced generations of automobile technology and on advanced refinements to automobile technology in use or under development by the private sector. Additionally, as required by section 4(e), ERDA shall intensify research in basic science areas, such as combustion and advanced materials research, which limits the development of advanced automobile propulsion systems.

The combined effect of the three elements of this requirement is intended to sharply define a Federal automotive R. & D. program which ultimately will advance the overall pace of development and state-of-the-art of advanced automotive technology. This cumulative advance will be accomplished not by wasting Federal R. & D. funds through unnecessary duplication and not by displacing or supplanting private efforts by having ERDA do the R. & D. for the private sector, but rather by establishing a Federal program which will supplement private R. & D. and be supportive of the private sector's ultimate development and design responsibility for transfer of the advanced technology into mass production vehicles. The conferees intend that the Federal automotive R. & D. program under this Act will be formulated and implemented in a manner which is consistent with each element of this requirement and with the overall combined effect of the three elements in advancing automotive technology.

DEFINITIONS

*House bill*

Terms used throughout the House bill are defined.

Of particular interest is the definition of "advanced automobile propulsion system" as the program envisioned by the House bill centers around a 5-year program aimed at the development of such systems. The term is defined to mean "an energy conversion system, including engine and drive train, which is used to propel an advanced automobile".

*Senate amendment*

Under the Senate amendment, the definition of an "advanced automobile" is important as the development of production prototypes of advanced automobiles is the goal. The term is defined to mean a personal use transportation vehicle which requires, consistent with environmental requirements, the least total amount of energy to be consumed during its fabrication, operation, and disposal, and must represent a substantial improvement over existing automobiles with respect to energy consumed. The vehicle must be capable of mass-production at the lowest possible cost consistent with the requirements of this title (the Senate amendment adds a new title VI to the Motor Vehicle Information and Cost Savings Act). It must operate safely and perform sufficiently with respect to acceleration, cold weather starting, cruising speed, and other performance factors. It must be, to the extent practicable, capable of intermodal adaptability, and comply with any requirement of Federal law.

The definition differs from the comparable definition of the House bill in that the Senate version does not include the requirement that projected ownership costs to the first owner be comparable to standard automobiles.

The Senate amendment does not include a definition of "advanced automobile propulsion system".

The Senate amendment includes a definition of "production prototype" whose construction is the goal of the R. & D. program. It is defined to mean an automobile which is in its final stage of development and is capable of being placed into production for retail sale in quantities exceeding 10,000 automobiles per year.

*Conference substitute*

The conference substitute includes definitions common to both the House bill and the Senate amendment.

In addition, the conference substitute defines "integrated test vehicle" which are to be developed under the 5-year program envisioned by the conference substitute along with advanced propulsion systems and advanced automobile subsystems. Integrated test vehicles incorporate advanced propulsion systems and other advanced automobile subsystems and are used to determine, when functioning in an integrated manner, the performance of such integrated systems and vehicles over their useful life. Integrated test vehicles must substantially increase automobile fuel economy and substantially reduce environmental impact and conform with all applicable Federal requirements. Integrated test vehicles must otherwise be satisfactory (concerning factors such as acceleration and handling) without unduly compromising the advanced automobile propulsion system, which is the heart of the vehicle. The vehicles must also perform sufficiently in different types of climatic conditions. Finally, the vehicle is to be compatible with criteria for an advanced automobile. In other words, it may not be developed in a way which will preclude subsequent development as an advanced automobile. This means that the integrated test vehicle need not satisfy each criterion comprising an advanced automobile. Rather, the technology must be developed, integrated, and tested in a manner that will support further engineering development and tooling for use in a mass produced vehicle. For example, the vehicle may not be of such an exotic nature that the technology cannot be incorporated into a mass-producable vehicle. Nor can the technology, when incorporated into mass produced vehicles, be extraordinarily costly to the consumer.



As the integrated test vehicle is defined to include advanced propulsion systems and other automobile subsystems, the definition of "advanced automobile subsystems" is important. It is defined to mean a subsystem of an automobile which materially impacts the performance of the automobile in terms of fuel economy, environmental impact, safety, damageability, or reliability and for which there is a promise of technological improvement in such performance through research and development.

The definition of "advanced automobile" contained in the conference substitute adopts the ownership cost criterion of the House bill with slight modification. The ownership cost consideration to be taken into account to the first owner must be "competitive with automobiles of the same size and class which are produced using standard technology taking into account the other features of such automobile which justify costs different than those associated with standard technology". Ownership cost refers not only to purchase cost but also operating and maintenance costs to the first owner.

In several places in the conference substitute, the term "advanced automobile technology" is used. So that there is no confusion over the use of this term, it is meant to include advanced propulsion systems, advanced automobile subsystems, and integrated test vehicles.

The definition of "advanced propulsion system" used in the House bill is incorporated in the conference substitute.

DUTIES OF THE ADMINISTRATOR

*House bill*

The House bill requires the Administrator to establish a 5-year program aimed at the development of advanced automobile propulsion systems which, to the maximum extent practicable, are flexible in the type of fuel used. In doing so, the Administrator would make grants and contracts for R. & D. and establish a research, development, and demonstration program within ERDA. The Administrator would intensify research in key basic science areas and give full consideration to the capabilities of Federal laboratories, except that not more than 60 percent of the funds authorized could be directly expended in Federal laboratories. The Administrator would conduct an active industry-Government fellowship program for scientists involved in automobile R. & D.

