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ELECTRIC VEHICLE RESEARCH, DEVELOPMENT, AND
DEMONSTRATION ACT OF 1975

JULY 31, 1975.—Committed to the Committee of the Whole House on the
State of the Union and ordered to be printed

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

REPORT

[To accompany H.R. 8800]

The Committee on Science and Technology, to whom was referred the bill (H.R. 8800) to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

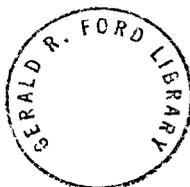
The amendment is as follows:

Page 15, line 25, after "vehicles" insert "or any components thereof".

PURPOSE OF THE BILL

The purpose of this bill is to set up a program, within the Energy Research and Development Administration, for research and development of electric vehicle technology together with demonstration phases to determine their commercial feasibility.

(1)



CONTENTS

	Page
I. Bill	5
II. Explanation of the bill.....	13
III. Background	17
IV. Legislative history.....	27
Legislation related to H.R. 5470.....	27
Introduction of H.R. 5470.....	30
Legislation identical to H.R. 5470.....	30
Hearings on H.R. 5470 and related legislation.....	31
V. Committee actions.....	35
Subcommittee actions.....	35
Full committee actions.....	37
VI. Committee views.....	39
VII. Section-by-section summary of the bill.....	41
VIII. Effect of legislation on inflation.....	47
IX. Agency communications.....	49
X. Vote of the committee on the bill.....	53
XI. Congressional budget act information.....	55
New budget authority.....	55
Estimate of costs.....	55
XII. Oversight findings and recommendations.....	57

I. BILL

[H.R. 8800, 94TH CONG., 1ST SESS.]

A BILL To authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "Electric Vehicle Research, Development, and Demonstration Act of 1975".

FINDINGS

SEC. 2. The Congress hereby finds that—

(1) travel patterns of commercial and private vehicles in urban areas are weighted heavily toward short and predictable trips well within the capability of electric vehicles;

(2) our balance of payments and our economic stability are threatened by the need to import oil for the production of liquid fuel for gasoline-powered vehicles;

(3) the shortage of fuel for gasoline-powered vehicles will continue indefinitely;

(4) the increased price of petroleum is a major factor in recent inflationary trends;

(5) the strain on individuals' budgets inflicted by liquid fuel prices mandates the development of an alternative source of propulsion wherever possible;

(6) environmental pollution control is becoming more and more difficult and expensive with the use of gasoline-powered vehicles, and the steadily increasing numbers of such vehicles threaten the quality of the air even when strict controls are applied to individual vehicles;

(7) stationary sources of pollutants are potentially easier to control than moving vehicles, making it environmentally desirable for transportation systems to be powered from central sources;

(8) liquid-fuel-powered vehicles are a major source of urban noise pollution;

(9) electric-powered vehicles do not emit any significant pollutants and are far less noisy than conventional automobiles and trucks;

(10) new technologies of propulsion and control have made electric and hybrid vehicles more practicable than in the past, and developments in battery technology indicate that further progress is likely in the next decade;

(11) because electric and hybrid vehicles use little or no energy when stopped in urban traffic, they permit the conservation of energy currently wasted by conventional automobiles and trucks;

(12) the power demands of electric and hybrid vehicles would promote energy conservation by loading utilities in off-peak late night hours, permitting more efficient use of plant capacity;

(13) the depressed state of the current automobile industry would be alleviated by the introduction of new technologies more closely matching consumer needs; and

(14) because of the large capital needs of new transportation technology, and the built-in features of current highway and maintenance systems which tend to bias consumers toward conventional vehicles, a Federal role is required in promoting the development of the socially desirable electric and hybrid vehicle industry.

POLICY AND GOALS

SEC. 3. (a) It is declared to be the policy of the United States and the purpose of this Act to demonstrate the commercial feasibility of electric and hybrid vehicles for urban individual and business use, and to encourage research and development in new technologies for electric and hybrid vehicles with wider applications, in order to promote long-range conservation of liquid fuel and reduce environmental pollution.

(b) In carrying out the purpose of this Act it is the goal of the Federal Government—

(1) to promote the substitution of electric and hybrid vehicles for many gasoline- and diesel-powered vehicles currently used in routine short-haul, low-load applications;

(2) to implement this policy by removing institutional barriers to such substitution where otherwise practicable;

(3) to provide incentives for consumers and industry to adopt and utilize electric and hybrid vehicles whenever the use of such vehicles would be beneficial; and

(4) to provide a research and development background for further applications as rapidly as possible to meet the further tightening of liquid fuel availability.

DEFINITIONS

SEC. 4. For the purposes of this Act—

(1) The term "electric vehicle" means a vehicle which is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include also a nonelectrical source of power designed to charge batteries.

(2) The term "hybrid vehicle" means a vehicle propelled by a combination of an electric motor and an internal combustion engine or other alternative engine.

(3) The term "project" means the Electric Vehicle Research, Development, and Demonstration Project established within the Energy Research and Development Administration as provided in section 5.

(4) The term "Administrator" means the Administrator of the Energy Research and Development Administration.

MANAGEMENT

SEC. 5. (a) The Administrator shall promptly establish, as an organizational entity within the Energy Research and Development Administration, the Electric Vehicle Research, Development, and Demonstration Project.

(b) The overall management of the project shall be the responsibility of the Administrator, but he may enter into such arrangements and agreements with the National Aeronautics and Space Administration, the Secretary of Transportation, the National Science Foundation, the Environmental Protection Agency, the Secretary of Housing and Urban Development, and other Federal officers and agencies as he may deem necessary or appropriate for the conduct by them of parts or aspects of the project which are within their particular competence.

(c) In providing for the effective management of the project the Administrator shall have specific responsibility for—

(1) promoting basic and applied research on electric and hybrid vehicle batteries, controls, and motors;

(2) determining optimum overall electric and hybrid vehicle design;

(3) conducting demonstrations of the feasibility of commercial electric and hybrid vehicles by contracting for the practical manufacture of electric and hybrid vehicles and by developing arrangements with other agencies and nongovernmental entities for the operation of such vehicles;

(4) ascertaining consumer needs and desires so as to match the design of electric and hybrid vehicles to their potential market; and

(5) ascertaining the long-term changes in road design, urban planning, traffic management, maintenance facilities, utility rate structures, and tax policies which are needed to facilitate the manufacture and use of electric and hybrid vehicles.

RESEARCH AND DEVELOPMENT

SEC. 6. The Administrator, acting through appropriate agencies and contractors, shall initiate and provide for the conduct of research and development in areas related to electric and hybrid vehicles, including—

(1) energy storage technology, including batteries and their potential for convenient recharging;

(2) vehicle control systems and overall design for energy conservation, including the use of regenerative braking;

(3) urban design and traffic management for optimum transportation-related energy use and minimum transportation-related degradation of the environment; and

(4) vehicle design for maximum practical lifetime, ease of repair, and interchangeability and replaceability of parts.

DEMONSTRATION

SEC. 7. (a) The Administrator (subject to section 13(c)) shall enter into such contracts as may be necessary and appropriate—

(1) within one year after the date of the enactment of this Act, for the production of a reasonable number of urban passenger and commercial electric vehicles for the purpose of evaluation tests and initial in-use demonstration of current state-of-the-art;

(2) within fifteen months after such date, for the production of at least twenty-five hundred select urban passenger and commercial electric vehicles (meeting the initial standards and criteria and developed under subsection (b)) with available components and designs; and

(3) within forty-two months after such date, for the production of at least five thousand urban passenger and commercial electric or hybrid vehicles (meeting the appropriate standards and criteria developed under subsection (b)) which have advanced components and designs.

(b) (1) Within one year after the date of the enactment of this Act, the Administrator shall develop or arrange for the development of initial performance standards and criteria which are suitable for the needs of urban private passenger vehicles and urban commercial vehicles (and which shall be applicable to the vehicles produced under subsection (a) (2)). The standards and criteria so developed shall not be designed simply to reflect the characteristics of current internal combustion engine automobiles and trucks, but shall also take into account the factors of energy conservation, urban traffic characteristics, patterns of use for "second" vehicles, consumer preferences, maintenance needs, battery recharging characteristics, materials demand and recyclability, vehicle safety and insurability, and other relevant considerations, as such factors and considerations particularly apply to or affect vehicles with electric or hybrid propulsion systems. Such standards and criteria are to be developed and determined utilizing the best current state-of-the-art and utilizing the state-of-the-art that would be projected to result from the research and development program described in section 6. These performance standards and criteria shall be revised periodically as the state-of-the-art improves. In developing such standards and criteria, the Administrator shall consult with appropriate authorities concerning design needs for electric and hybrid vehicles compatible with long-range urban planning, traffic management, and vehicle safety.

(2) Before entering into contracts for the production of vehicles under subsection (a) (3), the Administrator shall transmit to the Speaker of the House of Representatives and the President of the Senate and to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce of the Senate a full and complete statement of the standards and criteria developed under paragraph (1) as revised and currently in effect.

(c) The Administrator shall make such arrangements as may be necessary or appropriate—

(1) for the introduction of the electric and hybrid vehicles produced under subsection (a) into the vehicle fleets of State and local governments and Federal agencies;

(2) for the introduction of such vehicles into individual and business use, with the individuals and businesses involved being chose by an equitable process (such as a lottery in each region or category) and being given the option of purchasing or leasing such vehicles under terms and conditions which will insure their widespread use;

(3) for the evaluation of electric and hybrid vehicle performance and of consumer reaction to electric and hybrid vehicles in use;

(4) for demonstration maintenance projects (including maintenance organization and equipment needs), and model training projects on maintenance procedures; and

(5) for the dissemination of data on electric and hybrid vehicle safety and operating characteristics (including nontechnical descriptive data made available through the Government Printing Office) to State and municipal consumer affairs agencies and groups.

USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES

SEC. 8. The United States Postal Service, the General Services Administration, the Secretary of Defense, and the heads of other Federal agencies shall arrange for the introduction of electric and hybrid vehicles into their fleets as soon as possible. For competitive procurement purposes in purchasing such vehicles, life cycle costing and the beneficial emission characteristics of electric and hybrid vehicles shall be fully taken into account. In any case where (as determined by the head of the agency involved) electric or hybrid vehicles are practical but are not economically competitive with conventional vehicles, the Administrator may pay the incremental cost of the electric or hybrid vehicles (as part of the demonstration program under section 7) to insure that the maximum number of electric and hybrid vehicles are placed in use by Federal agencies.

INCENTIVES AND ASSESSMENTS

SEC. 9. (a) The Administrator shall conduct a study to determine the existence of any tax, regulatory, traffic, urban design, and other institutional factors which tend or may tend to bias surface transportation systems toward vehicles of particular characteristics, and shall report the results of such study to the Congress within one year after the date of the enactment of this Act.

(b) The Administrator shall conduct a continuing assessment of the long-range materials demand and pollution effects which may result from or in connection with the electrification of urban traffic, and shall include a statement of his current findings in each report submitted

under section 12. Any environmental impact statement which may be filed under a Federal law with respect to research, development, or demonstration activities under this Act shall include reference to the matters which are subject to assessment under this subsection.

(c) In carrying out his functions under this Act, the Administrator shall perform or cause to be performed studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technologies.

(d) The Secretary of Transportation shall conduct a study on the current and future applicability of safety standards and regulations to electric and hybrid vehicles and shall report the results of such study to the Administrator within two hundred forty days after the date of the enactment of this Act.

ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESS

SEC. 10. (a) In carrying out his functions under this Act, the Administrator shall take steps to assure that small business concerns and qualified individuals will have realistic and adequate opportunities to participate in the program under this Act to the maximum extent possible.

(b) To assist in accomplishing the objective of subsection (a), the Administrator shall reserve for contracts with small business concerns a reasonable portion of the funds made available pursuant to this Act for purposes of section 7(a).

(c) In addition, the Administrator—

(1) shall include in all contracts under section 7(a) such terms, conditions, and payment schedules as may assist in meeting the special needs of small business concerns, and shall take steps to avoid the inclusion in such contracts of any terms, conditions, or penalties which would tend to prevent such concerns from participating in the program under this Act; and

(2) shall make planning grants available to qualified small business concerns which require assistance in developing, submitting, and entering into such contracts.

LOAN GUARANTIES

SEC. 11. (a) It is the policy of the Congress to encourage and assist in the commercial development of electric and hybrid vehicles, and to ensure that small businesses are not excluded from participation in such development due to lack of adequate capital. Accordingly, it is the policy of the Congress to provide guaranties of loans made for such purposes.

(b) In order to encourage the commercial production of electric and hybrid vehicles, the Administrator is authorized to guarantee, and to enter into commitments to guarantee, lenders against loss of principal or interest on loans made by such lenders to qualified borrowers, primarily small business concerns, for the purposes of—

(1) research and development related to electric and hybrid vehicle technology;

(2) prototype development for such vehicles and parts thereof;
 (3) construction of capital equipment related to research on and development and production of electric and hybrid vehicles and components; or

(4) initial operating expenses associated with the development and production of electric and hybrid vehicles and components.

(c) Any guaranty under this section shall apply only to so much of the principal amount of the loan involved as does not exceed 90 per centum of the aggregate cost of the activity with respect to which the loan is made.

(d) Loan guaranties under this section shall be on such terms and conditions as the Administrator determines, except that a guaranty shall be made under this section only if—

(1) the loan bears interest at a rate not to exceed such annual per centum on the principal obligation outstanding as the Administrator determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed fifteen years;

(3) in the judgment of the Administrator, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the activity with respect to which the loan is made; and

(4) in the judgment of the Administrator, there is reasonable assurance of repayment of the loan by the qualified borrower.

(e) The amount of the guaranty of any loan for any single qualified borrower shall not exceed \$3,000,000; and the aggregate amount of guaranties outstanding under this section at any one time shall not exceed \$60,000,000.

(f) As used in this section, the term "qualified borrower" means any partnership, corporation, or other legal entity which (as determined by the Administrator) has presented satisfactory evidence of an interest in electric or hybrid vehicle technology and is capable of performing research or completing the development and production of electric or hybrid vehicles or any components thereof in an acceptable manner.

(g) (1) With respect to any loan guaranteed pursuant to this section, the Administrator (subject to section 13(c)) is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the Administrator finds—

(A) that the borrower is unable to meet interest charges, that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Federal Government in paying such interest will be less than that which would result in the event of a default; and

(B) the amount of such interest charges which the Administrator is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.

(2) In the event of any default by a qualified borrower on a guaranteed loan, the Administrator is authorized to make payment in accordance with the guaranty, and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments (including any payment of interest under paragraph (1)) from such assets of the defaulting borrower as are associated with the activity with respect to which the loan was made or from any other surety included in the terms of the guaranty.

(h) No loan guaranties shall be made, or interest assistance contracts entered into, pursuant to this section, after the expiration of the 5-calendar-year period following the date of the enactment of this Act.

REPORTS TO CONGRESS

SEC. 12. The Administrator shall submit to the Congress semiannually a report on all activities being undertaken or carried out pursuant to the provisions of this Act, including (1) such projections and estimates as may be necessary to evaluate the progress of the program under this Act and to indicate the extent to which and pace at which the objectives of this Act are being achieved, and (2) a statement of the extent to which imported automobile chassis or components are being used, or are desirable, for the production of vehicles under section 7(a), and of the extent to which restrictions imposed by law or regulation upon the importation or use of such chassis or components are impeding the achievement of the purpose of this Act. Each such report shall also include any recommendations which the Administrator may deem appropriate for legislation or related action which might further the purposes of this Act.

APPROPRIATIONS AND APPROPRIATION ACTS

SEC. 13. (a) There are authorized to be appropriated to the Administrator to carry out this Act (including the payment of loan guaranties and interest under section 11) not to exceed \$10,000,000 for the fiscal year 1976, and the three-month transition period immediately following, not to exceed \$40,000,000 for the fiscal year 1977, not to exceed \$30,000,000 for the fiscal year 1978, not to exceed \$60,000,000 for the fiscal year 1979, and not to exceed \$20,000,000 for the fiscal year 1980. Any amount appropriated pursuant to this section shall remain available until expended, and any amount authorized for any fiscal year (or period) prior to the fiscal year 1980 but not appropriated may be appropriated for any succeeding fiscal year through the fiscal year 1980.

(b) Any moneys received by the Administrator from vehicle sales or leases (or other activities) under this Act may be retained and used by him in carrying out this Act, notwithstanding the provisions of section 3617 of the Revised Statutes (31 U.S.C. 484), and may remain available until expended; but the amount authorized to be appropriated for any fiscal year (or period) under subsection (a) shall be reduced by the amount of the moneys to be so received in that year (or period).

(c) The authority of the Administrator to enter into contracts under section 7(a) or section 11(g) (1) shall be effective for any fiscal year (or period) only to such extent as is provided in appropriation Acts.

II. EXPLANATION OF THE BILL

H.R. 8800 establishes a program within the Energy Research and Development Administration (ERDA) to demonstrate the commercial feasibility of electric vehicles for private and business travel under urban conditions. It mandates a five year project of placing more than 7,500 vehicles into use in various applications and geographical regions, along with associated research and development efforts. It authorizes 160 million dollars over the five-year period for support of the project.

There are a number of pressing reasons for quickly bringing about the commercialization of electric highway vehicles in this country—the most prominent of which is the dwindling supply of oil. Already we are forced to import about 40 percent of our petroleum needs, and this is roughly comparable to the amount consumed by our transportation system. The near-term political and economic consequences of such high import dependence, and the long term world-wide petroleum shortage, indicate that we must achieve an alternative means of propulsion for a major portion of our transportation by the end of the century.

Electric propulsion can serve effectively as this alternative. Before the development of the modern internal combustion engine and before the availability of cheap petroleum, around the turn of the century, electric cars were more common than gasoline-powered cars. During the week of hearings before the Subcommittee on Energy Research, Development and Demonstration on H.R. 5470 at the beginning of June, approximately 18 different vehicles were on display and in use.

One significant limitation of today's electric vehicles is their range, which is typically about 50 miles for a single (battery) charge. However, even this short range is adequate for practically all (approximately 98 percent) of the daily travel of the "second" car. The limited range, of course, is due to the limited capacity of the lead-acid battery. One of the principal research and development targets in the program, therefore, will be advanced batteries. The hybrid vehicle may also be looked to for extended range. Here, for example, a small efficient, and low-emission gasoline engine may be used to maintain battery charge and thereby considerably extend the driving range.

Benefits of electric vehicles also include reduced urban noise and air pollution, plus energy conservation as compared to internal combustion powered vehicles on short trips or in heavy traffic. Air pollution can be more reliably and effectively controlled at central electric generating plants than at the exhaust of thousands of vehicles in a city. In addition, off-peak hour (night-time) recharging of batteries is very attractive for its efficient use of electric generating plant capacity.

OBJECTIVES

The objectives of the bill will be met through a three-phase demonstration program. Starting with a relatively small number of current design electric vehicles, the program will push the state of the art, and finally culminate with an advanced design demonstration involving five thousand vehicles. Altogether, the demonstration program is expected to result in distribution of about eight thousand electric vehicles, used in every region of the country.

In carrying out his responsibility for managing the program, the Administrator of ERDA will undertake cooperative work with other agencies—such as the National Aeronautics and Space Administration, the Department of Transportation, the National Science Foundation, the Environmental Protection Agency, and the Department of Housing and Urban Development—within their particular areas of expertise.

STATEMENT OF POLICY

The bill declares that it shall be the policy of the United States to demonstrate the commercial feasibility of electric and hybrid, personal- and business-use vehicles in order to conserve liquid fuel and to reduce environmental pollution.

RESEARCH AND DEVELOPMENT

The greatest potential for improvement of the electric vehicle state of the art is through the development of advanced batteries, having considerably increased energy density. The bill will underwrite research in energy storage technology, including batteries as well as other portable power sources such as flywheels and fuel cells.

In addition, research will be conducted on overall vehicle design for improved energy efficiency, minimal maintenance and extended lifetime. Traffic management alternatives will be investigated to optimize the conservation of both energy and the environment.

DEMONSTRATION PROGRAM

The heart of the bill is the demonstration program. Its purpose is to get present and future state-of-the-art electric vehicles out into every region of the country, and to use and evaluate them under all appropriate driving circumstances—both business and personal. This will serve not only to evaluate technical performance and identify problems, but it will also acquaint the public with this mode of propulsion and ascertain consumer preferences and reservations. Important social-technological issues, which may not be appreciated in advance, can be exposed and addressed. Most important, resulting consumer awareness and the creation of an electric vehicle "second car" market may actually push the state of the art, permitting the nation to reduce our petroleum dependency sooner than might otherwise be possible.

The demonstration program will be carried out in three stages. The first involves a few hundred electric vehicles at the present state of the art for in-use demonstration and evaluation. Contracts for this stage are to be let within one year of the date of enactment. Contracting for

the second and third stages is to be completed within fifteen months and forty-two months respectively. The second stage will include two thousand five hundred vehicles which meet initial performance standards and criteria, while the third stage will involve five thousand electric vehicles having advanced components and designs, meeting appropriately advanced revised standards and criteria.

The initial standards must be drawn up within one year of enactment of the bill, and they must be revised periodically thereafter. Before the third stage demonstration takes place, the Administrator is required to transmit a complete statement of performance standards and criteria, as revised, to the Congress and its appropriate committees.

In connection with the demonstration, arrangements must be made to introduce the vehicle into Federal, State and local government fleets; to introduce them on an equitable basis to individuals and businesses with the option of purchase or lease; to evaluate performance and consumer reaction; to undertake demonstration maintenance projects; and to disseminate safety and operating characteristics and data to appropriate consumer affairs groups.

USE BY FEDERAL AGENCIES

The U.S. Postal Service, the General Services Administration, the Department of Defense, and other Federal agencies will introduce electric and hybrid vehicles into their fleets as soon as possible. If agency heads find electric vehicles practical but not currently economically competitive, the Administrator may pay incremental life-cycle costs associated with use of the electrical vehicles.

ASSESSMENT

The Administrator must report within one year to the Congress the results of a study of institutional factors (urban design, regulatory constraints, etc.) which might bias surface transportation systems toward particular sorts of vehicles. He also shall conduct research on incentives to promote broader utilization and consumer acceptance of electric vehicles. He shall assess on a continuing basis and report to Congress on long-range materials demands and effects of urban traffic electrification on environmental quality.

The Secretary of Transportation must report to the ERDA Administrator within eight months of enactment on current and future applicability of safety standards to electric vehicles.

SMALL BUSINESS

The participation in the electric vehicle demonstration by small business is provided for in this bill in several ways. Provisions for encouragement and assistance include: (a) reservation of a reasonable portion of the funds for small business concerns; (b) design of contract terms and schedules to meet the special needs of small businesses, compatible with sound management practices and further accomplishment of the objectives of the Act; (c) making available

planning grants to small business concerns which require assistance in contracting.

LOAN GUARANTIES

The Administrator of ERDA is authorized to guarantee lenders against loss of principal or interest on loans made to electric vehicle manufacturers. This loan guarantee program will permit small businesses to have access to the capital necessary for their participation in the demonstration programs. Their loans may be used for R&D, prototype development, construction of facilities and other capital equipment, and initial operating expenses associated with electric vehicle production.

Up to 90 per centum of the aggregate cost of the activity for which the loan is made may be covered by the guarantee. This means that 100% of certain loans may be guaranteed if additional capital is allocated from other sources.

The maximum guarantee for a single company is \$3,000,000. The total of all outstanding guaranties will not be more than \$60,000,000 at any time.

The maximum repayment period is 15 years. Guaranties must be initiated within 5 years after enactment of the Act.

The Administrator is given authority to set the terms and conditions for the guaranties, subject to certain conditions related to interest rate and assurance of repayment.

REPORTS

The Administrator is required to report to the Congress semi-annually on all activities being taken or carried out pursuant to the provisions of this bill. A special requirement is that he must include a statement of the extent to which imported components or chassis are being used or are desirable for the first stage of the demonstration program, and the extent to which legal (or regulatory) restrictions on such importation or use may be impeding progress under this Act.

APPROPRIATIONS

A total of \$160 million dollars, distributed in consonance with the procurement cycles, is authorized:

Fiscal year 1976 and transition period: \$10 million

Fiscal year 1977: \$40 million

Fiscal year 1978: \$30 million

Fiscal year 1979: \$60 million.

Fiscal year 1980: \$20 million.

Revenues from sales, leases, etc., may be retained by ERDA, but the authorization for the corresponding year is reduced by an equivalent amount.

III. BACKGROUND

Prior to the nineteen sixties, there was no active interest by the Federal Government in civilian propulsion technology in general or in electric vehicle technology in particular. Up to then, electric vehicle technology was done in the private sector by various private concerns.

At the beginning of the automotive era, electric vehicles appeared to be the most successful of the three types of vehicles that were currently available, i.e., electric, steam, and gasoline powered cars. In fact, from 1900 to 1915, there were over a hundred manufacturers of electric vehicles. In the year 1900, almost 1,600 electric automobiles were manufactured compared with less than 1,000 cars equipped with internal combustion engines.

But the amount of time, money, and personnel that went into the development of the electric vehicle was nowhere near the time, money, and personnel that went into the gasoline-powered, internal combustion engine. As a result of these expenditures, great developments were made in the piston engine, such as the invention of the self-starter. Thus the gasoline powered car gradually replaced the electric car, and few electric automobiles were built after about 1930.

Interest in electric vehicles remained dormant until the sixties when it became apparent that the exhaust fumes from cars were a major source of air pollution. In fact, in 1967 the Panel on Electrically Powered Vehicles of the Department of Commerce pointed out that "in terms of total national air pollution, the automobile is the greatest single contributor, by weight." It was at this time that Federal governmental concern with automotive propulsion technology was initiated through the Clean Air Act, Public Law 88-206. This Act provided for, among other things, research on motor vehicle pollutant emissions. In 1965, the Act was amended to provide for national air pollution emission standards.

In the seventies, interest has been renewed in electric vehicles as an alternative to the motor vehicle with an internal-combustion engine. The flow out of the country of dollars for petroleum to be used in our cars has made it necessary to provide incentives for further development of electric vehicles. This legislation will help accomplish this.

REPORT OF THE PANEL ON ELECTRICALLY POWERED VEHICLES ¹

This Task Force Report, *The Automobile and Air Pollution*, recommended that "the Federal Government should initiate a five-year program, in total amount of approximately 60 million dollars, to support innovative developments useful in the establishment of future emission standards, in the following areas:

- a. energy sources for vehicles;
- b. vehicular propulsion systems;

¹ U.S. Department of Commerce, Panel on Electrically Powered Vehicles. *The Automobile and Air Pollution. Task Force Reports.* Washington, U.S. Govt. Print. Off., 1967. 2 volumes.

- c. emission control devices;
- d. special purpose urban cars; and
- e. general purpose vehicles.

It also recommended that "Federal, State and local governments should incorporate low emission performance criteria as factors in the purchase of vehicles for their requirements."

POWER SYSTEMS FOR ELECTRIC VEHICLES ²

The purpose of this symposium was to provide a coordinated review of current research related to power systems for electric vehicles. Meetings were designed to define the status of knowledge at that time and stimulated research. It was pointed out at that time that the Federal Government must develop early and realistic short- and long-term goals and standards, both for quality of our air and for transportation systems themselves. It was recognized that new types of automotive vehicles must be developed that will operate without generating harmful emissions.

ENERGY TASK FORCE REPORT ³

The report of the Task Force on Energy of the Committee on Science and Astronautics in December 1972 noted that results of energy research and development may change the outlook for demand or supply in ways not now anticipated. This Task Force was constituted specifically for reviewing energy matters during the 92d Congress.

The Task Force Report pointed out that transportation directly accounts for 25 percent of the total energy consumed in the United States (and perhaps as much as 40 percent if all indirect energy costs are included, such as those associated with the manufacture of automobiles or the construction of highways). The report indicated that one way to conserve motor fuel is to increase the efficiency of engines. However, current air pollution requirements are working at cross purposes, and the difficulties are great for developing an engine that is both efficient and acceptably non-polluting.

The report noted that opportunities for energy research and development during the 1980s could include the demonstration of incentives to encourage more efficient use of energy, including more efficient carriers for passengers and freight. Also called for was commercial demonstration of more efficient, environmentally acceptable, engines for motor vehicle transport.

AN EVALUATION OF ALTERNATIVE POWER SOURCES FOR LOW-EMISSION AUTOMOBILES ⁴

The Panel on Alternative Power Systems of the Committee on Motor Vehicle Emissions of the National Academy of Sciences was

² U.S. Department of Health, Education, and Welfare. Public Health Service. National Center for Air Pollution Control. Power Systems for Electric Vehicles. A Symposium sponsored by the U.S. Department of Health, Education and Welfare; Columbia University; and Polytechnic Institute of Brooklyn. Cincinnati, Ohio, 1967. 323 p.

³ U.S. Congress. House. Committee on Science and Astronautics. Subcommittee on Science, Research and Development. Energy Research and Development. Report of the Task Force on Energy. 92d Congress, 2d session. Washington, U.S. Govt. Print. Off., December 1972. pp. 63, 167, 222.

⁴ National Academy of Sciences. Committee on Motor Vehicle Emission. An Evaluation of Alternative Power Sources for Low-Emission Automobiles. Report of the Panel on Alternate Power Sources. Washington, April 1973. 151 p.

charged with considering the possibility of using engines other than spark-ignition gasoline-fueled Otto cycle engines for automobiles. Emission levels and delay before the engine could become available were major considerations.

The report noted that the central problem with electric vehicles is the lack of availability of batteries with sufficiently high specific energy and specific power capability.

The report noted that battery-operated vehicles exist now and limited-production battery-operated automobiles could be said to exist, albeit with low performance and small size. Mass production of these limited performance vehicles could be achieved in 4 to 6 years if required.

Advanced battery power plants are estimated to be about 4 years from a suitable prototype assuming optimum funding. If this schedule could be held, mass-produced electric-powered vehicles of high performance could become available in another 7 to 10 years.

IMPACT OF FUTURE USE OF ELECTRIC CARS IN LOS ANGELES REGION ⁵

Impacts of the use of electric cars in the Los Angeles region in 1980-2000 were projected for four-passenger subcompact electric cars using lead-acid and advanced batteries, such as nickel-zinc, zinc-chlorine, and lithium-sulfur, with urban driving ranges of about 55 and 140 miles, respectively. Data from Los Angeles Travel Surveys show that such cars could replace 17 to 74 percent of future Los Angeles autos with little sacrifice of urban driving.

Adequate raw materials and night-time recharging power should be available for such use in the Los Angeles region. Air quality improvements due to the electric cars would be minor because conventional automobile emissions are being drastically reduced. It was noted that the electric cars would save little energy overall, as compared to conventional subcompacts, but would save a considerable amount of petroleum if they were recharged from the nuclear power plants that are planned.

The electric subcompacts would be 20-60 percent more expensive overall than conventional subcompacts until battery development significantly reduces battery depreciation costs.

THE ROLE FOR FEDERAL R&D ON ALTERNATIVE AUTOMOTIVE POWER SYSTEMS ⁶

This report prepared for NSF examined various alternative automotive power systems including the battery-powered electric system. The report indicated that electrically driven battery-powered vehicles provide freedom from emissions and from high losses in energy conversion in the vehicle; however, these problems are transferred to the location of the electricity generating plant.

⁵ U.S. Environmental Protection Agency. Office of Mobile Source Air Pollution Control. Alternative Automobile Power Systems Division. Impact of Future Use of Electric Cars in the Los Angeles Region. Ann Arbor, Michigan, October 1974. 3 volumes. EPA-460/3-74-020.

⁶ Massachusetts Institute of Technology. The Role for Federal R and D on Alternative Automotive Power Systems, by John B. Heywood, Henry D. Jacoby, and Lawrence H. Linden. Cambridge, November 1974. 98 pages plus appendices. Rept. No. MIT-EL 74-013. Prepared for the National Science Foundation under Contract No. EN-44166. PB-238771.

The report pointed out that potential alternatives, including electrical battery-powered vehicles, may offer advantages over the internal combustion engine, but considerable development would be required, and Federal support was proposed.

FUNDING HISTORY OF ELECTRIC VEHICLE RESEARCH AND DEVELOPMENT

Prior to the energy crisis, automotive research and development appeared to have been carried out on a low level. For the period 1969-1974, EPA funding for alternative automotive fuels and power systems R & D programs totaled \$35.445 million. (See Table I.) For the same period, funding for battery-powered electric systems totaled \$1.166 million. (See Table II.)

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).⁷

TABLE I.—ALTERNATIVE AUTOMOTIVE FUELS AND POWER SYSTEMS RESEARCH AND DEVELOPMENT PROGRAMS—FISCAL SUMMARY—FISCAL YEARS 1969-74¹

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

¹ 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.

⁷ 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.

TABLE II.—ALTERNATIVE AUTOMOTIVE FUEL AND POWER SYSTEMS, BATTERY POWERED ELECTRIC SYSTEMS¹

[In thousands of dollars]

Contract and contractor	Fiscal year—						Total
	1969	1970	1971	1972	1973	1974	
W-31-109-Eng-38: AEC-Argonne National Laboratories		350	430				780
N00298-72-C-0028: ² USN-Dow Chemical Co.			50				50
68-01-2103: General Research Corp.					169	30	199
68-03-2004: General Research Corp.						137	137
Total		350	480		169	167	1,166

¹ U.S. Environmental Protection Agency, Office of Air and Waste Management, Mobile Source Air Pollution Control Alternative Automotive Power Systems Division, Ann Arbor, Mich. Alternative Automotive Fuels and Power Systems Research and Development Programs. Summary of Fiscal Obligations. June 30, 1974. p. E-7.

² An interagency fund transfer.

The transport of people and goods uses one fourth of all our energy. Automobiles use over half of all transportation energy. Savings of as much as four million barrels per day by 1985 may be feasible. Also, greater emphasis is given to this sector since it totally depends upon petroleum and, therefore, savings directly reflect an opportunity for lower imports.

The ERDA Advanced Transportation Power Systems program is the successor to and an expansion of the EPA advanced automotive power systems program and NSF R&D activities relating to internal combustion engines. The expanded ERDA program will encompass R&D in a broader range of transportation modes and technical issue areas including aircraft systems, rail systems, water systems, pipeline systems, and intermodal transportation studies, as well as an expanded highway vehicle systems follow on to the predecessor advanced automotive program.⁸

Funds for this program are shown in Table III.⁹

TABLE III.—ADVANCED TRANSPORTATION POWER SYSTEMS

[In thousands of dollars]

	Costs	Obligations
Fiscal year 1976	19,000	23,500
Transition period	4,800	5,810

One part of the ERDA Advanced Transportation Power Systems program is the Electric and Hybrid Systems Program. The objective of this program is to develop and evaluate the technologies for advanced

⁸ U.S. Congress, House, Joint Committee on Atomic Energy and Committee on Science and Technology, Authorizing Appropriations for the Energy Research and Development Administration for Fiscal Year 1976 and for the Transition Period Ending September 30, 1976. 94th Congress, 1st Session, Washington, U.S. Govt. Print. Off., June 13, 1975. p. 127. House Report No. 94-294.

⁹ *Ibid.*

electric, hybrid, and vehicular energy storage systems in order to demonstrate vehicle systems that will result in significant reduction in highway system petroleum demands in the midterm, and also demonstrate the viability of alternative transportation concepts capable of independence from petroleum based energy sources in the long term. The program will build upon existing electric and hybrid systems technology and experience in focusing R&D effort, to demonstrate the viable application of the technologies to satisfy current and future vehicular requirements. Activities will include the following:

Assess the current status of advanced battery technology and determine alternate approaches that offer the greatest potential for satisfying midterm electric vehicular requirements.

Research and development of advanced battery systems and related controls. Demonstrate these technologies in optimized electric/hybrid vehicles to assess their viability as energy efficient and publicly acceptable alternate transportation systems.

Develop simulation techniques for optimization and evaluation of electric and hybrid vehicular systems. These techniques will provide an accurate and efficient tool to assist in screening the matrix of potential candidates for directing research and development activities along the most optimum path.

Study and evaluation projects to determine the viability of electric vehicles utilizing near term technology. The results of this evaluation will provide guidance for decisions concerning near term impact from limited implementation of electric vehicles.¹⁰

Committee action on energy conservation R&D programs resulted in increased funding because it was recognized that present R&D programs are new and inadequately funded.

Increased funding approved by the Committee was to permit ERDA to expand the old Advanced Automotive Power System program which it inherited from the Environmental Protection Agency to encompass non-automotive activities as well as other new transportation concepts. High priority is given to these activities since the transport of people and goods use one fourth of all our energy, almost totally from petroleum. Savings in this sector therefore, reflect an excellent opportunity for implementing lower petroleum import demands.

The increased funding will permit assessments of the impacts of fuel shortages and price on various modes of transportation; technology development related to decreased wind drag and rolling resistance; improved technology for more efficient traffic control; improved technology and managerial methods for increased rail efficiency; and accelerated development of bottoming cycles for diesel trucks and, later, automobiles.

The increased budget will also permit acceleration of alternative fuels utilization programs including methanol and methanol/gasoline blends. Increased supporting research and development as well as support for new concepts associated with engine, components, and entire transportation systems will be made possible with the larger budget. Increases for this program are shown in Table IV.¹¹

¹⁰ *Ibid.*, p. 130.

¹¹ *Ibid.*, p. 170.

TABLE IV.—ADVANCED TRANSPORTATION POWER SYSTEMS

[In thousands of dollars]

	Fiscal year 1976	Transition period
Increases:		
Costs.....	10,760	2,740
Changes in selected resources.....	3,300	760
Obligations.....	14,060	3,500

Overall funding approved by the Committee for ERDA energy conservation research and development program most closely related to electric vehicles is given in Table V.¹²

¹² Ibid., p. 168.