The Administrator would consider any reasonable new or improved technology and to make Federal laboratories available for developing and prooftesting components and subsystems.

Procedures would be established for utilizing the Office of Energy-Related Inventions at the National Bureau of Standards.

Consideration would be given to the capabilities of other Federal agencies in the conduct of the programs under this authority. The Administrator would consult with EPA and establish procedures for periodic consultation with representatives of science, industry, and other groups. The Administrator would establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under this Act and to ensure that the R. & D. efforts supplement, but not supplant, the R. & D. efforts of the private industry.

*Senate amendment*

The Senate amendment requires that production prototypes of an advanced automobile be developed within 4 years after the date of enactment or within the shortest time practicable consistent with appropriate R. & D. technique. Non-petroleum based fuel would be utilized by the automobile to the maximum extent practicable.

In furtherance of the program, the Administrator would make contracts, grants, and loan guarantees for R. & D. efforts and establish new projects and accelerate existing projects within the Agency.

The Administrator would test or direct the testing of production prototypes and secure certification for Government procurement purposes (discussed later).

The Administrator would collect, analyze, and disseminate to developers information, data, and materials relevant to the development of advanced automobiles and evaluate any reasonble new or improved technology submitted to the Administrator.

Finally, the Administrator could not construct production prototypes if the Administrator found that such effort would duplicate efforts outside the Federal Government. A report of such finding would be submitted to relevant committees of Congress 60 days prior to making the finding.

*Conference substitute*

The conference substitute requires the Administrator to establish in ERDA a program to ensure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years, or within the shortest practicable time consistent with appropriate research and development techniques. No authority exists to finance the construction of production prototypes.

The Administrator is to establish and conduct new projects and accelerate existing projects in furtherance of the goals, and to give priority attention to the development of advanced propulsion systems, with appropriate attention to those which are flexible in the type of fuel used. Moreover, the Administrator is to ensure that R. & D. under this Act supplements, but does not supplant nor duplicate, the automotive research and development efforts by private industry. Again, the committee of conference intends the same interpretation of the latter requirement as that discussed earlier under "Findings and Purposes".



Thus, the conference substitute draws a middle-ground between the House and Senate versions of the legislation. Whereas the House version authorized a program only with respect to advanced propulsion systems, the Senate envisioned the preparation of production prototypes, defined in the Senate amendment to mean "an automobile which is in its final stage of development and which is capable of being placed into production, for sale at retail, in quantities exceeding 10,000 automobiles a year.

The conference substitute authorizes and requires the development of advanced automobile propulsion systems, other advanced automobile subsystems and "integrated test vehicles." Integrated test vehicles are complete, fully-tested vehicles, yet which have not gone through production engineering and made fully ready for mass production. It is clear that the heart of the vehicle to be produced is the propulsion system, and most of the effort, at least in the initial stages of the program should be directed toward the propulsion system. The committee of conference anticipates that perhaps two-thirds to three-fourths of the funds available over the life of the program would be devoted to advanced automobile propulsion systems. At the same time, it is extremely difficult to place an advanced propulsion system into existing automobiles and expect them to work properly without further R. & D. Problems of engine compartment size, chassis construction, weight distribution and other factors require that the vehicle produced be an integrated whole.

The vehicle must comply with all Federal standards affecting automobiles. Thus, in constructing the integrated vehicle, the ERDA Administrator must insure that standards relating to safety, damageability, and other requirements be complied with. It is expected that the Administrator will utilize advanced technology with respect to these factors in constructing the integrated text vehicle.

Provision is made (see "Coordination and Consultation") for the Administrator to coordinate his activities with the Secretary of Transportation and to utilize, to the maximum extent practicable, the expertise of the Department of Transportation (DOT) with respect to safety and damageability, in conducting the program under this Act. The conferees are of the opinion that the Administrator should use DOT for those areas of research and development in which it is the most appropriate Federal agency to perform the task. Other Federal agencies which have special expertise, such as the National Aeronautics and Space Administration with its propulsion system expertise, will participate as well.

Nonetheless, with respect to integrated test vehicles, new, advanced and innovative technology will be utilized to comply with applicable Federal standards.

In providing financial assistance, the Administrator is to give full consideration to the capabilities of Federal laboratories. The House provision providing that not more than 60 percent of the funds authorized to be appropriated shall be expended in Federal laboratories is incorporated. The 60 percent limitation is to be viewed not as a goal, but as a limitation. A lesser percentage is desirable.

The committee of conference discussed the question of how many integrated test vehicles should be constructed under the conference substitute. While it is difficult to predict the precise number of inte-

grated test vehicles that will be necessary for full and adequate testing, as required under the conference substitute, it is clearly the conferees' intention that the vehicles produced may number twenty or thirty, but not in the hundreds or thousands. Nonetheless, a sufficient number should be produced which will conform with the requirement that the vehicle will be tested over its useful life, and that the test data generated be reliable. Of course, accelerated testing will take to eliminate the necessity of testing for 5 or 10 years, or longer.