TABLE V.—ENERGY CONSERVATION RESEARCH AND DEVELOPMENT
 [in thousands of dollars]

	Fiscal year 1976						Transition period					
	Costs			Obligations			Costs			Obligations		
	Request	Committee change	Total	Request	Committee change	Total	Request	Committee change	Total	Request	Committee change	Total
Operating expenses:												
Energy storage systems	9,100	13,832	22,932	10,100	18,150	28,250	2,000	3,400	5,400	1,800	4,500	6,300
Advanced transportation power systems	8,240	10,760	19,000	9,440	14,060	23,500	2,060	2,740	4,800	2,310	3,500	5,810
Equipment:												
Energy storage systems	591	668	1,259	750	1,850	2,600	250	200	450	300	500	800
Advanced transportation power systems	0	800	800	0	1,500	1,500	0	200	200	0	400	400

Other automotive R&D requests for fiscal 1976 funding are shown in Table VI.

TABLE VI.—AUTOMOTIVE R. & D. REQUESTS FOR FISCAL 1976 FUNDING

	<i>1976 estimate (in thousands)</i>
DOT (Automotive Energy Efficiency)-----	\$4, 000
DOT (Transportation Energy Conservation and Impact Analysis)-----	1, 500
NASA (Energy Program)-----	10, 900

The energy role of NSF in 1976 will be “substantially less than in 1975 due to large transfers of responsibility to ERDA.”¹³

In 1976, DOD’s Army tank-Automotive Command will continue to provide technical support to other governmental agencies for developing ground propulsion engines.

¹³ U.S. Congress. House. Committee on Appropriations, Department of Housing and Urban Development—Independent Agencies, Appropriation Bill, 1976. 94th Congress, 1st Session, Washington, U.S. Govt. Print. Off., June 19, 1975. p. 36. House Report No. 94-313.

IV. LEGISLATIVE HISTORY

LEGISLATION RELATED TO H.R. 5470

Legislation in the 94th Congress, First Session

The 94th Congress thus far has seen a variety of bills introduced on electric vehicles. Several of these bills deal specifically with electric vehicles. In addition to these bills, there are several others, that are broad in scope covering the (1) research and development of ground propulsion systems or (2) research and development programs leading to advanced automobile prototypes.

The following summary given for H.R. 5470, the Electric Vehicle Research, Development and Demonstration Act of 1975, is also applicable to the following identical bills: H.R. 6031, H.R. 6198, H.R. 6315, H.R. 6531, and as well as to H.R. 7961 and H.R. 8214.

H.R. 5470 (Messrs. McCormack, Brown (California), Teague, Mosher, and Goldwater). Introduced March 25, 1975, to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicle technologies and to demonstrate the commercial feasibility of electricity vehicles. The bill authorized funds not to exceed \$40,000,000 for each of the three fiscal years, 1976, 1977, and 1978 to be appropriated. (Referred to the House Committee on Science and Technology.)

A companion bill, S. 1632, was introduced in the Senate on May 5 (legislative day April 21), 1975, by Messrs. Moss and Humphrey and referred to the Senate Committee on Commerce.

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

H.R. 6159 (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. 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."

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

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.

INTRODUCTION OF H.R. 5470

On March 25, 1975, H.R. 5470, The Electric Vehicle Research, Development and Demonstration Act of 1975, was introduced by Mr. McCormack, Mr. Brown of California, Mr. Teague, Mr. Mosher and Mr. Goldwater. As of the date of this report, 65 co-sponsors have introduced identical legislation.

H.R. 5470, The Electric Vehicle Research, Development and Demonstration Act of 1975, establishes an Electric Vehicle Research, Development, and Demonstration Project within ERDA for a three-year period, with an authorization of \$40 million annually. The primary goal of the project would be to demonstrate the commercial feasibility of electric cars, including the introduction of as many as 10,000 such vehicles over the life of the project. Electric vehicles, as second cars, would contribute to energy conservation through their greater efficiency for short range trips and would also serve to reduce urban pollution.

Under H.R. 5470 the demonstration project would involve two phases. First, within one year several thousand electrically powered vehicles designed about existing vehicle chassis would be procured. Next, within three years, several thousand electric vehicles designed from the ground up would be introduced through a program for purchase or lease of such vehicles to insure their widespread use would be made available through an equitable mechanism. Performance and maintenance standards would be established for the demonstration vehicles, and an adequate evaluation program initiated.

Research and development on electric vehicles would include work in energy storage as well as control systems and over-all design of such vehicles, with the aim of reaching maximum energy efficiency, durability, ease of repair, and recyclability of parts. Associated studies would focus on urban design and traffic management for optimum transportation energy use, and minimum environmental degradation.

The Administrator of ERDA would also conduct studies of tax provisions, regulatory law, and other factors which might tend to bias the transportation system toward particular vehicles. These findings, as well as assessments of the long-range environmental and economic impacts, would be first reported to Congress within six months, and subsequent reports on the over-all progress of the project would be required at six month intervals during the three-year life of the project.

LEGISLATION IDENTICAL TO H.R. 5470

The widespread interest in the Congress for accomplishing the goals of this legislation was demonstrated by 65 Members sponsoring legislation identical to H.R. 5470. A list of these Members and the bills which each introduced is given as follows:

	<i>H.R.</i>		<i>H.R.</i>
Abdnor -----	6198	Lujan -----	6198
Andrews (North Dakota) -----	6531	McCloskey -----	6198
Bell -----	6031	McCormack -----	5470
Blouin -----	6031	Mazzoli -----	6198
Brown (California) -----	5470	Milford -----	6198
Byron -----	6198	Miller -----	6315
Cleveland -----	6315	Mitchell (New York) -----	6315
Cotter -----	6315	Moorhead (Pennsylvania) -----	6315
Dodd -----	6031	Mosher -----	5470
Downey -----	6315	Moss -----	6315
Duncan (Tennessee) -----	6198	Myers (Pennsylvania) -----	6031
Edgar -----	6315	Nix -----	6198
Edwards -----	6315	Ottinger -----	6031
Emery -----	6031	Pepper -----	6031
Fish -----	6315	Pickle -----	6315
Ford (Tennessee) -----	6198	Prichard -----	6198
Frenzel -----	6315	Rodino -----	6198
Fuqua -----	6031	Roe -----	6031
Goldwater -----	5470	Rosenthal -----	6198
Grassley -----	6198	Scheuer -----	6031
Guyer -----	6198	Sisk -----	6198
Hagedorn -----	6315	Solarz -----	6531
Hall -----	6031	Staggers -----	6315
Harkin -----	6031	Stark -----	6315
Harrington -----	6198	Studds -----	6198
Hayes (Indiana) -----	6031	Symington -----	6031
Hechler (West Virginia) -----	6031	Teague -----	5470
Helstoski -----	6315	Thornton -----	6031
Hicks -----	6198	Ullman -----	6315
Lent -----	6315	Wilson (Texas) -----	6315
Lloyd (Tennessee) -----	6031	Winn -----	6031
Jenrette -----	6198	Yatron -----	6031
Koch -----	6198		

HEARINGS ON H.R. 5470 AND RELATED LEGISLATION

Hearings on H.R. 5470 were held on June 3, 4, 5, and 6, 1975. Testimony was presented by witnesses representing Government agencies, universities, large vehicle manufacturers, small businesses, and individuals, and was supplemented by written statements for the hearing record.

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

Tuesday, June 3, 10 a.m.

The Honorable Claude Pepper,

Member of Congress from Florida, accompanied by Dr. Vernon Roan, Professor of Mechanical Engineering, University of Florida, Gainesville.

Dr. James S. Kane, Deputy Assistant Administrator for Conservation, Energy Research and Development Administration, accompanied by Mr. Jack Vanderryn, Assistant Director for Energy Storage, Energy Research and Development Administration and Mr. John Brogan, Acting Director, Division for Transportation Energy Conservation, Energy Research and Development Administration.

Wednesday, June 4, 8 a.m.

- Dr. Edward David, Vice President, Gould, Inc., Rolling Meadow, Ill.
 Mr. James R. Braughton, Division of Delivery Services, U.S. Postal Services, Accompanied by Mr. Don Crane, Director, Office of Fleet Management Delivery Services, U.S. Postal Service.
 Mr. Cruse W. Moss, President, AM General, Wayne, Mich.
 Mr. A. Forbes Crawford, President, Jet Industries, Ltd., New York, N.Y.

Thursday, June 5, 9:30 a.m.

- Professor Richard Thornton, Massachusetts Institute of Technology, Cambridge, Mass.
 Mr. Edward A. Campbell, Executive Secretary, Electric Vehicle Council, New York, N.Y., accompanied by Mr. James F. Norberg, Administrator, Electric Transportation Projects, ESB, Inc., Philadelphia, Pa.; Mr. Connel A. Baker, Technical Service Engineer, Lead Industries Association, New York, N.Y.; Mr. Robert Bry, Vice President, Diversified Operations, Otis Elevator, Cleveland, Ohio.
 Mr. Robert G. Beaumont, President, Sebring-Vanguard, Inc., Sebring, Fla.

Thursday, June 5, 2 p.m.

- Mr. Robert Aronson, President, Electric Fuel Propulsion Co., Troy, Mich.
 Mr. Domenic Borello, President, Die Mesh Corporation, Pelham, N.Y.

Friday, June 6, 10 a.m.

- Mr. James Holzwarth, Technical Director, General Motors Technical Center, Warren, Mich.
 Mr. Frederick Sanborn, Director, Ecotec Foundation, Cincinnati, Ohio.
 Mr. Warren Harhay, President, Electric Vehicle Associates, Brook Park, Ohio.
 Mr. Harry Yoder, President, Batronic Truck Corporation, Boyertown, Pa.

In addition, written testimony was received from the following:

- The Honorable James C. Corman, Member of Congress from California.
 The Honorable Frank E. Moss, Member of Congress from Utah.
 Mr. Lowell J. Endahl, Coordinator of Research and Development, National Rural Electric Cooperative Association, Washington, D.C.
 Dr. Harrison H. Schmitt, Assistant Administrator for Energy Programs, NASA Headquarters, Washington, D.C.
 Mr. Gerald D. Griffin, Assistant Administrator for Legislative Affairs, NASA Headquarters, Washington, D.C.
 Mr. Eric Stork, Deputy Assistant Administrator, Mobile Source Pollution Control, Environmental Protection Agency, Washington, D.C.
 Mr. C. W. Tobias, Committee on Motor Vehicle Emissions, NAS-NRC, Washington, D.C.
 Mr. R. Bry, Vice President, Diversified Operations, Otis Elevator Company, Cleveland, Ohio.
 Mr. Raymond Durante, Westinghouse Electric Corporation, Washington, D.C.
 Mr. G. Rogers Parver, Publisher and General Manager, *Electric Vehicle News*, Westport, Conn.
 Mr. F. J. Port, President, E.S.B., Inc., Philadelphia, Pa.
 Mr. R. J. Hollander, SGL Batteries Manufacturing Company, Detroit, Mich.
 Mr. George M. Hartley, President, Copper Development Association, Inc., New York, N.Y.
 Mr. Albert R. Cook, Manager, Electrochemistry, International Lead Zinc Research Organization, Inc., New York, N.Y.
 Mr. Louis J. Daleo, Vespa Southwest, Inc., Houston, Tex.
 Mr. James F. Harvey, Vice President and Manager, Tech/Ops, Advanced Technology Division, Burlington, Mass.
 Dr. R. P. Hamlen, Exxon Enterprises, New York, N.Y.
 Mr. Joseph Zubris, Zubris Electric Company, Dorchester, Mass.
 Dr. Beno Sternlicht, Technical Director, Mechanical Technology, Inc., Latham, N.Y.
 Mr. John B. Newell, President, Electric Auto Association, San Jose, Calif.
 Mr. J. W. Penn, Electric Dynamics Corporation, Plainwell, Mich.
 Mr. R. J. Solem, Motorola, Inc.
 Mr. Charles R. Carlisle, St. Joe Minerals Corporation, Washington, D.C.

The increase in time ranged from changing the demonstration for production to within five years after the development of significant numbers of vehicles with advanced components and designs to postponing the demonstration and procurement programs until the battery technology is better developed.

The issue of the number of vehicles to be produced brought a range of numbers from about 350 to 20,000 or more vehicles. The need for flexibility in the size of the demonstration fleet was also discussed from the point of view of its effect on small business. It was pointed out that staggering the number of vehicles into smaller quantities would be helpful to small business as far as reducing the amount of necessary tooling.

Safety and the electric vehicle was of concern to several witnesses. One of the witnesses felt that there should be a study on the future applicability of safety standards and regulations to electric vehicles. Witnesses also felt that, at this time, electric vehicles should be exempted from safety regulations because of weight considerations.

The need for supporting small business was discussed by a number of witnesses. Suggestions for assisting small business included giving preferential treatment to small businesses that have been doing research and development work using their own funds to defray expenses. Other suggestions included a provision for a loan guarantee program, some type of subsidy, reserving 50 percent of the funds for other than major automobile companies, etc.

Several witnesses indicated the need for some type of infra-structure or administration to support electric vehicles. This infra-structure would be concerned with battery charging, repairs, marketing the vehicles, educating the public, etc.

The provision for a loan guarantee program was discussed by several witnesses who felt that the guarantee loan would assist small companies. One witness suggested a guarantee loan program similar to that in the Geothermal Energy Research, Development and Demonstration Act of 1974. Another witness pointed out loan guarantees similar to FHA or other government loan programs would make it attractive for lending institutions to put up the money.

V. COMMITTEE ACTIONS

SUBCOMMITTEE ACTIONS

The Subcommittee on Energy Research, Development and Demonstration met on July 16 to mark up H.R. 5470 and related bills. During the three-hour session, a number of changes to H.R. 5470 were adopted, and were incorporated into a clean bill, H.R. 8800. The major changes made in H.R. 5470 are described below:

Throughout the bill, the word "hybrid" was inserted in various places to emphasize the place of hybrid vehicles in the research and development project and possibly in the last phase of the demonstration. A new definition of hybrid vehicles was added in Section 4. Since H.R. 5470 included some forms of hybrid vehicles through its definition of "electric vehicle", this change does not substantially change the character of the program.

Section 7

Substantial changes were made in the procurement and delivery schedule, and in numbers of vehicles involved in the demonstration program. The original two procurement actions of (1) 5,000 state-of-the-art vehicles one year after enactment and (2) 5,000 advanced designs vehicles three years after enactment have been expanded to three procurement actions.

The first, on the order of 100 to 300 vehicles, is to begin immediately on enactment and to have contracting completed in one year. These vehicles, representing current electric vehicle technology, will be utilized for in-use testing and evaluation.

Contracting for purchase of 2500 vehicles will be complete after 15 months, with deliveries to be completed by 27 months, unless specific exemptions are granted by the Administrator. These vehicles will meet initial standards and criteria promulgated 12 months after the enactment of the Act, although vehicles are expected to mainly reflect the current state-of-the-art.

Contracting for the purchase of another 5,000 vehicles, which will include significant advances in electric vehicle technology, will be completed in 42 months after enactment. Delivery is to be completed by 54 months, unless specific exemptions are granted by the Administrator.

Before entering into contracts for the 5,000 vehicle purchase, the Administrator must submit a full and complete statement of the standards and criteria, as revised, to the Congress and its appropriate committees.

Section 9

Subsection (d) was added, requiring the Secretary of Transportation to conduct a study on the current and future applicability of safety

standards and regulations to electric and hybrid vehicles. This study is to be submitted to the Administrator 8 months after enactment. This will help coordinate ERDA and DOT standard setting.

Section 10—Small Business

Additions made to the original bill to help facilitate small business participation are:

- (a) The Administrator is permitted to set aside a portion of the contract funds for small businesses;
- (b) The Administrator is required to develop contract terms to facilitate small business participation; and
- (c) The Administrator is authorized to make planning grants to qualified small business concerns that require assistance in preparing contract bids.

Section 11—Loan Guarantees

A loan guarantee program was adopted to prevent the exclusion of small businesses due to problems in raising adequate capital. The provisions are similar to those of the Geothermal Research Development and Demonstration Act, Public Law 93-410, but differ in that loans are not specifically tied solely to physical assets. Rather, they extend to initial operating costs, and research and development expenses. They are limited to \$3 million per company with a \$60 million maximum Federal liability.

Section 12—Reports to Congress

A provision is added requiring the Administrator to include in his semi-annual reports a statement of the extent to which imported automobile chassis and components are being used in the production of electric vehicles participating in the demonstration, and whether laws or regulations related to such importation are impeding progress under the Act.

Section 13—Appropriations

The H.R. 5470 appropriation of \$40 million for three fiscal years, totaling \$120 million was revised as follows:

Fiscal year:	<i>Millions</i>
1976 and transition period-----	\$10
1977 -----	40
1978 -----	30
1979 -----	60
1980 -----	20

These amounts, totaling \$160 million, more closely correspond with the development and procurement cycles in the clean bill.

A subsection (b) was added which provides that revenues from sales, leases and other activities be retained by ERDA but that such amounts shall reduce the authorization by an equal amount for that year.

Subsection (c) was added concerning the Administrator's authority to enter into contracts to bring the bill into conformity with Budget Act requirements.

Recommendations

Having considered the bill, H.R. 5470, The Electric Vehicle Research, Development, and Demonstration Act of 1975, and related legislation duly referred to it, the Subcommittee on Energy Research, Development and Demonstration recommended that the Full Committee on Science and Technology adopt the Subcommittee Report and report favorably on the clean bill, H.R. 8800.

FULL COMMITTEE ACTIONS

Following the Subcommittee actions described above, a clean bill was introduced, cosponsored by 23 members of the Subcommittee (including the full Committee Chairman and the Ranking Minority Member) on July 22. The clean bill, H.R. 8800, was considered by the full Committee on July 28. During the full Committee markup an amendment was adopted that clarified the eligibility of manufacturers of electric vehicle components, as well as manufacturers of the complete vehicles, for guaranteed loans. A quorum being present, the Committee by voice vote unanimously approved the bill as amended, and recommended passage by the full House of Representatives.

VI. COMMITTEE VIEWS

PURCHASE PROCEDURE

The bill provides for the purchase of a reasonable number of electric vehicles within one year from the date of enactment for an assessment and evaluation of the current state-of-the-art. While the Committee did not set a specific number of vehicles to be purchased, the Committee expects that the purchases will span the full spectrum of domestic and foreign electric vehicles—passenger and commercial—and that the actual number of purchases may be in the range of 100 to 300 vehicles. Further the Committee expects that to the extent possible that early delivery will be sought to maximize the time for evaluation so that the results of the assessment of the state-of-the-art from the first purchase can be used for setting criteria in the selection of electric vehicles in the second purchase.

Within fifteen months of the date of enactment the Committee expects contracts for the second purchase to be signed which agree to buy 2,500 electric vehicles to be delivered within an additional twelve months. During the 5,000 vehicle third purchase under the demonstration program the Committee expects the orders to be placed within 42 months and delivery to be completed within 54 months of the date of enactment of the bill.

PERFORMANCE STANDARDS AND CRITERIA

The bill as approved by the Committee contains provisions in Section 7(b) for the Administrator to develop, to up-date as the state-of-the-art progresses, and to transmit to the Congress performance standards and criteria. In addition, the Committee directs the ERDA to present to the Committee the criteria and standards which will be used in selecting the manufacturers, prior to entering into contracts for the third phase of the demonstration program.