The substitute also requires the Administrator to intensify research in basic science areas, such as combustion and advanced materials research which limit the development of advanced propulsion systems.

DUTIES OF THE SECRETARY

*House bill*

The House bill requires the Secretary to make available facilities and expertise for testing prototypes which are developed based on activities related to the programs under this Act and to collect, analyze, and disseminate to developers information, data, and materials that may be relevant.

The Secretary is to evaluate the extent to which the automobile industry utilizes current technology and to recommend incentive measures to the Congress.

*Senate amendment*

No comparable provision.

*Conference substitute*

The conference substitute requires the Secretary to evaluate the extent to which the automobile industry utilizes advanced automotive technology and shall report to the Congress on an annual basis on the results of this continuing study and shall include in such report any recommendations that may be appropriate to encourage utilization of advanced automobile technology by the automobile industry. The other duties of the Secretary referred to in the House bill have been incorporated in other provisions of the conference substitute.

COORDINATION AND CONSULTATION

*House bill*

The House bill requires the Secretary and Administrator to consult and cooperate with respect to their duties and responsibilities so that the duties and responsibilities of both would be performed in the most meaningful and effective way. Nothing contained in the bill is to affect the assigned duties of the Administrator under the Energy Reorganization Act of 1974, or the Federal Non-Nuclear Energy Research and Development Act.

*Senate amendment*

The Senate amendment requires the Administrator to utilize DOT to the maximum extent practicable and to utilize other Federal agencies to the extent that the other agencies have capabilities which would allow them to contribute to the attainment of the purposes of this title.

The Secretary of Transportation, when utilized, would be authorized to exercise powers granted to the Administrator with respect to grants and contracts, loan guarantees, and other matters.



The Administrator would be authorized to obtain the assistance of other Federal agencies on a reimbursable basis or otherwise, with the consent of the assisting agency.

*Conference substitute*

The Administrator of ERDA will have overall management responsibility for carrying out the program, but shall, to the maximum extent practicable, utilize the expertise of DOT in the areas of safety and damageability, and other areas as the Administrator deems appropriate. The Administrator may also utilize other Federal agencies, such as NASA, to the extent that other agencies have appropriate capabilities.

The committee of conference is aware of ongoing research programs within DOT concerning motor vehicle safety and damageability and other programs supporting the Department's administration of the motor vehicle fuel economy standards program. It is also aware of the Memorandum of Understanding between DOT and ERDA, dated April 26, 1976, concerning working relationships between the two agencies relating to energy conservation in transportation. Among other things, the memorandum establishes a steering group to coordinate the activities of the two agencies.

While the responsibility for this program lies with the ERDA Administrator, the role of other agencies is recognized and there is considerable flexibility in the conference substitute as to how he discharges those responsibilities.

There is nothing contained in the conference substitute which would preclude the Administrator's discharging his duties in the manner outlined in the Memorandum of Understanding. Nonetheless, as the responsibility for the R. & D. program under the conference substitute is assigned to the Administrator, he is the accountable official.

The Secretary is authorized to utilize the grants and contracts authority when the expertise of DOT is utilized. Of course, nothing contained in the provision will affect the authority of other agencies to make grants and contracts as well to the extent that they are otherwise authorized.

The ERDA Administrator is to consult with the Administrator of the Environmental Protection Agency (EPA) and DOT and to consult with representatives of science, industry, and other groups. The ERDA Administrator may establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under the Act.

Nothing contained in the Act affects the responsibilities of the Administrator under the Energy Reorganization Act or the Federal Non-Nuclear Energy Research and Development Act. Of course, the responsibilities of other Federal agencies are also unaffected.

POWERS OF THE ADMINISTRATOR

*House bill*

No provision.

*Senate amendment*

The Senate amendment specifically authorizes the Administrator to appoint personnel to carry out the program, procure temporary intermittent services, enter into contracts, leases, cooperative agreements,

and other transactions to carry out this duties, and to acquire, deal in and with, and dispose of property.

*Conference substitute*

The conference substitute deletes the Senate amendment as being duplicative of authority already possessed by the Administrator under other statutes.

CONTRACTS AND GRANTS

*House bill*

The House bill contains no separate provision dealing with contracts and grants as the authority was specifically provided under "Duties of the Administrator", discussed above.

*Senate amendment*

The Senate provides specific provision for contracts and grants in support of the program and requires the Administrator to consult with EPA, DOT, and other groups as may be appropriate.

Contracts and grants would be made in accordance with rules of the Administrator.

*Conference substitute*

As the provisions of the Senate amendment were duplicative of other provisions of the conference substitute, the provisions of the Senate amendment were deleted.

OBLIGATION GUARANTEES

*House bill*

No provision.

*Senate amendment*

The Senate amendment authorizes the Administrator to guarantee financial obligations for the purpose of financing programs which would be likely to lead to the development of production prototypes and to the availability of advanced automobiles. The Administrator is authorized to guarantee obligations up to a total amount of $175 million.

*Conference substitute*

While loan guarantees may provide needed capital for the development of advanced automobile technology, there is sufficient question about what kinds of projects should be financed in this manner and at what stage of development. Consequently, the committee of conference deleted the loan guarantee provision in favor of a 1-year study of loan guarantees and their applicability which will be discussed under "Reports" below.

EVALUATION, TESTING, AND INFORMATION DISSEMINATION

*House bill*

The House bill has no specific provision dealing with this subject, although the functions of evaluation, testing and information dissemination are referred to under "Duties of the Administrator", discussed above.

*Senate amendment*

The Senate amendment requires the Administrator of EPA to perform tests for compliance with standards under EPA's authority and



for fuel economy. It also provides for the testing, under procedures specified by the Secretary of Transportation, of production prototypes for compliance with automobile standards under the jurisdiction of the Department of Transportation.

The Low Emission Vehicle Certification Board, established under section 212 of the Clean Air Act, would evaluate production prototypes for the purposes of Federal procurement, discussed below.

*Conference substitute*

The conference substitute requires the Administrator to consider any reasonable new or improved technology which could contribute to the development of advanced automobile technology and for testing by the EPA Administrator for compliance with statutes under EPA jurisdiction. EPA would also test for fuel economy.

The Secretary of Transportation is required to test integrated test vehicles constructed in whole or in part with financial assistance under this Act for the purpose of determining compliance with standards administered by DOT.

The conference substitute also requires the Administrator to collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of advanced automobile technology.

As the Government procurement provisions of the Senate amendment have been deleted, the provisions of the Senate amendment dealing with certification by the Low Emission Vehicle Certification Board have been deleted as well.

PATENTS

*House bill*

The House bill contains no provision, although section 9 of the Federal Non-Nuclear Energy Research and Development Act was deemed by the House to apply to any contract or grant entered into under this Act.

*Senate amendment*

The Senate amendment includes language concerning patents which is virtually identical to section 9 of the Federal Non-Nuclear Energy Research and Development Act. Under the provisions, title to inventions made or conceived under the program would be vested with the United States with appropriate waiver provision to assure the commercial availability of the technology.

Moreover, the Senate amendment provides compulsory patent licensing when the Administrator determines that it is reasonably necessary to the development, demonstration, or commercial application of any advanced automotive invention, process, or system. The district courts, when the necessary findings by the Administrator had been made, would be authorized to order that the patent be licensed at such reasonable royalty and on such reasonably nondiscriminatory terms and conditions as the court shall determine.

*Conference substitute*

The conference substitute explicitly provides that the patent policy of the Federal Non-Nuclear Energy Research and Development Act of 1974 will apply to any contract or grant entered into, made, or issued by the Administrator under this Act. In administering the

waiver provisions as they will be applicable to this Act, it is expected that the Administrator will take care to recognize the benefits of involving small business enterprises in the programs envisioned by this Act, and will grant waivers to the extent practicable in recognition of that policy.

AUDIT AND EXAMINATION

*House bill*

No specific provision is provided, although general authority for the Administrator and the Comptroller General to have access to records is provided under the Energy Reorganization Act.

*Senate amendment*

The Senate amendment requires recipients of financial assistance to keep such records as the Administrator prescribes.

Morever, the Administrator and the Comptroller General would have access for the purpose of audit and examination to any books, documents, papers, and records which, in the opinion of the Administrator or the Comptroller General, may be related to the financial assistance granted.

*Conference substitute*

The conference substitute does not include a record-keeping requirement because the authority currently exists under the Energy Reorganization Act.

The conference substitute states that with respect to the authority of the Comptroller General to conduct audit and examinations, section 306 of the Energy Reorganization Act will apply to recipients of financial assistance under this Act.

Under section 306 of the Energy Reorganization Act, contracts issued must contain a clause which gives the Comptroller General or his duly authorized representative, until the expiration of 3 years after final payment, access to and the right to examine any "directly pertinent books, documents, papers, and records of the contractor or any of his subcontractors". So that it is clear that the grant authority of this Act is included as well, the conference substitute specifies that the word "contract" means "contract or grant" insofar as this program is related.

The committee of conference deleted the expanded authority of the Comptroller General contained in the Senate amendment because of litigation which is currently being conducted over similar language to that contained in section 306 of the Energy Reorganization Act, concerning procurement by the Department of Defense. Until that litigation is concluded and the authority of the Comptroller General in these kinds of instances is more precisely defined, it is unwise to create yet another objective standard for GAO access.

REPORTS

*House bill*

The House bill requires, as a separate part of the annual report submitted under section 15(a) of the Federal Non-Nuclear Energy Research and Development Act of 1974, reports concerning a number of activities. They include (1) a current comprehensive program definition for implementing the Act, which is the planning document on how the goals of this Act are to be accomplished, (2) an account



of the state of automobile R. & D. in the United States, (3) the number and amount of contracts and grants made under this Act, (4) progress made in developing advanced automobile propulsion systems and their components, and (5) suggestions for improvements in the R. & D. program.

*Senate amendment*

The Senate amendment is similar, but without the requirement that a current comprehensive program definition for implementing the Act be included.