SMALL BUSINESS PROVISIONS

The Committee is concerned that the Electric Vehicle Research, Development and Demonstration Project be organized so that the many small, innovative businesses which are developing and manufacturing electric vehicles are not excluded from participation in the project. Testimony indicated that many of the technological advances in electric vehicle design in recent years had come from individual inventors and very small groups or corporations. It was clear that these organizations might have to compete with some of the largest enterprises in the Nation—the major automobile manufacturers—in trying to win contracts under the demonstration program. A key problem that could hinder small businesses with formidable start-up problems

would be rigid delivery schedules and other strict contract terms. The Committee has attempted to set goals within the demonstration program to encourage ERDA to move forward rapidly with its role of administering the program, but does not wish for these goals to have the effect of hindering small business participation.

The Committee is also concerned that performance standards and criteria be developed to the extent practicable in a manner which takes cognizance of the special problems that small businesses may encounter.

Another important problem for small businesses was found to be access to capital. Two measures in the bill, the planning grants and loan guarantee program, are designed to narrow this difference between the very small and very large organizations.

The Committee does not want to exclude large businesses from participating, or fail to encourage the large auto makers from using their production expertise to begin the transition from petroleum-based transportation, but it does wish to insure that all organizations with the technical ability to participate have a fair chance to do so.

The Administrator, in applying the provisions of section 10 (relating to encouragement and protection of small business) and section 11 (relating to loan guaranty), should adopt a definition of the term "small business concern" which is based on or consistent with the definition of that term currently in effect for similar purposes under the Small Business Act—the Federal law dealing most directly with such concerns. The actual definition is contained in regulations prescribed by the Small Business Administration on the basis of statutory criteria. Under these criteria, a small business concern must be independently owned and operated, and not dominant in its field; and in addition the number of a concern's employees and the dollar volume of its business may be taken into account, with industry-by-industry variations in the maximum permissible number of such employees in order to reflect differing industry characteristics and other relevant factors.

LOAN GUARANTEE PROGRAM

The Committee is aware that a substantial number of firms have already expended their own funds to establish a research and development capability or a manufacturing facility for electric vehicles. The Committee is concerned that governmental sponsorship of research and development provisions for loan guarantees may tend to undercut this private effort. Hence, the Committee expects that ERDA will give due consideration in reviewing loan guarantee applications to those firms which have already expended significant amounts of their own funds on electric vehicle technology.

The Committee also feels that while the loan guarantee program is available for all interested business concerns, those needing it most will most likely be small businesses with limited working capital and small assets available for collateral. The Committee believes that this would result in about one-half of the loan guarantees being awarded chiefly to small businesses.

VII. SECTION-BY-SECTION SUMMARY OF THE BILL

SHORT TITLE

Section 1 of the bill provides that it may be cited by its short title—the “Electric Vehicle Research, Development, and Demonstration Act of 1975”.

FINDINGS

Section 2 sets forth the Congressional findings for purposes of the bill, emphasizing the capability of electric vehicles for travel in urban areas, the beneficial effects which such vehicles would have in terms of eliminating fuel shortages, reducing environmental pollution, and promoting energy conservation, and the need for Federal participation in developing an electric and hybrid vehicle industry.

POLICY AND GOALS

Section 3(a) declares it to be the policy of the United States and the purpose of the bill to demonstrate the commercial feasibility of electric and hybrid vehicles for urban use, and to encourage electric and hybrid vehicle research and development, in order to promote long-range fuel conservation and reduce environmental pollution.

Section 3(b) declares it to be the goal of the Federal Government to promote the substitution of electric and hybrid vehicles for many conventional vehicles now in use, to remove institutional barriers to such substitution, to provide incentives for the utilization of electric and hybrid vehicles, and to provide a research and development background for further applications as rapidly as possible.

DEFINITIONS

Section 4 contains definitions of terms used in the bill. An “electric vehicle” is a vehicle which is powered by an electric motor drawing current from rechargeable storage batteries or other portable sources (and which may include also a nonelectric source of power for charging batteries). A “hybrid vehicle” is a vehicle propelled by a combination of an electric motor and an internal combustion engine or other alternative engine.

MANAGEMENT

Section 5(a) directs the Administrator of the Energy Research and Development Administration to establish within ERDA an electric vehicle research, development, and demonstration project.

Section 5(b) places overall management of the project in the Administrator but authorizes him to enter into arrangements with NASA, DOT, NSF, EPA, HUD, and other Federal agencies for the conduct of project activities within their particular competence.

Section 5(c) set forth the specific responsibilities of the Administrator under the project. These would include promoting basic and applied research on electric and hybrid vehicle batteries, controls, and motors; determining optimum vehicle designs; conducting demonstrations of commercial electric and hybrid vehicle feasibility through contracts for the manufacture of such vehicles and arrangements for their operation; ascertaining relevant consumer needs and desires; and ascertaining the long-term changes in road design, urban planning, traffic management, maintenance facilities, utility rate structures, and tax policies which are needed to facilitate the manufacture and use of such vehicles.

RESEARCH AND DEVELOPMENT

Section 6 directs the Administrator, acting through appropriate agencies and contractors, to initiate and provide for the conduct of research and development related to electric and hybrid vehicles, including energy storage technology, vehicle control systems and overall design for energy conservation, urban design and traffic management, and vehicle design for maximum practical lifetime, ease of repair, and interchangeability and replaceability of parts.

DEMONSTRATION

Section 7(a) directs the Administrator to enter into contracts in three stages for the demonstration of electric and hybrid vehicles. Contracts for the production of a reasonable number of electric vehicles for evaluation tests and initial in-use demonstration would be entered into within one year after the enactment of the bill; contracts for the production of at least 2,500 select electric vehicles with available components and designs would be entered into within 15 months after that date; and contracts for the production of at least 5,000 electric or hybrid vehicles with advanced components and designs would be entered into within 42 months after that date.

Section 7(b) directs the Administrator, within one year after the enactment of the bill, to develop initial performance standards and criteria for urban passenger and commercial vehicles, with particular reference to vehicles having electric or hybrid propulsion systems. The Administrator would revise these standards and criteria periodically as the state-of-the-art improves; and he would transmit to the Congress a full statement of the standards and criteria so developed and currently in effect before entering into any contracts for the production of electric or hybrid vehicles with advanced components and designs under the third contracting stage described above.

Section 7(c) directs the Administrator to provide for the introduction of electric and hybrid vehicles produced under section 7(a) into the vehicle fleets of State and local governments and Federal agencies and into individual and business use, for the evaluation of the performance of such vehicles and of consumer reaction to them, for demonstration maintenance projects and model training projects on maintenance procedures, and for the dissemination of data on electric and hybrid vehicle safety and operating characteristics to State and Municipal consumer affairs agencies and groups.

USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES

Section 8 directs the Postal Service, the Secretary of Defense, GSA and other Federal agencies to introduce electric and hybrid vehicles into their fleets as soon as possible. In purchasing these vehicles, life cycle costing and their beneficial emission characteristics would be fully taken into account; and if necessary the Administrator (as part of the demonstration program under section 7) could pay a part of the cost of the vehicles involved to make them economically competitive with conventional vehicles and to assure their maximum use by Federal agencies.

INCENTIVES AND ASSESSMENTS

Section 9(a) directs the Administrator to study any tax, regulatory, traffic, urban design, and other institutional factors which may tend to bias surface transportation systems toward particular types of vehicles, and to report to the Congress within one year after the enactment of the bill.

Section 9(b) directs the Administrator to conduct a continuing assessment of the long-range materials demand and pollution effects which may result from the electrification of urban traffic, and to include a statement of his findings in his annual report (and in any environmental impact statement filed under Federal law with respect to activities under the bill).

Section 9(c) directs the Administrator to perform studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technology.

Section 9(d) directs the Secretary of Transportation to study the current and future applicability of safety standards and regulations to electric and hybrid vehicles, and to report to the Administrator within 240 days after the enactment of the bill.

ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESSES

Section 10(a) directs the Administrator to take steps to assure that small business concerns and qualified individuals can realistically participate in the program under the bill.

Section 10(b) directs the Administrator, to assist in accomplishing this objective, to reserve for small business concerns a reasonable portion of the funds made available for contracts under section 7(a).

Section 10(c) directs the Administrator to assure that the terms and conditions contained in those contracts are such as will assist in meeting the special needs of small business concerns and permit their participation in the program, and to make planning grants available to qualified small business concerns which need assistance in developing and entering into those contracts.

LOAN GUARANTIES

Section 11(a) declares that it is the policy of the Congress to provide guaranties of loans made for the commercial development of electric and hybrid vehicles in order to insure that small businesses are not

excluded from participation in such development due to lack of adequate capital.

Section 11(b) directs the Administrator to guarantee lenders against loss of principal or interest on loans made to qualified borrowers (primarily small business concerns) for research and development related to electric and hybrid vehicle technology, prototype development for such vehicles and their components, construction of capital equipment related to research, development, and production of such vehicles and components, or initial operating expenses associated with such development and production.

Section 11(c) limits any guaranty to 90 percent of the total cost of the activity with respect to which the loan is made.

Section 11(d) provides that loan guaranties are to be on terms and conditions fixed by the Administrator, except that a guaranteed loan must bear interest at a rate which is reasonable in the light of the rates prevailing in the private sector for similar loans and risks; the maturity may not exceed 15 years; the amount of the loan (when combined with other resources) must be sufficient to carry out the activity for which the loan is made; and there must be reasonable assurance of repayment.

Section 11(e) limits the loan guaranty for any single borrower to \$3,000,000 and the aggregate amount of guaranties outstanding at any one time to \$60,000,000.

Section 11(f) defines "qualified borrower" to mean any legal entity which (as determined by the Administrator) has an interest in electric or hybrid vehicle technology and is capable of acceptably carrying out (with respect to such vehicles or their components) the research, development, or production involved.

Section 11(g) authorizes the Administrator to enter into contracts to pay interest due on guaranteed loans which the borrower is unable to pay, upon a finding that it is in the public interest to permit the borrower to continue with his project and the probable Federal cost of the interest payment will be less than the cost which would result from a default. Section 11(g) also includes the Administrator's general authority to make payments under loan guaranties in the event of default; and directs the Attorney General to take appropriate action to recover any such payments made by the Administrator.

Section 11(h) terminates the loan guaranty program five years after the enactment of the bill.

REPORTS TO CONGRESS

Section 12 directs the Administrator to submit to Congress semi-annually a report on all activities under the bill, including projections and estimates to evaluate the progress of the program, a statement with respect to the use or desirability of imported automobile chassis or components for vehicle production under section 7(a), and appropriate recommendations for legislation or related action to further the purposes of the bill.

APPROPRIATIONS AND APPROPRIATION ACTS

Section 13(a) authorizes the appropriation of the funds necessary to carry out the program under the bill—up to \$10,000,000 for fiscal year 1976 (and the transitional quarter), \$40,000,000 for fiscal year 1977, \$30,000,000 for fiscal year 1978, \$60,000,000 for fiscal year 1979, and \$20,000,000 for fiscal year 1980.

Section 13(b) permits the Administrator to retain and use any moneys received from vehicle sales or leases (or other activities) under the bill, with a corresponding reduction in the amounts otherwise authorized to be appropriated under section 13(a).

Section 13(c), in conformity with section 401 of the Congressional Budget Act of 1974, limits the contracting authority of the Administrator under the bill to such amounts as are provided in appropriation Acts.

VIII. 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 1976 and the transition period will not exceed \$10 million compared to total budget outlays for ERDA of more than \$4 billion in fiscal year 1976. The latter amount represents about 1.1% of estimated total Federal fiscal year 1976 outlays. For following fiscal years the budget outlays will not exceed \$40 million in fiscal year 1977, \$30 million in fiscal year 1978, \$60 million in fiscal year 1979, and \$20 million in fiscal year 1980. Again, the amounts authorized for these years represent a small percentage of the anticipated budgets for ERDA and all Federal programs.

Since ERDA activities are conducted mainly by hundreds of contractors, colleges, and universities located throughout the United States and representing various segments of the economy, it is estimated that the increased fiscal year 1976 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, the funds provided under this bill would not materially contribute to competitive pressures for manpower and materials which might contribute to inflation.

The results of the research and development on electric vehicles 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. Further, there will be in all likelihood technical improvements and breakthroughs as a result of the research and development which will have an impact on productivity and prices in the electric vehicle and supporting industries, such as the storage battery industry.

IX. AGENCY COMMUNICATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., July 16, 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. 5470, to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles.

The bill would direct ERDA to conduct a specialized program for promoting the technologies and demonstrating the commercial feasibility of urban electric vehicles for individual and business use by establishing an organizational entity within ERDA known as the Electric Vehicle Research, Development and Demonstration Project. ERDA would have overall 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 basic research on electric vehicle batteries, controls, and motors; determining optimum overall vehicle design; conducting feasibility demonstrations; ascertaining consumer needs and desires; and ascertaining changes in road design, urban planning, maintenance facilities, utility rate structures and tax policies which would be needed to facilitate the manufacture and use of electric vehicles.

Finally, the bill would authorize to ERDA for the project \$40 million for each of the three fiscal years 1976, 1977, and 1978.

NASA has done extensive work in areas of technology relevant to electrical vehicle development. These areas include, for example, batteries, electric control systems, electric motors, materials, light weight structures, etc. All of these technologies were employed in the development of the lunar roving vehicle, which had the characteristics of both a spacecraft and an electric vehicle. As an example of our current involvement in urban electric vehicle technology, NASA is funding a small demonstration of the application of nickel-zinc batteries in postal service vehicles. Also, as you know, ERDA and NASA have just recently signed a Memorandum of Understanding under which we hope to cooperate closely with ERDA in this and other areas of mutual interest.

Since ERDA would be the agency primarily responsible for the conduct of the project envisioned by H.R. 5470, NASA 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,

GERALD D. GRIFFIN,
Assistant Administrator for Legislative Affairs.

U.S. ENVIRONMENTAL PROTECTION AGENCY,
Washington, D.C., June 17, 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 the letter, dated April 28, 1975, from Mr. John L. Swigert, Jr., Executive Director of your Committee, requesting our views and recommendations with regard to H.R. 5470, a bill "To authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles."

The purpose of this proposed legislation is to demonstrate the commercial feasibility of electric vehicles for urban individual and business use, and to encourage research and development in new technologies for electric vehicles with wider applications, in order to promote long-range conservation of liquid fuel and reduce environmental pollution.

The Administrator of the Energy Research and Development Administration (ERDA) immediately upon passage of the legislation would be mandated to establish the Electric Vehicle Research, Development and Demonstration Project for which he would be responsible for the overall management. But he could enter into agreements with other Federal agencies, including the Environmental Protection Agency (EPA), for the conduct of certain aspects of the project which are within their particular competence.

Acting through appropriate agencies and contractors, the Administrator of ERDA would be required to initiate and provide for the conduct of research and development in areas related to electric vehicles, including (1) energy storage technology, including batteries and their potential for convenient recharging; (2) vehicle control systems and overall design for energy conservation, including the use of regenerative braking; (3) urban design and traffic management for optimum transportation-related energy use and minimum transportation-related degradation of the environment; and (4) vehicle design for maximum practical lifetime, ease of repair, and interchangeability and replaceability of parts.

In the demonstration area, it would be required that the Administrator enter into such contracts as are necessary and appropriate for the production of "significant numbers" (defined as 5,000 or more) of urban passenger and commercial vehicles (1) within one year which

have electrical propulsion systems on conventional chassis, and (2) within three years which are specifically designed for electrical propulsion as the primary source. These vehicles would be required to meet the performance standards and criteria to be developed within 180 days for each of these two types of vehicles. Such standards and criteria would not simply reflect the characteristics of current combustion engine vehicles, but would have to take into account such factors as energy conservation, urban traffic characteristics, patterns of use for "second" vehicles, consumer preferences, maintenance needs, battery recharging characteristics, materials demand and recyclability, and vehicle safety and insurability. Appropriate authorities concerning design needs for electrical vehicles compatible with long-range urban planning and traffic management would have to be consulted in developing such standards and criteria.

The Administrator would also be charged with the responsibility of making arrangements for the introduction of such electrical vehicles into (1) the vehicle fleets of government agencies at all levels; and (2) individual and business use under conditions insuring widespread use; as well as for the evaluation of performance and consumer reaction, for model training projects on maintenance procedures, and for dissemination of data on safety and operating characteristics.

Further, the Administrator would be required to (1) conduct a study and report to Congress within six months on the existence of any tax, regulatory, traffic, urban design and other institutional factors which might bias transportation systems toward vehicles of particular characteristics; (2) conduct a continuing assessment of long-range materials demand and potential pollution effects of electrification of urban traffic; and (3) have studies made on incentives to promote broader utilization and consumer acceptance of electric vehicle technologies.

A semi-annual report to Congress would be required on all activities under the proposed Act with appropriate recommendations for further action.

An amount not to exceed \$40,000,000 would be authorized to be appropriated for each of the fiscal years 1976, 1977, and 1978. Any amount appropriated would remain available until expended, and any amount authorized for either of the first two fiscal years, but not appropriated, could be appropriated through the third fiscal year.

While the Environmental Protection Agency endorses the need for intensive research on the feasibility of electric vehicles, it does not support the enactment of H.R. 5470 for the following reasons.

H.R. 5470 is an extremely comprehensive bill with very short deadlines in which to accomplish complicated research and various studies. By emphasizing the commercialization of electric vehicles prematurely, this bill might be detrimental in the long run if the currently available vehicles fail to live up to expectations as the solution to urban traffic problems.

Under the authorities of the Clean Air Act, EPA has gained substantial knowledge about electric vehicles. This resulted from our AAPS program (research, development, and demonstration of alternative automotive power systems) which was transferred to ERDA in January of this year, and from work carried out under Section 212

of the Act—Development of Low-Emission Vehicles. To summarize, the major limiting factor on the use of electric vehicles is the current inadequacy of storage batteries. We, therefore, believe that Federal research should focus on the development of a battery with sufficiently high power and energy density to provide adequate vehicle range and road performance. The development of motors, chassis, controls, etc. could, and should, be left to industry.

Although there is some disagreement among independent analysts and electric car enthusiasts, EPA has concluded that electric vehicles constructed with existing technology do not represent an energy-efficient way for performing the types of transportation services which privately-owned automobiles are expected to perform. For example, a comparison between two equal-size vehicles of the four-passenger compact car category—one powered by a conventional combustion engine and one by state-of-the-art lead acid storage batteries—shows roughly one-third greater energy consumption for the electric vehicle, over a typical city-suburban commuter cycle. An exception to this would be applications such as milk delivery trucks, which encounter numerous stops and start and relatively extended periods of engine idling.

Further, the pollution potential of the generation of electricity must be factored in and must be evaluated as an offset to the absence of HC, CO and NO_x emissions from the electric vehicle itself. The nature of this pollution, in turn, depends upon whether fossil or nuclear powerplants are used and where they are sited. That is not an easy balance to make, but it must not be ignored.

The EPA has been conducting analytical studies on the impact of future expanded use of electric cars in selected metropolitan regions, which are scheduled for completion later this year. The results of these studies may be expected to provide guidance as the usefulness and direction of future Federal programs designed to encourage electric cars.

Since improved batteries are essential before an electric vehicle can be a viable substitute for the conventional internal combustion vehicle in urban areas, we believe that research priority should be directed toward that goal. Related problems can only be addressed realistically if that goal is achieved.