*Conference substitute*

The conference substitute adopts the House provision with technical changes.

In complying with the requirement that annual reports contain a comprehensive program definition, the Administrator shall include projections for funding over the life of the program, the number and types of propulsion systems and other technologies to be developed, the costs of program elements, and a schedule for accomplishing the goals of the program.

In lieu of the inclusion of the loan guarantees provisions of the Senate amendment, the conference substitute requires the Administrator to conduct a survey of developers, lending institutions, and others and to make a study for the purpose of determining whether, and under what conditions, research, development, and demonstration, and commercialization of advanced automotive technology may be aided by loan guarantees. Specific attention should be given to the considerations of small business and the various classes of potential recipients of loan guarantee assistance. The results are to be reported to Congress within 1 year and shall contain such legislative recommendations as may be necessary. It is expected that the amount of money spent by ERDA on this study will be small and will not significantly displace funds to be used for R. & D. purposes.

AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT

*House bill*

The House bill amends the National Aeronautics and Space Act to require that the unique competence in the scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the development of advanced automobile propulsion systems.

*Senate amendment*

No comparable provision.

*Conference substitute*

The conference substitute adopts the provision in the House bill. In doing so, it is intended that the provision is necessary only for the purpose of ensuring that the National Aeronautics and Space Administration has the authority to carry out programs assigned to it by the ERDA Administrator. NASA may not establish a separate program for such R. & D. under this new authority. The provision is thus to insure that NASA has the authority to be eligible for "pass through" funds from ERDA under the provisions of this Act. Of course, the inclusion of the amendments to the National Aeronautics and Space

Act does not effect the eligibility of any other Federal agency for funds on a "pass through" basis.

INFORMATION DISSEMINATION

*House bill*

The House bill requires that information maintained by the Administrator under this Act shall be subject to the provisions of section 552 of title V, United States Code, the "Freedom of Information Act". A prohibition on disclosure when the information, if made public, would divulge (1) trade secrets or (2) other proprietary information of such person is provided. Exceptions are made for furnishing such information to other Federal agencies, employees of ERDA, and to the Congress.

Any disclosure of the protected material would be punishable in accordance with the penalties contained in 18 U.S.C. 1905.

*Senate amendment*

No comparable provision. The provisions of existing law would apply.

*Conference substitute*

The conference substitute contains no reference to information dissemination. Thus, the provisions of existing law would apply.

TRANSFER OF FUNCTIONS

*House bill*

The House bill requires that within 60 days of the enactment of the law creating the electric vehicle research, development, and demonstration program, all the authorities of that program vested in other agencies shall be transferred to ERDA.

*Senate amendment*

No comparable provision.

*Conference substitute*

As the electric vehicle research, development, and demonstration program will be administered by the ERDA Administrator, no transfer is necessary. Consequently, the provision of the House bill was deleted.

GOVERNMENT PROCUREMENT

*House bill*

No provision.

*Senate amendment*

The Senate amendment requires that vehicles certified as advanced automobiles by the Low Emission Vehicle Certification Board be procured by all Federal agencies to the extent required under regulations prescribed jointly by the Vehicle Certification Board and the Administrator of General Services.

*Conference substitute*

The conference substitute deletes the provision in the Senate amendment. As the goal of the program is to produce "integrated test vehicles", which are not yet ready for production, the inclusion of a procurement provision is not appropriate.



RELATIONSHIP TO ANTITRUST LAWS

*House bill*

No provision. A disclaimer against any immunity from antitrust liability is provided under the Federal Non-Nuclear Energy Research and Development Act and applies to activities of ERDA.

*Senate amendment*

The Senate amendment specifically states that nothing in this title shall be deemed to convey any immunity from civil or criminal liability, or to create any defenses to actions under the antitrust laws.

*Conference substitute*

The conference substitute contains no provision as existing law applicable to ERDA already disclaims any intent to grant immunity.

AUTHORIZATION FOR APPROPRIATION

*House bill*

The House bill authorizes to be appropriated not to exceed $20 million for fiscal year 1977, and such sums as may be included in the annual authorization for the nonnuclear programs of the Energy Research and Development Administration for such subsequent fiscal year.

Any request for appropriations pursuant to this Act are to specify the relationship between the programs to be supported with such appropriations and any related programs which are being supported or are being proposed to be supported under other authorities.

*Senate amendment*

The Senate amendment provides authorization for appropriations of $55 million for fiscal year 1977 and $100 million for fiscal year 1978. The amounts authorized under this provision are for grants and contracts. Authorization for appropriations to pay defaulted loans is provided for under the loan guarantee provisions.

*Conference substitute*

The conference substitute authorizes not to exceed $25 million for the fiscal year 1977, and not to exceed $75 million for the fiscal year 1978.

The provisions of the House bill which require the Administrator to specify the relationship between budget requests for programs under this Act and other related requests under other programs are also included.

OLIN E. TEAGUE,
DON FUQUA,
MIKE MCCORMACK,
GEORGE E. BROWN, JR.,
RAY THORNTON,
CHARLES A. MOSHER,
BARRY M. GOLDWATER, JR.,
*Managers on the Part of the House.*

WARREN G. MAGNUSON,
FRANK E. MOSS,
JOHN V. TUNNEY,
HOWARD H. BAKER, JR.,
TED STEVENS,
*Managers on the Part of the Senate.*

O

H. R. 13655

# Ninety-fourth Congress of the United States of America

**AT THE SECOND SESSION**

***Begun and held at the City of Washington on Monday, the nineteenth day of January, one thousand nine hundred and seventy-six***

## An Act

**To establish a five-year research and development program leading to advanced automobile propulsion systems, and for other purposes.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That this Act may be cited as the "Automotive Transport Research and Development Act of 1976".

FINDINGS AND PURPOSES

SEC. 2. (a) The Congress finds that—

(1) existing automobiles, on the average, fall short of meeting the long-term goals of the Nation with respect to environmental protection, safety, and energy conservation;

(2) advanced alternatives to existing automobiles could, with sufficient research and development effort, meet these long-term goals, and have the potential to be mass produced at reasonable cost; and advanced automobiles could operate with significantly less adverse environmental impact and fuel consumption than existing automobiles, while meeting all of the other requirements of Federal law;

(3) insufficient resources are being devoted to both research on and development of advanced automobile technology;

(4) an expanded research and development effort with respect to advanced automobile technology would complement and stimulate corresponding efforts by the private sector and would encourage automobile manufacturers to consider seriously the incorporation of such advanced technology into automobiles and automobile components; and

(5) the Nation's energy, safety, and environmental problems are urgent, and therefore advanced automobile technology should be developed, tested, demonstrated, and prepared for manufacture within the shortest practicable time.

(b) It is therefore the purpose of the Congress in this Act to—

(1) (A) direct the Energy Research and Development Administration to make contracts and grants for research and development leading to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years of the date of enactment of this Act, or within the shortest practicable time consistent with appropriate research and development techniques, and (B) evaluate and disseminate information with respect to advanced automobile technology.

(2) preserve, enhance, and facilitate competition in research, development, and production with respect to existing and alternative automobiles, automobile propulsion systems, and automobile components; and

(3) supplement, but neither supplant nor duplicate, the automotive research and development efforts of private industry.

DEFINITIONS

SEC. 3. As used in this Act, the term—

(1) "Administrator" means the Administrator of the Energy Research and Development Administration;

(2) "advanced automobile" means a personal-use transportation vehicle which is fuel-propelled and is energy-efficient, safe, reliable, damage-resistant, and environmentally sound, and which—

(A) requires, consistent with environmental requirements, the least total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing automobiles with respect to such factors;

(B) to the extent practicable, is capable of utilizing different types of fuel;

(C) can be mass produced at the lowest possible cost consistent with the requirements of this Act;

(D) has a projected ownership cost to the first owner which is competitive with automobiles of the same size and class which are produced using standard technology, taking into account the other features of such advanced automobile which may justify costs different than those associated with standard technology;

(E) operate safely and with sufficient performance with respect to acceleration, cold weather starting, cruising speed, and other performance factors;

(F) to the extent practicable, is capable of intermodal adaptability; and

(G) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any requirement of Federal law, including requirements for fuel economy, exhaust emissions, noise control, safety, and damage resistance;

(3) "advanced automobile propulsion system" means an energy conversion system, including engine and drive train, which utilizes advanced technology and is suitable for use in an advanced automobile;

(4) "advanced automobile subsystem" means a subsystem which impacts materially the performance of the automobile in terms of fuel economy, environmental impact, safety, damageability, or reliability, and for which there is promise of technological improvement in such performance through research and development;

(5) "damage resistance" refers to the ability of an automobile to withstand physical damage when involved in an accident;

(6) "developer" means any person engaged in whole or in part in research or other efforts directed toward the development of advanced automobile technology;

(7) "fuel" means any energy source capable of propelling an automobile;

(8) "fuel economy" refers to the average distance traveled in representative driving conditions by an automobile per unit of fuel consumed, as determined by the Administrator of the Environmental Protection Agency in accordance with test procedures which shall be established by rule and shall require that fuel economy tests be conducted in conjunction with the exhaust emissions tests mandated by section 206 of the Clean Air Act (42 U.S.C. 1857f-5);

(9) "integrated test vehicle" means a vehicle which incorporates an advanced automobile propulsion system and other advanced automobile subsystems and which is used to determine, when functioning in an integrated manner, the compatibility and performance characteristics of these advanced subsystems over their useful life, (A) consistent with the Nation's need to increase substantially automobile fuel economy, to reduce substantially environmental impact, to conform to Federal requirements, including safety and damageability standards, and otherwise to provide automobiles satisfactory to consumers without unduly compromising the advanced automotive propulsion system and other subsystems; and (B) compatible with the criteria for an advanced automobile;

(10) "intermodal adaptability" refers to any characteristics of an automobile which enable it to be operated or carried, or which facilitate its operation or carriage, by or on an alternative mode or other system of transportation;

(11) "reliability" refers to (A) the average time and distance over which normal automobile operation can be expected without significant repair or replacement of parts, and (B) the ease of diagnosis and repair of an automobile, its systems, and parts in the event of failure during use or damage from an accident;

(12) "safety" refers to the performance of an automobile or automobile system or equipment in such a manner that the public is protected against unreasonable risk of accident and against unreasonable risk of death or bodily injury in case of accident;

(13) "Secretary" means the Secretary of Transportation; and

(14) "State" means any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, or any other territory or possession of the United States.