For these reasons, the Environmental Protection Agency recommends that a more desirable approach would be for ERDA to continue with the research program on an improved battery and to defer any decisions relating to demonstration and procurement programs until the battery technology is better developed.

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 yours,

JOHN QUARLES,
FOR RUSSELL E. TRAIN,
Administrator.

X. VOTE OF THE COMMITTEE ON THE BILL

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

(53)

XI. CONGRESSIONAL BUDGET ACT INFORMATION

No information pursuant to section 308(a) of the Congressional Budget Act of 1974 has been provided to the Committee by the Congressional Budget Office.

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:

Fiscal year:	Millions
1976 and transition period.....	\$10
1977	40
1978	30
1979	60
1980	20

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 cost together with a projection of the estimated costs associated with the loan guaranties program.

Operating and Capital Expenses

The bill provides that funds authorized but not appropriated for any year prior to fiscal year 1980 may be appropriated for any succeeding fiscal year through fiscal year 1980. The Committee expects that this added flexibility will result during the 5-year period in operating and capital expenses which will total the full \$160 million authorized.

During the 5 years of the program, the Committee expects activities related to research and development to increase sharply 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)
1976 and transition period.....	\$8
1977	15
1978	30
1979	20
1980	20

The activities associated with the demonstration program account for the uneven nature of the budget authority approved for the 5 years. Estimates in the following chart are 5-year projections of costs to be incurred for the demonstration program based on Committee estimates of the prices of electric vehicles and on the number of electric vehicles to be purchased under the provisions (Sec. 7) of the bill.

Demonstration program

Fiscal year :	<i>Committee's estimate (in millions)</i>
1976 and transition period.....	\$2
1977	25
1978	0
1979	40
1980	0

In relationship to the demonstration program any monies received by ERDA through anticipated sales or leases of electric vehicles in a given fiscal year will be used to reduce the appropriation request for that year.

Loan Guarantees

The Committee has no firm basis for estimating the potential defaults on principal and interest payments under the loan guarantees program. The problem in estimating is based on several factors. The bill provides for securing up to \$3,000,000 of a loan to a company or other business entity, but not to exceed 90 per centum of the expenses of the cost of the activity for which the loan is made. The maximum Federal liability will not exceed \$60,000,000.

An intent of this loan guarantee section is to encourage small business participation in the research, development, and manufacture of electric vehicles. Since there is a probability of some defaults among these small businesses, reasonable regulations regarding the qualification for loan guarantees should limit default of principal and interest without unduly hampering the aims of the program. Experience with other programs leads to an expected default rate on the order of one percent.

XII. 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.

ESTIMATE AND COMPARISON, CONGRESSIONAL BUDGET OFFICE

No report has been submitted to the committee from the Congressional Budget Office pursuant to clause 2(1)(3)(C) of rule XI of the Rules of the House of Representatives.

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.

(57)



ELECTRIC AND HYBRID VEHICLE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1976

JULY 22, 1976.—Ordered to be printed

Mr. TEAGUE, from the committee of conference,
submitted the following

CONFERENCE REPORT

[To accompany H.R. 8800]

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill (H.R. 8800) to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles, 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 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 "Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976."

SEC. 2. FINDINGS AND POLICY.

(a) *The Congress finds and declares that—*

(1) *the Nation's dependence on foreign sources of petroleum must be reduced, as such dependence jeopardizes national security, inhibits foreign policy, and undermines economic well-being;*

(2) *the Nation's balance of payments is threatened by the need to import oil for the production of liquid fuel for gasoline-powered vehicles;*

(3) *the single largest use of petroleum supplies is in the field of transportation, for gasoline- and diesel-powered motor vehicles;*



(4) *the expeditious introduction of electric and hybrid vehicles into the Nation's transportation fleet would substantially reduce such use and dependence;*

(5) *such introduction is practicable and would be advantageous because—*

(A) *most urban driving consists of short trips, which are within the capability of electric and hybrid vehicles;*

(B) *much rural and agricultural driving of automobiles, tractors, and trucks is within the capability of such vehicles;*

(C) *electric and hybrid vehicles are more reliable and practical now than in the past because propulsion, control, and battery technologies have improved, and further significant improvements in such technologies are possible in the near term;*

(D) *electric and hybrid vehicles use little or no energy when stopped in traffic, in contrast to conventional automobiles and trucks;*

(E) *the power requirements of such vehicles could be satisfied by charging them during off-peak periods when existing electric generating plants are underutilized, thereby permitting more efficient use of existing generating capacity;*

(F) *such vehicles do not emit any significant pollutants or noise; and*

(G) *it is environmentally desirable for transportation systems to be powered from central sources, because pollutants emitted from stationary sources (such as electric generating plants) are potentially easier to control than pollutants emitted from moving vehicles; and*

(6) *the introduction of electric and hybrid vehicles would be facilitated by the establishment of a Federal program of research, development, and demonstration to explore electric and hybrid vehicle technologies.*

(b) *It is therefore declared to be the policy of the Congress in this Act to—*

(1) *encourage and support accelerated research into, and development of, electric and hybrid vehicle technologies;*

(2) *demonstrate the economic and technological practicability of electric and hybrid vehicles for personal and commercial use in urban areas and for agricultural and personal use in rural areas;*

(3) *facilitate, and remove barriers to, the use of electric and hybrid vehicles in lieu of gasoline- and diesel-powered motor vehicles, where practicable; and*

(4) *promote the substitution of electric and hybrid vehicles for many gasoline- and diesel-powered vehicles currently used in routine short-haul, low-load applications, where such substitution would be beneficial.*

SEC. 3. DEFINITIONS.

As used in this Act, the term—

(1) *“Administrator” means the Administrator of the Energy Research and Development Administration;*

(2) *“advanced electric or hybrid vehicle” means a vehicle which—*

(A) minimizes the total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing electric and hybrid vehicles with respect to the total amount of energy so consumed;

(B) is capable of being mass-produced and operated at a cost and in a manner which is sufficiently competitive to enable it to be produced and sold in numbers representing a reasonable portion of the market;

(C) is safe, damage-resistant, easy to repair, durable, and operates with sufficient performance with respect to acceleration, cold-weather starting, cruising speed, and other performance factors; and

(D) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any applicable requirement of Federal law;

(3) "commercial electric or hybrid vehicle" includes any electric or hybrid vehicle which can be used (A) for business or agricultural production purposes on farms (e.g. tractors and trucks) or in rural areas, or (B) for commercial purposes in urban areas;

(4) "electric vehicle" means a vehicle which is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include a nonelectrical source of power designed to charge batteries and components thereof;

(5) "hybrid vehicle" means a vehicle propelled by a combination of an electric motor and an internal combustion engine or other power source and components thereof;

(6) "project" means the Electric and Hybrid Vehicle Research, Development, and Demonstration Project established under section 4(a);

(7) "Secretary" means the Secretary of Transportation; and

(8) "small business concern" shall have the meaning prescribed by the Administrator after consultation with the Small Business Administration.

SEC. 4. DUTIES OF THE ADMINISTRATOR.

(a) The Administrator shall promptly establish, as an organizational entity within the Energy Research and Development Administration, the Electric and Hybrid Vehicle Research, Development, and Demonstration Project.

(b) The Administrator shall have the responsibility for the overall management of the project. The Administrator may enter into any agreement or other arrangement with the National Aeronautics and Space Administration, the Department of Transportation, the National Science Foundation, the Environmental Protection Agency, the Department of Housing and Urban Development, the Department of Agriculture, or any other Federal agency, pursuant to which such agency shall conduct such specified parts or aspects of the project as the Administrator deems necessary or appropriate and within the particular competence of such agency, to the extent that such agency has capabilities which would enable it to contribute to the success of the project and the attainment of the purposes of this Act.

(c) *In providing for the effective management of this project, the Administrator shall have specific responsibility to—*

(1) *promote basic and applied research on electric and hybrid vehicle batteries, controls, and motors;*

(2) *determine optimum overall electric and hybrid vehicle design;*

(3) *conduct demonstration projects with respect to the feasibility of commercial electric and hybrid vehicles (A) by contracting for the purchase or lease of electric and hybrid vehicles for practical use, and (B) by entering into arrangements, with other governmental entities and with nongovernmental entities, for the operation of such vehicles;*

(4) *ascertain consumer needs and desires so as to match the design of electric and hybrid vehicles to their potential market; and*

(5) *ascertain the long-term changes in road design, urban planning, traffic management, maintenance facilities, utility rate structures, and tax policies which are needed to facilitate the manufacture and use of electric and hybrid vehicles in accordance with sections 13 and 14.*

SEC. 5. COORDINATION BETWEEN THE ADMINISTRATOR AND OTHER AGENCIES.

(a) *In carrying out the project established under section 4, the Administrator shall, to the maximum extent practicable, consult and coordinate with the Secretary, with respect to any functions of the Administrator under this Act which relate to regulatory activities or other responsibilities of the Secretary, including safety and damage-ability programs.*

(b) *Each department, agency, and instrumentality of the executive branch of the Federal Government shall carefully consider any written request from the Administrator, or the head of any agency to which the Administrator has delegated responsibility for specified parts or aspects of the project, to furnish such assistance, on a reimbursable basis, as the Administrator or such head deems necessary to carry out the project and to achieve the purposes of this Act. Such assistance may include transfer of personnel with their consent and without prejudice to their position and rating.*

SEC. 6. RESEARCH AND DEVELOPMENT.

The Administrator, acting through appropriate agencies and contractors, shall initiate and provide for the conduct of research and development in areas related to electric and hybrid vehicles, including—

(1) *energy storage technology, including batteries and their potential for convenient recharging;*

(2) *vehicle control systems and overall design for energy conservation, including the use of regenerative braking;*

(3) *urban design and traffic management to promote maximum transportation-related energy conservation and minimum transportation-related degradation of the environment; and*

(4) *vehicle design which emphasizes durability, length of practical lifetime, ease of repair, and interchangeability and replaceability of parts.*

SEC. 7. DEMONSTRATIONS.

(a) Within 12 months after the date of enactment of this Act, the Administrator shall develop data characterizing the present state-of-the-art with respect to electric and hybrid vehicles. The data so developed shall serve as baseline data to be utilized in order (1) to compare improvements in electric and hybrid vehicle technologies; (2) to assist in establishing the performance standards under subsection (b) (1); and (3) to otherwise assist in carrying out the purposes of this section. In developing any such data, the Administrator shall purchase or lease a reasonable number of such vehicles or enter into such other arrangements as the Administrator deems necessary to carry out the purposes of this subsection.

(b) (1) Within 15 months after the date of enactment of this Act, the Administrator shall promulgate rules establishing performance standards for electric and hybrid vehicles to be purchased or leased pursuant to subsection (c) (1). The standards so developed shall take into account the factors of energy conservation, urban traffic characteristics, patterns of use for "second" vehicles, consumer preferences, maintenance needs, battery recharging characteristics, agricultural requirements, materials demand and their ability to be recycled, vehicle safety and insurability, cost, and other relevant considerations, as such factors and considerations particularly apply to or affect vehicles with electric or hybrid propulsion systems. Such standards are to be developed taking into account (A) the best current state-of-the-art, and (B) reasonable estimates as to the future state-of-the-art, based on projections of results from the research and development conducted under section 6. In developing such standards, the Administrator shall consult with appropriate experts concerning design needs for electric and hybrid vehicles which are compatible with long-range urban planning, traffic management, and vehicle safety.

(2) Separate performance standards shall be established under paragraph (1) with respect to (A) electric or hybrid vehicles for personal use, and (B) commercial electric or hybrid vehicles. Such performance standards shall represent the minimum level of performance which is required with respect to any vehicles purchased or leased pursuant to subsection (c). Initial performance standards under paragraph (b) (1) shall be set at such levels as the Administrator determines are necessary to promote the acquisition and use of such vehicles for transportation purposes which are within the capability (as determined by the Administrator) of electric and hybrid vehicles.

(3) Such performance standards shall be revised, by rule, periodically as the state-of-the-art improves, except that rules promulgated under paragraph (1) shall be amended not later than 6 months prior to the date for contracts specified in subsection (c) (2).

(4) Before entering into contracts for the production of vehicles under subsection (c) (2), the Administrator shall transmit to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, the performance standards developed under paragraph (1), as revised and currently in effect.

(c) (1) The Administrator shall, within 6 months after the date of promulgation of performance standards pursuant to subsection (b) (1),

contract for the purchase or lease of 2,500 electric or hybrid vehicles which satisfy the performance standards set forth under subsection (b) (1). The delivery of such vehicles shall be completed within 39 months after the date of enactment of this Act. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 2,500 of the electric or hybrid vehicles which satisfy performance standards under subsection (b) (1) will be available within such delivery period, the Administrator shall (A) immediately forward this information along with a detailed justification of such determination to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, and (B) contract for the purchase or lease of the maximum number of such vehicles (up to 2,500) that will be available within such delivery period. To the extent practicable, vehicles purchased or leased under such contracts shall represent a cross-section of the available technologies and types of uses of such vehicles.

(2) (A) The Administrator shall, within 6 months after the required amendment of such standards pursuant to subsection (b) (3), and not later than 54 months after the date of enactment of this Act, contract for the purchase or lease of 5,000 advanced electric or hybrid vehicles, which satisfy such amended standards. The final delivery of such vehicles shall be completed within 72 months after the date of enactment of this Act. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 5,000 of the electric and hybrid vehicles which satisfy performance standards set forth under subsection (b) (3) will be available within the delivery period (including any extension under subparagraph (B)), the Administrator shall (i) immediately forward this information along with a detailed justification of such determination to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, and (ii) contract for the purchase or lease of the maximum number of such vehicles (up to 5,000) that will be available during such delivery period. To the extent practicable, vehicles purchased or leased under such contracts shall represent a cross section of the available technologies and types of uses of such vehicles.

(B) The Administrator shall extend the delivery period for such vehicles for a period not to exceed 6 additional months, if he finds that such an extension in delivery date would result in the delivery of advanced electric and hybrid vehicles which would add to the total number of vehicles to be purchased or leased (up to 5,000) and which would not otherwise be available. If the Administrator finds that such an extension is appropriate and necessary for the delivery of such vehicles, he shall so notify the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate.

(d) The Administrator, in supervising the demonstration of vehicles acquired under subsection (c), shall make such arrangements as may be necessary or appropriate—

(1) (A) to make such vehicles available to Federal agencies and to State or local governments and other persons for individual or business use (including farms). The individuals and businesses involved shall be selected by an equitable process which assures that the Administrator will receive accurate and adequate data on vehicle performance, including representative geographical and climatological information and data on user reaction to the utilization of electric and hybrid vehicles. Such individuals and businesses shall be given the option of purchasing or leasing such vehicles under terms and conditions which will promote their widespread use;

(B) to pay the differential operating costs of such vehicles to the extent necessary to assure the adequate demonstration of such vehicles;

(2) for demonstration maintenance projects, including maintenance organization and equipment needs and model training projects for maintenance procedures; and

(3) for the dissemination of data on electric and hybrid vehicle safety and operating characteristics (including nontechnical descriptive data which shall be made available by the Government Printing Office) (A) to Federal, State, and local consumer affairs agencies and groups; (B) to Federal, State, and local agricultural and rural agencies and groups; and (C) to the public.

(e) (1) At least 60 days prior to entering into any contract for the purchase or lease of any electric or hybrid vehicle under subsection (c) (1) or any advanced electric or hybrid vehicle under subsection (c) (2), the Administrator shall determine (A) if the purchase or lease of the number of such vehicles specified in such subsection (c) (1) or (c) (2) will, with high probability, displace the normal level of private procurement of such vehicles which would conform to the applicable performance standards promulgated pursuant to subsection (b) and which would be used in the United States, and (B) if such displacement will occur, the necessary extent of such displacement in order to carry out the purposes of this Act. At the time any such determination is made, the Administrator shall transmit such determination, along with all relevant information in support thereof, to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce of the Senate.

(2) The Administrator shall reduce the number of vehicles for which he shall contract for the purchase or lease under subsection as modified by paragraph (1) (B), except in no event shall he contract for the purchase or lease pursuant to subsection (c) (1) of less than 1,000 electric or hybrid vehicles; and in no event shall he contract for the purchase or lease pursuant to subsection (c) (2) of less than 2,500 advanced electric or hybrid vehicles unless he determines on the basis of responses to the solicitations for proposals for such contracts, under the provisions of (c) (1) and (c) (2), that lesser numbers of such vehicles which satisfy the applicable performance standards will be available within the delivery periods. All other provisions of subsection (c) shall apply.

SEC. 8. CONTRACTS.

(a) The Administrator shall provide funds, by contract, to initiate, continue, supplement, and maintain research, development, and demon-

stration activities which are necessary to carry out the purposes of the project. The Administrator may enter into such contracts with any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual.

(b) In addition to the requirements of sections 4 and 5, the Administrator, in the exercise of his duties and responsibilities under this section, shall consult with the Department of Transportation, the Environmental Protection Agency, the Federal Energy Administration, the National Aeronautics and Space Administration, the Department of Agriculture, and representatives of other appropriate Federal agencies, and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in electric and hybrid vehicle research, development, and demonstration.

(c) Each contract under this section shall be entered into in accordance with such rules as the Administrator may prescribe in accordance with the provisions of this section. Each application for funding shall be made in writing in such form and with such content and other submissions as the Administrator shall require. The Administrator may enter into contracts under this section without regard to section 3709 of the Revised Statutes (41 U.S.C. 5).

SEC. 9. ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESS.

(a) The Administrator shall take such steps as are feasible to assure that small business concerns have a realistic and adequate opportunity to participate in the project.

(b) To assist in accomplishing the objectives of subsection (a), the Administrator shall reserve, for contracts with small business concerns, a reasonable portion of the funds made available pursuant to this Act for research, development, or demonstration of electric or hybrid vehicles.

(c) The Administrator shall, in addition to the requirements set forth in subsections (a) and (b)—

(1) include in all contracts for research, development, or demonstration of electric or hybrid vehicles such terms, conditions, and payment schedules as may assist in meeting the needs of small business concerns, and shall take steps to avoid the inclusion in such contracts of any terms, conditions, or penalties which would tend to prevent such concerns from participating in the program under this Act; and

(2) make planning grants available to qualified small business concerns which require assistance in developing, submitting, and entering into such contracts.

SEC. 10. LOAN GUARANTEES.

(a) It is the policy of the Congress to assist in the introduction into the Nation's transportation fleet of electric and hybrid vehicles and to assure that qualified small business concerns and other qualified borrowers are not excluded from participation in such development due to lack of adequate capital. Accordingly, it is the policy of the Congress to provide guarantees of loans made for such purposes.

(b) In order to encourage the commercial production of electric and hybrid vehicles, the Administrator is authorized to guarantee, and to

enter into commitments to guarantee, principal and interest on loans made by lenders to qualified borrowers, primarily small business concerns, for the purposes of—

(1) research and development related to electric and hybrid vehicle technology;

(2) prototype development for such vehicles and parts thereof;

(3) construction of capital equipment related to research on, and development and production of, electric and hybrid vehicles and components; or

(4) initial operating expenses associated with the development and production of electric and hybrid vehicles and components.

(c) Any guarantee under this section shall apply only to so much of the principal amount of the loan involved as does not exceed 90 percentum of the aggregate cost of the activity with respect to which the loan is made.

(d) Loan guarantees under this section shall be on such terms and conditions as the Administrator determines, except that a guarantee shall be made under this section only if—

(1) the loan bears interest at a rate not to exceed such annual percent on the principal obligation outstanding as the Administrator determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed 15 years;

(3) in the judgment of the Administrator, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the activity with respect to which the loan is made;

(4) in the judgment of the Administrator, there is reasonable assurance of repayment of the loan by the qualified borrower; and

(5) no loan shall be guaranteed by the Administrator under subsection (b) unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant.

(e) (1) The amount of the guarantee of any loan shall not exceed \$3,000,000, unless the Administrator finds that a higher guarantee level for specific loan guarantees is necessary in order to carry out the purposes of this Act. If the Administrator makes such finding, he shall immediately report that finding to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate.

(2) The aggregate amount of guarantees outstanding under this section at any one time shall not exceed \$60,000,000.

(f) As used in this section, the term "qualified borrower" means any partnership, corporation, or other legal entity which (as determined by the Administrator) has presented satisfactory evidence of an interest in electric or hybrid vehicle technology and is capable of performing research or completing the development and production of electric or hybrid vehicles or any components thereof in an acceptable manner.

(g) (1) *With respect to any loan guaranteed pursuant to this section, the Administrator is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the Administrator finds—*

(A) *that the borrower is unable to meet interest charges, that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Federal Government in paying such interest will be less than that which would result in the event of a default; and*

(B) *that the amount of such interest charges which the Administrator is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.*

(2) *In the event of any default by a qualified borrower on a guaranteed loan, the Administrator is authorized to make payment in accordance with the guarantee, and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments (including any payment of interest under paragraph (1)) from such assets of the defaulting borrowers as are associated with the activity with respect to which the loan was made or from any other surety included in the terms of the guarantee.*

(h) *No loan guarantee shall be made, or interest assistance contracts entered into, pursuant to this section, after the expiration of the 5-year period following the date of enactment of this Act.*

(i) *An applicant seeking a guarantee under this section must be a citizen or national of the United States. A corporation, partnership, firm, or association shall not be deemed to be a citizen or national of the United States unless the Administrator determines that it satisfactorily meets all the requirements of section 2 of the Shipping Act of 1916 (46 U.S.C. 802), for determining such citizenship, except that the provisions in subsection (a) of such section 2 concerning (1) the citizenship of officers or directors of a corporation, and (2) the interest required to be owned in the case of a corporation, association, or partnership operating a vessel in the coastwise trade, shall not be applicable. The Administrator, in consultation with the Secretary of State, may waive such requirements in the case of a corporation, partnership, firm, or association, controlling interest in which is owned by citizens of countries which are participants in the International Energy Agreement.*

SEC. 11. USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES.

The Postmaster General of the United States Postal Service, the Administrator of the General Services Administration, the Secretary of Defense, and the heads of other Federal agencies shall—

(1) *carry out a study of the practicability of using electric and hybrid vehicles in the performance of some or all of the functions of their agencies; and*

(2) *arrange for the introduction of electric and hybrid vehicles into their fleets as soon as possible.*

For competitive procurement purposes in purchasing such vehicles,

life-cycle costing and any beneficial air pollution control characteristics of electric and hybrid vehicles shall be fully taken into account. If the head of the agency involved determines that electric or hybrid vehicles are technologically practicable, but that they are not completely economically competitive with conventional vehicles, the Administrator may, for purposes of the demonstration program described in section 7, pay to such agency the incremental costs of the electric or hybrid vehicles, including differential operating costs.

SEC. 12. PATENTS.

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), entered into, made, or issued by the Administrator pursuant to section 8 of this Act.

SEC. 13. STUDIES.

(a) The Administrator shall conduct a study to determine the existence of any tax, regulatory, traffic, urban design, rural electrical, or other institutional factor which tends or may tend to bias surface transportation systems toward vehicles of particular characteristics. The Administrator shall submit a report to the Congress on the findings and conclusions of such study, within 1 year after the date of the enactment of this Act. The report shall include any legislative or other recommendations of the Administrator.

(b) The Administrator shall conduct a continuing assessment of the long-range material demand and pollution effects which may result from or in connection with the electrification of urban traffic. Such assessment shall include a statement of the Administrator's current findings in each report submitted under section 14. Any environmental impact statement which may be filed under a Federal law with respect to research, development, or demonstration activities under this Act shall include reference to the matters which are subject to assessment under this subsection.

(c) The Administrator shall perform, or cause to be performed, studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technologies. A description, and a statement of the findings, of such studies and research activities shall be included in each report submitted under section 14.

(d) The Secretary shall conduct a study of the current and future applicability of safety standards and regulations to electric and hybrid vehicles. The Secretary shall report the results of such study to the Administrator and the Congress within 1 year after the date of enactment of this Act.

(e) The Administrator shall conduct a study to determine the overall effectiveness and feasibility of including regenerative braking systems on electric and other automobiles in order to recover energy. In such study the Administrator shall—

- (1) review the history of regenerative braking devices;
- (2) describe relevant experimental test data and theoretical calculations with respect to such devices;
- (3) assess the net energy impacts and cost effectiveness of such devices;

(4) examine present patents and patent policy regarding such devices; and

(5) determine whether regenerative braking should be used on some of the advanced electric or hybrid vehicles to be purchased or leased pursuant to section 7(c)(2). The Administrator shall submit a report to the Congress on the findings and conclusions of such study within 1 year after the date of enactment of this Act.

SEC. 14. ANNUAL REPORT.

The Administrator shall submit to the Congress annually a report on all activities being undertaken or carried out pursuant to the provisions of this Act, including—

(1) such projections and estimates as may be necessary to evaluate the progress of the project and to indicate the extent to which, and the pace at which, the objectives of this Act are being achieved; and

(2) a statement of the extent to which imported automobile chassis or components are being used, or are desirable, for the production of vehicles under section 7, and of the extent to which restrictions imposed by law or regulation upon the importation or use of such chassis or components are impeding the achievement of the purposes of this Act.

Each such report shall also include any recommendations which the Administrator may deem appropriate for legislation or related action which might further the purposes of this Act.

SEC. 15. AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT.

(a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended (1) by redesignating subsection (d) thereof as subsection (e) thereof; and (2) by inserting immediately after subsection (c) thereof 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 ground propulsion systems research and development. Such development shall be conducted so as to contribute to the objectives of developing energy- and petroleum-conserving ground propulsion systems, and of minimizing the environmental degradation caused by such systems.”

(b) Section 102(e) of such Act, as redesignated by paragraph (1) of this subsection, is amended by striking out “and (c)” and inserting in lieu thereof “(c), and (d)”.

(c) Section 203 of such Act (42 U.S.C. 2473) is amended (A) by redesignating subsection (b) thereof as subsection (c) thereof, and (B) by inserting immediately after subsection (a) thereof the following new subsection:

“(b) The Administration shall, to the extent of appropriated funds, initiate, support, and carry out such research, development, demonstration, and other related activities in ground propulsion technologies as are provided for in sections 4 through 10 of the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976.”

SEC. 16. AUTHORIZATION FOR APPROPRIATIONS.

(a) *There are authorized to be appropriated to the Administrator, for purposes of carrying out this Act, (1) not to exceed \$30,000,000 for the fiscal year ending September 30, 1977, except that at least \$10,000,000 of such authorization shall be allocated for battery research and development; (2) not to exceed \$40,000,000 for the fiscal year ending September 30, 1978; (3) not to exceed \$25,000,000 for the fiscal year ending September 30, 1979; (4) not to exceed \$20,000,000 for the fiscal year ending September 30, 1980; and (5) not to exceed \$45,000,000 for the fiscal year ending September 30, 1981. Any amount appropriated pursuant to this section shall remain available until expended, and any amount authorized for any fiscal year prior to the fiscal year ending September 30, 1981, but not appropriated, may be appropriated for any succeeding fiscal year through the fiscal year ending September 30, 1983.*

(b) *Any moneys received by the Administrator from vehicle sales or leases or other activities under this Act may be retained and used for purposes of carrying out this Act, notwithstanding the provisions of section 3617 of the Revised Statutes (31 U.S.C. 484), and may remain available until expended; but the amount authorized to be appropriated for any fiscal year under subsection (a) shall be reduced by the amount of the moneys so received in that year.*

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 to the bill (H.R. 8800) to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles, 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 Electric and Hybrid Vehicle Research, Development and Demonstration Act is the result of a committee of conference designated to reconcile the differences between the House and Senate versions of H.R. 8800.

The major areas of difference between the House bill and the Senate amendment deal with the electric and hybrid vehicle demonstration program, particularly in the amount of time provided for specific demonstration activities, and the amount of discretion in the conduct of the demonstration left to the Administrator of the Energy Research and Development Administration (ERDA). The House bill includes a 4½-year demonstration schedule with scheduled events occurring at dates certain after enactment and with exact numbers of demonstration vehicles specified. The Senate amendment includes a 5-year demonstration schedule, with provision for extension to a maximum of 7 years. Dates after enactment of scheduled events and exact numbers of demonstration vehicles are specified, but provision is made for a time extension and changes in the number of vehicles delivered in the event of designated conditions. The conference substitute establishes a 6-year demonstration program with dates certain and exact numbers, but does provide flexibility for a time extension and number changes, conditioned upon specified events or determinations, and for the exercise of the Administrator's discretion in conducting the program.

The substitute reported by the committee of conference establishes within the Energy Research and Development Administration a comprehensive research and development project which will focus on basic and applied research on electric and hybrid vehicle batteries, controls,

motors, and overall vehicle design, with early emphasis on battery technology. The Energy Research and Development Administration shall also carry out a three-stage demonstration project to provide for (a) the development of baseline data to delineate the performance and other characteristics of existing electric and hybrid vehicle technology, (b) contracting for the purchase, or lease of 2,500 electric or hybrid vehicles which represent the best available state-of-the-art technology, and (c) contracting for the purchase or lease of 5,000 advanced electric or hybrid vehicles. Such advanced vehicles must represent a significant improvement over present state-of-the-art vehicles.

The Administrator shall, through contracts and loan guarantees, carry out the research, development, and demonstration project. The Administrator may utilize other Federal agencies to the extent they may have relevant expertise. The Administrator shall protect and enhance the participation of small businesses concerned with electric and hybrid vehicle technology. The Administrator shall reserve a reasonable portion of funds to be made available for the research, development, and demonstration project for contracts with such small businesses.

The Administrator must undertake a number of studies on various factors which may hinder or encourage the utilization of electric and hybrid vehicles. He shall also make annual reports on the progress of the project.

A total of \$160 million is authorized over 5 years to achieve the purposes of the project.

SHORT TITLE

House bill

The House bill provides that this act shall be cited as the "Electric Vehicle Research, Development and Demonstration Act of 1975".

Senate amendment

The Senate amendment provides that this act shall be cited as the "Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976".

Conference substitute

The committee of conference accepted the short title in the Senate amendment.

FINDINGS AND POLICY

House bill

The House bill does not contain a specific section entitled "Findings and Policy," but does contain separate sections on Findings (section 2) and Policy and Goals (section 3). In section 2 of the House bill the Congress finds that vehicles propelled by electric power can satisfy many important transportation functions, and that such vehicles can meet these needs while utilizing less liquid fuel and emitting fewer pollutants and less noise than automobiles powered by internal combustion engines.

The House bill also finds that the economic, political and environmental consequences of demands to fuel the internal combustion engine have an adverse economic and political impact on individual citizens and the Nation as a whole. Such demands undermine our

balance of payments, contribute to inflationary trends, and inhibit energy conservation efforts.

In addition, the House bill finds that new propulsion technologies utilizing electric batteries have improved significantly and are likely to continue to improve during the next decade. A practical electric or hybrid vehicle would alleviate many of the problems to which the internal combustion engine now contributes. The House bill finds that the state of the automobile industry and the conditions of the marketplace are not conducive to developing a practical alternative to conventional vehicles without Federal assistance.

Section 3 of the House bill declares that the United States will follow a policy to encourage research, development, and demonstration designed to promote utilization of electric and hybrid vehicles where practicable and beneficial. The purposes of the Federal involvement in developing such alternative technologies are to promote conservation of liquid fuel and to reduce environmental pollution. The Federal effort should also direct itself towards removing institutional barriers to the introduction of electric and hybrid vehicles and to broadening the range of applications of such vehicles for use by consumers and industry.

Senate amendment

The Senate amendment is substantially similar to sections 2 and 3 of the House bill, except that it emphasizes the adverse effects on national security and foreign policy of our continued dependence on foreign sources of petroleum supplies. Like the House provision, the Senate amendment finds electric or hybrid vehicles desirable because they reduce consumption of liquid fuel and emit fewer environmental pollutants. The Senate amendment does not refer explicitly (as does the House bill) to the adverse effects of fuel imports on our balance of payments, the likelihood of indefinite liquid fuel shortages, or the need to alleviate the depressed state of the automobile industry.

Conference substitute

The committee of conference accepted the substance of the Senate amendment, which encompassed many findings from the House bill. The committee of conference also accepted the findings of the House bill that (1) the Nation's balance of payments is threatened by continued dependence on foreign sources for foreign petroleum, and (2) that the substitution of electric or hybrid vehicles for conventional vehicles should be actively promoted under Federal auspices where practical and beneficial.

DEFINITIONS

House bill

Among the terms defined in the House bill, of particular interest are the definitions of "electric vehicle", "hybrid vehicle", and "commercial electric or hybrid vehicle". "Electric vehicle" means a vehicle powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electric current, which may also include a non-electrical source of power designed to charge batteries. "Hybrid vehicle" is defined as a vehicle propelled by a combination of an electric motor and an internal combustion or

alternative engine. The term "commercial electric or hybrid vehicle" means a vehicle suitable for purposes of business or agricultural production on farms or rural transportation and commercial purposes in urban areas.

Senate amendment

The definitions in the Senate amendment are similar to those in the House bill. However, the Senate bill adds a definition of "an advanced electric or hybrid vehicle". An "advanced electric or hybrid vehicle" is a vehicle which minimizes the total amount of energy to be consumed during fabrication, operation, and disposal, and which represents a substantial improvement over existing electric or hybrid vehicles with respect to the total amount of energy so consumed. Such a vehicle must be capable of being mass produced and operated at a cost and in a manner which is sufficiently competitive to enable its production and sale in numbers representing a reasonable portion of the market. This vehicle also must be safe, damage-resistant, easy to repair, durable, and operate with sufficient performance with respect to acceleration, cold-weather starting, cruising speed, and other performance factors. Such vehicle must be able to be produced, operated, and disposed of in compliance with any applicable requirement of Federal law.

Conference substitute

The committee of conference accepted the definitions common to both the House and Senate versions. The Senate definition of an "advanced electric or hybrid vehicle" was also accepted.

DUTIES OF THE ADMINISTRATOR

House bill

The House bill directs the Administrator to establish promptly an electric vehicle research, development, and demonstration project within the Energy Research and Development Administration. The Administrator shall manage the project, but may enter into such arrangements and agreements with other Federal agencies as the Administrator deems necessary or appropriate to conduct parts or aspects of the project within the particular competence of such agencies. In carrying out his management duties, the Administrator has specific responsibility for various aspects of basic and applied research on electric and hybrid vehicle batteries, controls, motors, and overall vehicle design. He shall also demonstrate the feasibility of electric and hybrid vehicles by contracting for their practical manufacture and arrange with other government agencies and non-government entities for the operation of such vehicles.

He shall ascertain (a) consumer needs and desires in order to insure that the design of such vehicles match their potential market, and (b) various other factors which affect the manufacture and use of electric and hybrid vehicles.

Senate amendment

The Senate amendment is nearly identical to the House bill, except for the addition of a subsection which amends the National Aeronautics and Space Act of 1958.

Conference substitute

The committee of conference accepted the language common to the House and Senate versions regarding the duties of the Administrator. The conferees also decided that the subsection in the Senate bill which amended the National Aeronautics and Space Act should be made a separate section of the conference substitute.

Section 4(c) (5) of the conference substitute gives the ERDA Administrator specific responsibility for ascertaining long-term changes in *inter alia*, road design, urban planning, traffic management, and maintenance facilities needed to facilitate the manufacture and use of electric and hybrid vehicles. The assignment of ultimate responsibility to ERDA for these activities does not necessarily imply that the activities should be conducted directly or exclusively by the ERDA. These areas are examples of the parts of the program that the ERDA Administrator may appropriately delegate pursuant to an agreement with another agency with existing expertise. Such agreements are permitted by section 4(b) of the conference substitute, and coordination is encouraged by section 5 of the conference substitute. The Administrator may find it advisable to delegate certain portions of the studies mandated by section 13 to the Department of Transportation in addition to the study the Secretary of Transportation is required to conduct under section 13(d).

COORDINATION BETWEEN THE ADMINISTRATOR AND OTHER AGENCIES

House bill

No provision.

Senate amendment

The Senate amendment directs the Administrator of ERDA to consult and coordinate with the Secretary of the Department of Transportation (DOT) to the maximum extent practicable concerning any functions of the Administrator under this act which relate to the regulatory activities or other responsibilities of the Secretary, including safety and damageability programs. The Senate amendment also authorizes the Administrator, or any agency to which the Administrator has delegated responsibility for specified parts or aspects of the electric or hybrid vehicle project, to obtain the assistance of any other department, agency, or instrumentality of the Executive Branch on written request, on a reimbursable basis, and with the consent of the other department, agency, or instrumentality.

Conference substitute

The committee of conference accepted the provision contained in the Senate amendment. The conferees stress that a close working relationship between ERDA and DOT is highly important to the success of the project. The Administrator and the Secretary shall cooperate and insure that the expertise in each department is appropriately utilized.

RESEARCH AND DEVELOPMENT

House bill

The Administrator shall direct research and development relating to energy storage technology and overall design to promote energy

conservation. Other research objectives include design for maximum practical lifetime, ease of repair, and interchangeability and replaceability of parts. Research and development under this project shall seek optimum transportation-related energy use and minimum transportation-related degradation of the environment. The Administrator shall also investigate regenerative braking systems and may investigate flywheel and other such advanced energy storage systems.

Senate amendment

No specific provision.

Conference substitute

The committee of conference accepted the provisions of the House bill.

DEMONSTRATION PROJECT

House bill

Within 1 year after the enactment of this act, the Administrator shall contract for the production of a reasonable number of urban passenger and commercial electric vehicles for the purpose of evaluation tests of current state-of-the-art vehicles.

Within this same time period, the Administrator shall develop initial performance standards. Such standards shall take into account the factors of energy conservation, urban traffic characteristics, patterns of use for "second vehicles," consumer preferences, maintenance needs, battery recharging characteristics, agricultural requirements, demands for materials and their ability to be recycled, vehicle safety and insurability, and other relevant considerations, as they apply to or affect vehicles with electric or hybrid propulsion systems. Such performance standards are to be developed utilizing the best current state-of-the-art and the state-of-the-art expected to result from the research and development program mandated under this act.