DUTIES OF THE ADMINISTRATOR

SEC. 4. (a) The Administrator shall establish, within the Energy Research and Development Administration, a program to insure the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles within 5 years after the date of enactment of this Act, or within the shortest practicable time, consistent with appropriate research and development technique. In conducting such program, the Administrator shall—

(1) establish and conduct new projects and accelerate existing projects which may contribute to the development of advanced automobile propulsion systems, advanced automobile subsystems, and integrated test vehicles;

(2) give priority attention to the development of advanced propulsion systems with appropriate attention to those advanced propulsion systems which are flexible in the type of fuel used, except that in integrating the various features of an automobile or the purpose of constructing integrated test vehicles, the Administrator shall incorporate advanced technology with respect to safety, damageability, and the other features of an integrated test vehicle in a manner which recognizes the automobile as a personal transportation system; and

(3) insure that research and development under this Act supplements, but neither supplants nor duplicates, the automotive research and development efforts of private industry.

(b) The Administrator shall, in fulfilling his responsibilities under this Act, make contracts and grants with any Federal agency, laboratory, university, non-profit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual for—

(1) research and development leading to advanced automobile propulsion systems which are likely to help meet the Nation's long-term goals with respect to fuel economy, environmental protection, and other objectives;

(2) research and development on other automobile subsystems in which possible improvements can be identified and which are suitable for inclusion in an integrated test vehicle; and

(3) the integration of advanced automobile propulsion systems developed under this program, with other advanced automobile subsystems developed under this program or elsewhere, into integrated test vehicles, which will be fully tested to determine the characteristics of such advanced propulsion system and other subsystems when integrated.

(c) In providing financial assistance under this Act, the Administrator shall give full consideration to the capabilities of Federal laboratories, except that not more than 60 per centum of the funds appropriated pursuant to the authorization under section 12 shall be directly expended in Federal laboratories. In accordance with section 7, such laboratories shall be available for testing components and subsystems which, in the Administrator's judgment, is likely to contribute to the development of advanced automobiles.

(d) The Administrator shall conduct evaluations, arrange for tests, and disseminate information pursuant to section 7 and submit reports required under section 10.

(e) The Administrator shall intensify research in key basic science areas in which the lack of knowledge limits development of advanced automobile propulsion systems.

DUTIES OF THE SECRETARY

SEC. 5. The Secretary, in furtherance of the purposes of this Act, shall evaluate the extent to which the automobile industry utilizes advanced automotive technology which is or could be made available to it. The Secretary shall submit a report to the Congress each year on the results of such evaluation including any appropriate recommendations which may encourage the utilization of advanced automobile technology by the automobile industry.

COORDINATION AND CONSULTATION

SEC. 6. (a) The Administrator shall have overall management responsibility for carrying out the program under section 4. In carrying out such program, the Administrator, consistent with such overall management responsibility—

(1) shall utilize the expertise of the Department of Transportation to the maximum extent practicable in the areas of safety and damageability research and development and, to the extent deemed appropriate by the Administrator, in other areas of research and development on automobile technology; and

(2) may utilize any other Federal agency (except as provided in paragraph (1)) in accordance with subsection (c), in carrying out any activities under this Act, to the extent that the Administrator determines that any such agency has capabilities which would allow such agency to contribute to the purposes of this Act.

(b) The Secretary, whenever the expertise of the Department of Transportation is utilized in accordance with subsection (a), may exercise the powers granted to the Administrator under subsection (c) and shall enter into contracts and make grants for such purpose, subject to the overall management responsibility of the Administrator.

(c) The Administrator may, in accordance with subsection (a), obtain the assistance of any department, agency, or instrumentality of the executive branch of the Federal Government upon written request, on a reimbursable basis or otherwise and with the consent of such department, agency, or instrumentality. Each such request shall identify the assistance the Administrator deems necessary to carry out any duty under this Act.

(d) The Administrator shall consult with the Administrator of the Environmental Protection Agency and the Secretary, and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in the area of automobile research, development, and technology. The Administrator may establish such advisory panels as he deems appropriate to review and make recommendations with respect to applications for funding under this Act.

(e) Nothing contained in this Act shall be construed to reduce in any way the responsibilities of the Administrator for automotive research, development, and demonstration under the Energy Reorganization Act of 1974 (42 U.S.C. 5801 et seq.) and the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5901 et seq.)

EVALUATION, TESTING, AND INFORMATION DISSEMINATION

SEC. 7. (a) The Administrator shall, for the purposes of performing his responsibilities under this Act, consider any reasonable new or improved technology, a description of which is submitted to the Administrator in writing, which could lead or contribute to the development of advanced automobile technology.

(b) The Administrator of the Environmental Protection Agency shall test, or cause to be tested, in a facility subject to Environmental Protection Agency supervision, each integrated test vehicle developed in whole or in part with Federal financial assistance under this Act, or referred to the Administrator of the Environmental Protection Agency for such purpose by the Administrator, to determine whether such vehicle complies with any exhaust emission standards or any other requirements promulgated or reasonably expected to be promulgated under any provision of the Clean Air Act (42 U.S.C. 1857 et seq.), the Noise Control Act of 1972 (42 U.S.C. 4901 et seq.), or any other provision of Federal law administered by the Administrator of the Environmental Protection Agency. In conjunction with any test for compliance with exhaust emission standards under this section, the

Administrator of the Environmental Protection Agency shall also conduct tests to determine the fuel economy of such vehicle. The Administrator of the Environmental Protection Agency shall submit all test data and the results of such tests to the Administrator.

(c) The Secretary shall test, or shall cause to be tested in a facility subject to supervision by the Secretary, each type of integrated test vehicle developed in whole or in part with Federal financial assistance under this Act, or referred to the Secretary for such purpose by the Administrator, to determine whether such vehicle complies with any standards promulgated as of the date of such testing, or reasonably expected to be promulgated in the future, under any provision of the National Traffic and Motor Vehicle Safety Act of 1966 (15 U.S.C. 1381 et seq.), the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.), the Automobile Information Disclosure Act (15 U.S.C. 1232), and any other statute enacted by Congress and whose provisions are applicable to automobiles where testing would be appropriate. All test data and the results of all tests conducted by the Secretary shall be submitted to the Administrator.

(d) The Administrator shall collect, analyze, and disseminate to developers information, data, and materials that may be relevant to the development of advanced automobile technology.

PATENTS

SEC. 8. Section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908) shall apply to any contract (including any assignment, substitution of parties, or subcontract thereunder) or grant, entered into, made, or issued by the Administrator under this Act.

COMPTROLLER GENERAL AUDIT AND EXAMINATION

SEC. 9. Section 306 of the Energy Reorganization Act of 1974 (42 U.S.C. 5876) shall apply with respect to the authority of the Comptroller General to have access to and rights of examination of books, documents, papers, and records of recipients of financial assistance under this Act; except that for the purposes of this Act, the term "contract" (as used in section 166 of the Atomic Energy Act (42 U.S.C. 2206), insofar as it relates to such section 306) means "contract or grant".

REPORTS

SEC. 10. (a) As a separate part of the annual report submitted under section 15(a) of the Federal Nonnuclear Energy Research and Development Act of 1974 with respect to the comprehensive plan and program then in effect under section 6 (a) and (b) of such Act, the Administrator shall submit to Congress an annual report of activities under this Act. Such report shall include—

(1) a current comprehensive program definition for implementing this Act;

(2) an evaluation of the state of automobile research and development in the United States;

(3) the number and amount of contracts and grants made under this Act;

(4) an analysis of the progress made in developing advanced automobile technology; and

(5) suggestions for improvements in advanced automobile research and development, including recommendations for legislation.

(b) The Administrator shall conduct a survey of developers, lending institutions, and other appropriate persons or institutions and shall otherwise make a study for the purpose of determining whether, and under what conditions, research, development, demonstration, and commercial availability of advanced automobile technology may be aided by the guarantee of financial obligations by the Federal Government. The Administrator shall report the results of such survey and study to the Congress within 1 year after the date of enactment of this Act. Such report shall include an examination of those stages of advanced automobile technology research, development, demonstration, and commercialization for which financial obligation guarantees may be useful or appropriate and shall contain such legislative recommendations as may be necessary.

AMENDMENT OF THE NATIONAL AERONAUTICS AND SPACE ACT

SEC. 11. (a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended by redesignating subsection (d) as subsection (e), and by inserting immediately after subsection (c) the following new subsection:

"(d) The Congress declares that the general welfare of the United States requires that the unique competence in scientific and engineering systems of the National Aeronautics and Space Administration also be directed toward the development of advanced automobile propulsion systems. Such development shall be conducted so as to contribute to the achievement of the purposes set forth in section 2(b) of the Automotive Transport Research and Development Act of 1976.".

(b) The subsection of section 102 of such Act redesignated as subsection (e) by subsection (a) of this section is amended by striking out "and (c)" and inserting in lieu thereof "(c), and (d)".

AUTHORIZATION FOR APPROPRIATION

SEC. 12. There are authorized to be appropriated to carry out the purposes of this Act—

(1) not to exceed $25,000,000 for the fiscal year ending September 30, 1977, and

(2) not to exceed $75,000,000 for the fiscal year ending September 30, 1978.

(b) Any budget request for appropriations pursuant to the authority in subsection (a) shall specify the relationship between the research, development, and demonstration to be supported with such appropriations and any related requests for appropriations for programs of the Federal Government concerning automobile research and development.

*Speaker of the House of Representatives.*

*Vice President of the United States and*
*President of the Senate.*

September 24, 1976

Received from the White House a sealed envolope said to contain a message from the President wherein he transmits H.R. 13655, An Act to establish a five-year research and devolopment program leading to advanced automobile propulsion systems, and for other purposes, and a veto message thereon.

Edmund Henshaw Jr.
Clerk of the House of Representatives

By Benjamin Guthrie

7:30
Time received