Within 15 months of enactment, the Administrator shall contract for the production of at least 2,500 urban passenger and commercial electric vehicles which meet the initial performance standards. These performance standards shall be revised periodically, as the state-of-the-art improves. Within 42 months after the date of enactment, the Administrator shall contract for the production of 5,000 urban passenger and commercial electric or hybrid vehicles which have advanced components and designs. Before entering into such contracts, the Administrator shall notify the Congress of the performance standards as revised and then in effect. The Administrator shall provide for the introduction of electric and hybrid vehicles into the fleets of State and local governments and Federal agencies, and for citizens and businesses to use such vehicles in order to facilitate the evaluation of vehicle performance and consumer reaction to such vehicles. The Administrator shall arrange for demonstration maintenance projects and model training projects on maintenance procedures, and for the dissemination of data on electric and hybrid safety and operating characteristics to State and municipal consumer affairs agencies and groups, and Federal, State, and local farm and rural agencies and groups.

Senate amendment

Within 12 months of enactment, the Administrator of ERDA shall develop baseline data characterizing the best current state-of-the-art with respect to electric and hybrid vehicle technology. This baseline data shall serve in order to evaluate improvements in electric and hybrid vehicle technology, to assist in establishing the performance standards for the demonstration contracts, and otherwise to assist in carrying out the purposes of this act.

Within 18 months of enactment, the Administrator shall promulgate performance standards for state-of-the-art electric and hybrid vehicles for (1) personal use vehicles and (2) commercial electric or hybrid vehicles. Vehicles contracted for will, at a minimum, satisfy these performance standards.

Within 6 months of the date of promulgation of such performance standards, the Administrator shall contract for the purchase or lease of at least 2,500 electric or hybrid vehicles (or such other number as the Administrator determines is appropriate for the adequate demonstration of such vehicles) which satisfy such performance standards. Such contracts should represent a cross-section of the available technologies, and types and uses of such vehicles.

Within 54 months, the Administrator shall promulgate revised performance standards for advanced electric or hybrid vehicles which are to be substantial improvements over present state-of-the-art electric or hybrid vehicles. Within 6 months after the promulgation of performance standards for advanced electric or hybrid vehicles, the Administrator shall contract for the purchase or lease of at least 5,000 advanced electric or hybrid vehicles (or such other number as the Administrator determines is appropriate for the adequate demonstration of such vehicles) which satisfy the final performance standards. If no such vehicles satisfy such performance standards within such 5-year period, such contracts shall be entered into as soon as practicable thereafter, but no such contracts shall be entered into more than 7 years after the date of enactment of this act.

The Administrator shall arrange to make such vehicles available to Federal agencies, to State or local governments, and to citizens for individual or business use. Individuals and businesses involved shall be selected by an equitable process. The Administrator should take care that accurate and adequate data on vehicle performance, including representative geographical and climatological information and user reaction is thus obtained. The Administrator may pay the operating costs of such vehicles. The Administrator shall carry out demonstration maintenance projects and disseminate data on electric and hybrid vehicle safety, and other operating characteristics.

Conference substitute

The conference substitute sets forth a demonstration program which generally incorporates the dates and numbers certain approach of the House bill, but with the increased flexibility of the Senate amendment in terms of a lengthened schedule and provision for date and number changes in the event of specified determinations. The compromise establishes a program goal of demonstrating electric or hybrid vehicles

culminating with the delivery of 5,000 advanced electric or hybrid vehicles for demonstration of the improved technology within 6 years or with an extension within 6½ years after the date of enactment. Scheduled activities in the demonstration program preceding the delivery of 5,000 advanced vehicles are timed to provide administrative flexibility, but at the same time, realistically support this delivery objective.

Within 12 months after the date of enactment, the Administrator shall develop data characterizing the present state-of-the-art of electric and hybrid vehicles. Based on the belief that much relevant data is already available, such as the interim results of the U.S. Postal Service project and the existing ERDA electric vehicle program, the conferees urge the Administrator to strive for the earlier publication of this baseline data before the outside limit of 1 year. Early availability of the baseline data would enable the Administrator to use the time saved to provide more time for the other parts of the demonstration. In order to develop such data, the Administrator shall purchase or lease a reasonable number of such vehicles or enter into such arrangements as he deems necessary.

Within 15 months of enactment, the Administrator shall promulgate the first performance standards comprising (1) the best state-of-the-art in existence at such time and (2) the state-of-the-art projected to result from the research and development program prescribed under this act by the date for contracting. The provisions of the conference substitute for the first performance standards generally follow the House bill provisions; however, the committee of conference also provides that vehicle procurement cost should be taken carefully into account. Such performance standards shall represent the minimum level of performance required by any vehicle purchased or leased pursuant to this act. Again, the conferees urge the Administrator to strive for early promulgation of performance standards.

The conferees emphasize that the term "performance standard" does not mean a design specification. ERDA shall not design the vehicles to be contracted for under this section. Performance standards will specify minimum levels of performance which may include a series of designated categories, such as safety, battery cycles and range. The performance standards may also specify varying priorities for increased performance levels within and among the designated categories in order to provide a basis for choosing among technologies which exceed the minimum standards and to guide both those who respond to the subsequent solicitation for proposals and those who evaluate the proposals.

Within 6 months after the date of promulgation of the first performance standards, the Administrator shall contract for the purchase or lease of 2,500 electric or hybrid vehicles, which satisfy such performance standards. The committee of conference intends that the Administrator determine the proper combination of electric and hybrid vehicles.

The delivery of the 2,500 vehicles shall be completed within 39 months of the date of enactment. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 2,500 electric or hybrid vehicles, which satisfy such performance standards will be available within the delivery period, the

Administrator shall so notify the Congress and contract for the maximum number of such vehicles (up to 2,500) that will be available within the delivery period. Vehicles purchased or leased should represent a cross-section of the available technologies and types of uses. The conferees intended that this provision for such a cross-section will result in participation by a number of competent manufacturers. The Administrator shall supervise the demonstration of such vehicles and arrange to make such vehicles available to Federal agencies, to State or local governments, and to persons for individual or business use (including agricultural use). The Administrator shall make such vehicles available to individuals or businesses on an equitable basis consistent with the need to obtain accurate and adequate data to evaluate the performance of such vehicles.

Within 48 months, the Administrator shall revise the performance standards to reflect the criteria for advanced electric or hybrid vehicles. Such vehicles shall represent a significant improvement over present state-of-the-art electric or hybrid vehicles regarding energy consumption and other operating characteristics.

Within 6 months of the promulgation of the performance standards for advanced electric or hybrid vehicles, the Administrator shall contract to purchase or lease 5,000 advanced electric or hybrid vehicles, which satisfy the updated performance standards for advanced vehicles. Delivery of such vehicles shall be completed within 72 months after the date of enactment of this act.

If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 5,000 advanced electric or hybrid vehicles which satisfy the performance standards will be available within the delivery period, the Administrator shall so notify the Congress and contract for the maximum number of such vehicles (up to 5,000) that will be available. The Administrator shall extend such delivery period an additional 6 months, if he finds and notifies Congress that such extension would result in the delivery of additional vehicles toward the 5,000 total that would otherwise be unavailable during the specified delivery period. The advanced electric or hybrid vehicles purchased or leased should, to the extent practicable, represent a cross-section of the available technologies and types of uses of such vehicles. The conferees intend that this provision for such a cross-section will result in participation by a number of competent manufacturers. The Administrator shall supervise the demonstration of such vehicles and arrange to make such vehicles available to Federal agencies, to State or local governments, and to persons for individual or business use (including agricultural use). The Administrator shall make such vehicles available to individuals or businesses on an equitable basis consistent with the need to obtain accurate and adequate data to evaluate the performance of such vehicles. The Administrator may pay the differential operating costs of such vehicles, where necessary for the purposes of the demonstration project. Such payments should be of short duration and in any case should not be for more than 4 years. The Administrator shall also carry out demonstration maintenance and training projects with respect to upkeep procedures, and disseminate information on such vehicles' safety and other characteristics to Federal, State and local consumer groups and the general public.

Subsection (e) specifies procedures by which the Administrator shall avoid or minimize the displacement of private purchases of electric and hybrid vehicles for use in the United States resulting from the Federal purchase or lease of vehicles under subsections (c)(1) and (c)(2) to support the demonstration project. Subsection (e)(1) requires the Administrator to make determinations on displacement at least 60 days prior to entering into contracts for electric and hybrid vehicles under subsection (c)(1) and for advanced electric and hybrid vehicles under subsection (c)(2). Subsection (e)(1)(A) specifies that the Administrator first shall determine if the Federal purchase or lease of the specified numbers of vehicles (2,500 or 5,000) will, with high probability, displace the normal level of private procurement of vehicles, which could meet the applicable performance standards, for use in the United States. This determination will be in the form of the number of vehicles which will, with high probability, be displaced.

The Administrator, in determining the likelihood of displacement, shall make a demonstrable attempt to ascertain the number of electric and hybrid vehicles which would have been procured by the private sector in the absence of the contracting requirements of section 7(c)(1) and (c)(2) of the conference substitute. In making such determination, the Administrator shall examine the productive capacity of electric and hybrid vehicle manufacturers, past and projected sales estimates, projected demand for such vehicles, and such other information as the Administrator deems relevant.

In determining displacement, it is important to note that the conference substitute refers only to the displacement of electric and hybrid vehicles used within the United States which conform to the applicable performance standards of subsection (b) of the conference substitute.

The Administrator will then, under subsection (e)(1)(B), determine the extent, if any, to which the displacement determined in (e)(1)(A) is necessary to carry out the purposes of the act in the demonstration project. In determining such necessity, the Administrator must fully consider the purposes of the demonstration program including the public interest benefits of demonstrating electric and hybrid vehicles.

The committee of conference recognizes the demonstration project is a critical part of the act. A demonstration project will insure that present and future state-of-the-art electric vehicles will be put into use in different regions of the country, so that their performance can be evaluated under various driving conditions (such as diverse climatological, topographical, and geographical circumstances) and for various business and personal uses. Such utilization will serve not only to evaluate technical performance and identify problems, but also acquaint the public with this mode of propulsion and ascertain consumer preferences and reservations. It is hoped that the resulting consumer awareness and the creation of an electric vehicle "second car" market will advance the state-of-the-art, thereby permitting the Nation to reduce its dependence on foreign sources of petroleum. Proper conduct of the demonstration project shall insure that sufficient numbers of different vehicle types shall be purchased or leased to gather enough data to permit proper evaluation. In order to realize these important benefits, some displacement may be necessary.

The conferees are convinced that the numbers of electric or hybrid vehicles (2,500) and advanced electric or hybrid vehicles (5,000) to conduct properly the demonstration project are realistic and desirable targets which must not be reduced without clear cause.

The results of the Administrator's determination will be a number of vehicles to be contracted for, taking into account both displacement and the purposes of the act. The Administrator will transmit this determination with any relevant supporting information to the House Committee on Science and Technology and the Senate Committee on Commerce. The determination must be made and transmitted with supporting information at least 60 days before he contracts for such vehicles. The 60-day period will provide the Committees with an opportunity to review the determination and information before the Administrator proceeds with the reduced number of purchases.

Subsection (e) (2) directs the Administrator to use the new number of vehicles for purposes of solicitations under subsection (c) (1) and (c) (2) in place of the vehicle numbers (2,500 and 5,000 respectively) in those subsections. However, the numbers for which the Administrator must solicit proposals shall not be less than 1,000 and 2,500, for subsections (c) (1) and (c) (2) respectively, notwithstanding the Administrator's determination under subsection (e) (1). The numbers to be used in subsections (c) (1) and (c) (2) therefore shall be the higher of the numbers determined under subsection (e) (1) and 1,000 or 2,500, respectively. The procedures in subsections (c) (1) and (c) (2) for reduction of the number of vehicles contracted for in the event of insufficient proposals meeting applicable performance standards and all other procedures therein shall apply even if maximum numbers specified in subsections (c) (1) or (c) (2) to be contracted for is altered as a result of this subsection.

The conferees selected the 1,000 and 2,500 vehicle level, notwithstanding displacement, to insure that there is a minimum demonstration under this act.

Where the total number of demonstration vehicles is reduced because of the Administrator's determination on displacement, the Administrator shall attempt to obtain on a voluntary basis or for reasonable compensation the participation of private purchasers of comparable vehicles in the performance measurement and maintenance data aspects of the demonstration program, in order to achieve the statistical data base which would be available in the absence of this displacement.

The schedule in the conference substitute for delivery of the advanced electric or hybrid vehicles could result in first demonstration of these vehicles in the 1983-84 timeframe. These time requirements should be considered as outside deadlines and the conferees encourage ERDA to make every effort to achieve initial demonstration of advanced vehicles which satisfy the applicable performance standards at the earliest possible date. Certainly, the planning for demonstration activities should not proceed on the basis of merely scheduling for the statutory deadlines. While the schedule may be demanding at certain points, the conferees believe that it is realistic and includes enough leeway for ERDA to move on a faster schedule. Of course, the conferees intend that ERDA will keep the Congress fully and cur-

rently informed on the progress of the demonstration, and in particular any scheduling difficulties which may arise under section 7.

CONTRACTS

House bill

No provision.

Senate amendment

The Senate amendment states that funds shall be provided by contract to initiate, continue, supplement, and maintain research, development, and demonstration programs for activities necessary to the purposes of the program. The Administrator shall consult with specified agencies and establish procedures for periodic consultation with representatives of science, industry, and other groups which have special relevant expertise. Each contract shall be made in writing and in accordance with rules prescribed by the Administrator. Section 3709 of the revised statutes (41 U.S.C. 5) need not apply to contracts under this section.

Conference substitute

The committee of conference adopted the language of the Senate amendment.

ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESS

House bill

The Administrator of the Energy Research and Development Administration shall reserve for contracts with small business concerns, a reasonable portion of the funds made available for the demonstration. The Administrator shall take into account the special needs of small business concerns in all contracts, terms, conditions, and payment schedules and avoid the inclusion in all such contracts of any provision which would impede participation by such small business concerns. The Administrator shall make planning grants available to qualified small business concerns.

Senate amendment

The House bill and Senate amendment contain essentially similar provisions regarding small business enterprises. The Senate amendment, however, states that such reservation of funds should be for research and development, as well as the demonstration program.

Conference substitute

The committee of conference accepted the House and Senate provisions to include the reservation of funds for small businesses for the research, development, and demonstration project. The conferees intend that the Administrator provide planning grants to small businesses, but only where such small businesses evidence satisfactory interest in and capability for research, development, or demonstration of electric or hybrid vehicle technology. The conferees intend that while a reasonable portion of funds should be reserved for small businesses, if sufficient proposals from small businesses which fulfill the requirements of the act are not forthcoming, the Administrator may make the funds available to other qualified

persons for the research, development and demonstration project. The conference substitute provides that the Administrator in consultation with the Small Business Administration shall define small business for the purposes of this act.

LOAN GUARANTEES

House bill

The House bill directs the Administrator to guarantee principal and interest on loans made to qualified borrowers (primarily small business concerns) for research and development related to electric and hybrid vehicle technology, prototype development for such vehicles and their components, construction of capital equipment related to research, or initial operating expenses associated with such development and production.

Such guarantees are to be limited to no more than 90 percent of the total cost of the activity with respect to which the loan is made. The Administrator shall fix the terms and conditions of the loan guarantees except that (1) the loan guarantee must bear interest at a rate which reasonably compares with rates prevailing in the private sector for similar loans and risks; (2) maturity may not exceed 15 years; (3) the amount of the loan (when combined with other resources) must be sufficient to carry out the activity for which the loan is made; and there must be reasonable assurance of repayment. Loan guarantees for any single borrower shall be limited to \$3 million, and the aggregate amount of guarantees outstanding at any one time is limited to \$60 million. The House bill limits loan guarantees to citizens or nationals of the United States. The House bill authorizes the Administrator to enter into contracts to pay interest due on guaranteed loans which the borrower cannot pay if the Administrator finds it is in the public interest to permit the borrower to continue with the project, and if the Administrator determines that the probable Federal cost of the interest payment will be less than the cost which would result from a default. In the event of a default, the House bill authorizes the Administrator to make payments on defaulted loan guarantees and directs the Attorney General to take appropriate action to recover any such payments from assets associated with the loan activities or other contractual surety.

Senate amendment

Under the Senate amendment, the Administrator is authorized to guarantee, and make commitments to guarantee, the interest, and the principal balance of, loans and other obligations to facilitate those projects involving research or development of electric or hybrid vehicles.

Applications shall be made in writing to the Administrator in accordance with his requirements and conditions. Modifications may be made to the provisions of the guarantee if the Administrator finds that the modification is equitable, not prejudicial to the interests of the United States, and has been consented to by the holder of the obligation. Guarantees may be made to a variety of agencies, institutions, and individuals.

All guarantees issued by the Administrator shall constitute general obligations of the United States backed with the full faith and credit of the United States. No obligation shall be guaranteed unless the

Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant. The Senate bill places no limitation on the citizenship or nationality for eligibility for loan guarantees under this act. Sixty million dollars is authorized to pay the interest on and the principal balance of any obligation guaranteed by the Administrator on which the obligor has defaulted. The outstanding indebtedness guaranteed shall not exceed \$60 million.

Conference substitute

The conference substitute substantially follows the House bill with three significant modifications. First, the language of the Senate amendment which requires that "no obligation shall be guaranteed by the Administrator unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant" was accepted by the conference. Second, the conferees agreed that loan guarantees should be limited to \$3 million per single qualified borrower, unless the Administrator finds that a higher guarantee level for a specific loan guarantee is necessary in order to carry out the act. If the Administrator makes such finding, he is immediately to notify the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate. The conferees intend that such higher loan guarantee be given only in those few circumstances where the Administrator finds it necessary to carry out a large, but promising research, development, or demonstration project.

Third, the committee of conference narrowed the House bill's restriction on the nationality of an applicant for a loan guarantee.

The Administrator shall direct careful attention to overseeing such loan guarantees, and only such funds as are necessary to meet a reasonably expectable default rate should be held in reserve so as not to compromise the project's goals.

USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES

House bill

The heads of the United States Postal Service, the General Services Administration, the Secretary of Defense, and other Federal agencies shall arrange to introduce electric and hybrid vehicles into their fleets as soon as possible. For competitive procurement purposes, life-cycle costing and the beneficial emission characteristics of electric and hybrid vehicles shall be fully taken into account. In any case where the head of the agency determines electric or hybrid vehicles are practical, but not economically competitive with conventional vehicles, the Administrator may pay the incremental costs of the electric or hybrid vehicles as part of the demonstration program to assure that the maximum number of electric and hybrid vehicles are placed in use by Federal agencies.

Senate amendment

The Senate amendment is substantially similar to the House bill. In the Senate amendment the various agencies shall carry out a study of the practicability of electric and hybrid vehicle use in the perform-

ance of some or all of the functions of their agencies and are to arrange for the introduction of such vehicles into their fleets to the maximum extent practicable. If he deems it necessary for the purposes of the demonstration program, the Administrator may pay the incremental costs of electric and hybrid vehicles, including operating costs, where such vehicles are practicable but not completely economically competitive with conventional vehicles.

Conference substitute

The conference substitute substantially accepted the language of the House and Senate bills. The various agencies are directed to carry out studies of the practicability of utilizing electric and hybrid vehicles to perform some or all of the vehicular functions of their agencies and to arrange for the introduction of electric or hybrid vehicles into their fleet where such vehicles can be so used as soon as possible. If the head of an agency determines that electric or hybrid vehicles are technologically practicable, but not completely economically competitive with conventional vehicles, the Administrator may pay for purposes of the demonstration project the incremental costs of the electric or hybrid vehicles, including differential operating costs.

PATENTS

House bill

The House bill contains no patent provision, although it is assumed that section 9 of the Federal Nonnuclear Energy Research and Development Act would apply to any contract or grant entered into under this act.

Senate amendment

The Senate amendment included language which was virtually identical to section 9 of the Federal Nonnuclear Energy Research and Development Act relating to patents. Under the provisions, title to inventions made or conceived under the program would lie with the United States with the appropriate waiver provision to assure the commercial availability of the technology.

Moreover, the Senate amendment provides for compulsory licensing of patents when the Administrator determines that it is reasonably necessary to the development, demonstration, or commercial application of any electric or hybrid vehicle invention, process or system or component thereof. When the necessary finding by the Administrator is made, the district courts are authorized to order that the patent be licensed at such reasonable royalty fee schedule and on such reasonable nondiscriminatory terms and conditions as the court shall determine.

Conference substitute

The conference substitute explicitly provides that the patent policy of the Federal Nonnuclear Energy Research and Development Act of 1974 will apply to any contract entered into, made, or issued by the Administrator pursuant to section 8 of this act. In administering waivers under the patent provisions, the conferees intended that the Administrator take care to recognize the benefits of involving small business in the projects envisioned by this act, and grant waivers where reasonable in recognition of this policy. There is no mandatory licensing provision.

STUDIES

House bill

The House bill directs the Administrator to study any tax, regulatory, traffic, urban design, or other institutional factor which may bias surface transportation systems toward particular types of vehicles, and to report to the Congress on findings and conclusions within 1 year after the enactment of the act.

The Administrator shall conduct a continuing assessment of the long-range effects of demand for materials and pollution which may result from the electrification of urban traffic. A statement of his findings thereon shall be included in his annual report (and in any environmental impact statement filed under Federal law with respect to activities under this legislation). The Administrator is also to perform studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technology.

The Secretary of Transportation is directed to study the current and future applicability of safety standards and regulations for electric and hybrid vehicles, and to report to the Administrator and to the Congress within 240 days after the enactment of this act.

Senate amendment

The Senate amendment is essentially similar to the House bill. However, the Administrator shall carry out an additional study to determine the overall effectiveness and feasibility of including regenerative braking systems for electric vehicles and other automobiles. The Administrator shall submit this report to the Congress 1 year after the date of enactment of this act. The Senate amendment also gives the Secretary of Transportation 1 year to carry out a study on safety.

Conference substitute

The committee of conference accepted the House and Senate language with the additions and changes noted in the Senate amendment. The conferees feel that the Secretary's report will provide important guidance for the Administrator in promulgating performance standards for the demonstration program. The conferees urge that the DOT report be completed as soon as possible to accomplish the purposes of this act.

REPORT TO CONGRESS

House bill

The House bill requires a semiannual report to the Congress on all activities undertaken or carried out pursuant to this legislation. The Administrator shall also forward to the Congress any recommendations for legislation or other actions he deems necessary to further the purposes of this act.

Senate amendment

The Senate amendment requires a report and materials similar to those required by the House provisions; however, the Senate amendment calls for an annual report.

Conference substitute

The committee of conference accepted language common to the House and Senate versions but calls for an annual report. The committee of conference intends that the annual report should be in the nature

of an evaluation of the progress of the project and should include (1) projections and estimates as to the extent to which the purposes of the act are being achieved, (2) an assessment of the progress and projections of the ability to meet the timetables set forth in the act, and (3) if any difficulties in meeting the timetables are encountered, a detailed analysis of the reasons for such difficulty and projected timetables that might be required and a justification for such projections.

AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT

House bill

No provision.

Senate amendment

Section 4 of the Senate amendment amends the National Aeronautics and Space Act of 1958. The Senate amendment recognizes NASA's expertise and competence in scientific and engineering systems as well as in the development of propulsion systems. The Administrator may utilize NASA's capabilities to further the purposes of the demonstration program.

Conference substitute

The committee of conference agreed to adopt the Senate provision, but decided to create a separate section 15 to amend the National Aeronautics and Space Act. The committee agreed that the Administrator of ERDA should take full advantage of the special knowledge, experience, and competence within NASA; however, NASA under this authority shall not establish a separate program under this act for any research, development, and demonstration and shall confine itself to the duties and projects which the Administrator may assign. The conferees intend this amendment will insure that NASA is eligible for "pass-through" funds from ERDA. The inclusion of the amendments to the National Aeronautics and Space Act does not affect the eligibility of any other Federal agency for funds on a "pass-through" basis.

AUTHORIZATION FOR APPROPRIATION

House bill

The House bill authorizes to be appropriated for purposes of this Act not more than: \$10 million for the fiscal year 1976 and the 3-month transition period following; \$40 million for the fiscal year 1977; \$30 million for the fiscal year 1978; \$60 million for the fiscal year 1979, and; \$20 million for the fiscal year 1980.

Senate amendment

The Senate amendment provides authorization for not more than: \$10 million for the fiscal year ending September 30, 1977; \$40 million for the fiscal year ending September 30, 1978; \$25 million for the fiscal year ending September 30, 1979; \$25 million for the fiscal year ending September 30, 1980, and; \$60 million for the fiscal year ending September 30, 1981.

Conference substitute

The conference substitute authorizes not more than: \$30 million for the fiscal year ending September 30, 1977; \$40 million for the fiscal

year ending September 30, 1978; \$25 million for the fiscal year ending September 30, 1979; \$20 million for the fiscal year ending September 30, 1980, and; \$45 million for the fiscal year ending September 30, 1981. Recognizing the importance of battery technology to the success of the demonstration program, the committee of conference specified that at least \$10 million of the funds authorized for the fiscal year 1977 shall be allocated for battery 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.



ELECTRIC AND HYBRID VEHICLE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1976

JULY 23, 1976.—Ordered to be printed

Mr. Moss, from the committee of conference,
submitted the following

CONFERENCE REPORT

[To accompany H.R. 8800]

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill (H.R. 8800) to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles, 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 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 "Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976."

SEC. 2. FINDINGS AND POLICY.

(a) *The Congress finds and declares that—*

(1) *the Nation's dependence on foreign sources of petroleum must be reduced, as such dependence jeopardizes national security, inhibits foreign policy, and undermines economic well-being;*

(2) *the Nation's balance of payments is threatened by the need to import oil for the production of liquid fuel for gasoline-powered vehicles;*

(3) *the single largest use of petroleum supplies is in the field of transportation, for gasoline- and diesel-powered motor vehicles;*



(4) the expeditious introduction of electric and hybrid vehicles into the Nation's transportation fleet would substantially reduce such use and dependence;

(5) such introduction is practicable and would be advantageous because—

(A) most urban driving consists of short trips, which are within the capability of electric and hybrid vehicles;

(B) much rural and agricultural driving of automobiles, tractors, and trucks is within the capability of such vehicles;

(C) electric and hybrid vehicles are more reliable and practical now than in the past because propulsion, control, and battery technologies have improved, and further significant improvements in such technologies are possible in the near term;

(D) electric and hybrid vehicles use little or no energy when stopped in traffic, in contrast to conventional automobiles and trucks;

(E) the power requirements of such vehicles could be satisfied by charging them during off-peak periods when existing electric generating plants are underutilized, thereby permitting more efficient use of existing generating capacity;

(F) such vehicles do not emit any significant pollutants or noise; and

(G) it is environmentally desirable for transportation systems to be powered from central sources, because pollutants emitted from stationary sources (such as electric generating plants) are potentially easier to control than pollutants emitted from moving vehicles; and

(6) the introduction of electric and hybrid vehicles would be facilitated by the establishment of a Federal program of research, development, and demonstration to explore electric and hybrid vehicle technologies.

(b) It is therefore declared to be the policy of the Congress in this Act to—

(1) encourage and support accelerated research into, and development of, electric and hybrid vehicle technologies;

(2) demonstrate the economic and technological practicability of electric and hybrid vehicles for personal and commercial use in urban areas and for agricultural and personal use in rural areas;

(3) facilitate, and remove barriers to, the use of electric and hybrid vehicles in lieu of gasoline- and diesel-powered motor vehicles, where practicable; and

(4) promote the substitution of electric and hybrid vehicles for many gasoline- and diesel-powered vehicles currently used in routine short-haul, low-load applications, where such substitution would be beneficial.

SEC. 3. DEFINITIONS.

As used in this Act, the term—

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

(2) "advanced electric or hybrid vehicle" means a vehicle which—

(A) minimizes the total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing electric and hybrid vehicles with respect to the total amount of energy so consumed;

(B) is capable of being mass-produced and operated at a cost and in a manner which is sufficiently competitive to enable it to be produced and sold in numbers representing a reasonable portion of the market;

(C) is safe, damage-resistant, easy to repair, durable, and operates with sufficient performance with respect to acceleration, cold-weather starting, cruising speed, and other performance factors; and

(D) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any applicable requirements of Federal law;

(3) "commercial electric or hybrid vehicle" includes any electric or hybrid vehicle which can be used (A) for business or agricultural production purposes on farms (e.g. tractors and trucks) or in rural areas, or (B) for commercial purposes in urban areas;

(4) "electric vehicle" means a vehicle which is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include a nonelectrical source of power designed to charge batteries and components thereof;

(5) "hybrid vehicle" means a vehicle propelled by a combination of an electric motor and an internal combustion engine or other power source and components thereof;

(6) "project" means the Electric and Hybrid Vehicle Research, Development, and Demonstration Project established under section 4(a);

(7) "Secretary" means the Secretary of Transportation; and

(8) "small business concern" shall have the meaning prescribed by the Administrator after consultation with the Small Business Administration.

SEC. 4. DUTIES OF THE ADMINISTRATOR.

(a) The Administrator shall promptly establish, as an organizational entity within the Energy Research and Development Administration, the Electric and Hybrid Vehicle Research, Development, and Demonstration Project.

(b) The Administrator shall have the responsibility for the overall management of the project. The Administrator may enter into any agreement or other arrangement with the National Aeronautics and Space Administration, the Department of Transportation, the National Science Foundation, the Environmental Protection Agency, the Department of Housing and Urban Development, the Department of Agriculture, or any other Federal agency, pursuant to which such agency shall conduct such specified parts or aspects of the project as the Administrator deems necessary or appropriate and within the particular competence of such agency, to the extent that such agency has capabilities which would enable it to contribute to the success of the project and the attainment of the purposes of this Act.

(c) *In providing for the effective management of this project, the Administrator shall have specific responsibility to—*

(1) *promote basic and applied research on electric and hybrid vehicle batteries, controls, and motors;*

(2) *determine optimum overall electric and hybrid vehicle design;*

(3) *conduct demonstration projects with respect to the feasibility of commercial electric and hybrid vehicles (A) by contracting for the purchase or lease of electric and hybrid vehicles for practical use, and (B) by entering into arrangements, with other governmental entities and with nongovernmental entities, for the operation of such vehicles;*

(4) *ascertain consumer needs and desires so as to match the design of electric and hybrid vehicles to their potential market; and*

(5) *ascertain the long-term changes in road design, urban planning, traffic management, maintenance facilities, utility rate structures, and tax policies which are needed to facilitate the manufacture and use of electric and hybrid vehicles in accordance with sections 13 and 14.*

SEC. 5. COORDINATION BETWEEN THE ADMINISTRATOR AND OTHER AGENCIES.

(a) *In carrying out the project established under section 4, the Administrator shall, to the maximum extent practicable, consult and coordinate with the Secretary, with respect to any functions of the Administrator under this Act which relate to regulatory activities or other responsibilities of the Secretary, including safety and damage-ability programs.*

(b) *Each department, agency, and instrumentality of the executive branch of the Federal Government shall carefully consider any written request from the Administrator, or the head of any agency to which the Administrator has delegated responsibility for specified parts or aspects of the project, to furnish such assistance, on a reimbursable basis, as the Administrator or such head deems necessary to carry out the project and to achieve the purposes of this Act. Such assistance may include transfer of personnel with their consent and without prejudice to their position and rating.*

SEC. 6. RESEARCH AND DEVELOPMENT.

The Administrator, acting through appropriate agencies and contractors, shall initiate and provide for the conduct of research and development in areas related to electric and hybrid vehicles, including—

(1) *energy storage technology, including batteries and their potential for convenient recharging;*

(2) *vehicle control systems and overall design for energy conservation, including the use of regenerative braking;*

(3) *urban design and traffic management to promote maximum transportation-related energy conservation and minimum transportation-related degradation of the environment; and*

(4) *vehicle design which emphasizes durability, length of practical lifetime, ease of repair, and interchangeability and replaceability of parts.*

SEC. 7. DEMONSTRATIONS.

(a) *Within 12 months after the date of enactment of this Act, the Administrator shall develop data characterizing the present state-of-the-art with respect to electric and hybrid vehicles. The data so developed shall serve as baseline data to be utilized in order (1) to compare improvements in electric and hybrid vehicle technologies; (2) to assist in establishing the performance standards under subsection (b) (1); and (3) to otherwise assist in carrying out the purposes of this section. In developing any such data, the Administrator shall purchase or lease a reasonable number of such vehicles or enter into such other arrangements as the Administrator deems necessary to carry out the purposes of this subsection.*

(b) (1) *Within 15 months after the date of enactment of this Act, the Administrator shall promulgate rules establishing performance standards for electric and hybrid vehicles to be purchased or leased pursuant to subsection (c) (1). The standards so developed shall take into account the factors of energy conservation, urban traffic characteristics, patterns of use for "second" vehicles, consumer preferences, maintenance needs, battery recharging characteristics, agricultural requirements, materials demand and their ability to be recycled, vehicle safety and insurability, cost, and other relevant considerations, as such factors and considerations particularly apply to or affect vehicles with electric or hybrid propulsion systems. Such standards are to be developed taking into account (A) the best current state-of-the-art, and (B) reasonable estimates as to the future state-of-the-art, based on projections of results from the research and development conducted under section 6. In developing such standards, the Administrator shall consult with appropriate experts concerning design needs for electric and hybrid vehicles which are compatible with long-range urban planning, traffic management, and vehicle safety.*

(2) *Separate performance standards shall be established under paragraph (1) with respect to (A) electric or hybrid vehicles for personal use, and (B) commercial electric or hybrid vehicles. Such performance standards shall represent the minimum level of performance which is required with respect to any vehicles purchased or leased pursuant to subsection (c). Initial performance standards under paragraph (b) (1) shall be set at such levels as the Administrator determines are necessary to promote the acquisition and use of such vehicles for transportation purposes which are within the capability (as determined by the Administrator) of electric and hybrid vehicles.*

(3) *Such performance standards shall be revised, by rule, periodically as the state-of-the-art improves, except that rules promulgated under paragraph (1) shall be amended not later than 6 months prior to the date for contracts specified in subsection (c) (2).*

(4) *Before entering into contracts for the production of vehicles under subsection (c) (2), the Administrator shall transmit to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, the performance standards developed under paragraph (1), as revised and currently in effect.*

(c) (1) *The Administrator shall, within 6 months after the date of promulgation of performance standards pursuant to subsection (b) (1).*

contract for the purchase or lease of 2,500 electric or hybrid vehicles which satisfy the performance standards set forth under subsection (b) (1). The delivery of such vehicles shall be completed within 39 months after the date of enactment of this Act. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 2,500 of the electric or hybrid vehicles which satisfy performance standards under subsection (b) (1) will be available within such delivery period, the Administrator shall (A) immediately forward this information along with a detailed justification of such determination to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, and (B) contract for the purchase or lease of the maximum number of such vehicles (up to 2,500) that will be available within such delivery period. To the extent practicable, vehicles purchased or leased under such contracts shall represent a cross-section of the available technologies and types of uses of such vehicles.

(2) (A) The Administrator shall, within 6 months after the required amendment of such standards pursuant to subsection (b) (3), and not later than 54 months after the date of enactment of this Act, contract for the purchase or lease of 5,000 advanced electric or hybrid vehicles, which satisfy such amended standards. The final delivery of such vehicles shall be completed within 72 months after the date of enactment of this Act. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 5,000 of the electric and hybrid vehicles which satisfy performance standards set forth under subsection (b) (3) will be available within the delivery period (including any extension under subparagraph (B)), the Administrator shall (i) immediately forward this information along with a detailed justification of such determination to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, and (ii) contract for the purchase or lease of the maximum number of such vehicles (up to 5,000) that will be available during such delivery period. To the extent practicable, vehicles purchased or leased under such contracts shall represent a cross section of the available technologies and types of uses of such vehicles.

(B) The Administrator shall extend the delivery period for such vehicles for a period not to exceed 6 additional months, if he finds that such an extension in delivery date would result in the delivery of advanced electric and hybrid vehicles which would add to the total number of vehicles to be purchased or leased (up to 5,000) and which would not otherwise be available. If the Administrator finds that such an extension is appropriate and necessary for the delivery of such vehicles, he shall so notify the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate.

(d) The Administrator, in supervising the demonstration of vehicles acquired under subsection (c), shall make such arrangements as may be necessary or appropriate—

(1) (A) to make such vehicles available to Federal agencies and to State or local governments and other persons for individual or business use (including farms). The individuals and businesses involved shall be selected by an equitable process which assures that the Administrator will receive accurate and adequate data on vehicle performance, including representative geographical and climatological information and data on user reaction to the utilization of electric and hybrid vehicles. Such individuals and businesses shall be given the option of purchasing or leasing such vehicles under terms and conditions which will promote their widespread use;

(B) to pay the differential operating costs of such vehicles to the extent necessary to assure the adequate demonstration of such vehicles;

(2) for demonstration maintenance projects, including maintenance organization and equipment needs and model training projects for maintenance procedures; and

(3) for the dissemination of data on electric and hybrid vehicle safety and operating characteristics (including nontechnical descriptive data which shall be made available by the Government Printing Office) (A) to Federal, State, and local consumer affairs agencies and groups; (B) to Federal, State, and local agricultural and rural agencies and groups; and (C) to the public.

(e) (1) At least 60 days prior to entering into any contract for the purchase or lease of any electric or hybrid vehicle under subsection (c) (1) or any advanced electric or hybrid vehicle under subsection (c) (2), the Administrator shall determine (A) if the purchase or lease of the number of such vehicles specified in such subsection (c) (1) or (c) (2) will, with high probability, displace the normal level of private procurement of such vehicles which would conform to the applicable performance standards promulgated pursuant to subsection (b) and which would be used in the United States, and (B) if such displacement will occur, the necessary extent of such displacement in order to carry out the purposes of this Act. At the time any such determination is made, the Administrator shall transmit such determination, along with all relevant information in support thereof, to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce of the Senate.

(2) The Administrator shall reduce the number of vehicles for which he shall contract for the purchase or lease under subsection as modified by paragraph (1) (B), except in no event shall he contract for the purchase or lease pursuant to subsection (c) (1) of less than 1,000 electric or hybrid vehicles, and in no event shall he contract for the purchase or lease pursuant to subsection (c) (2) of less than 2,500 advanced electric or hybrid vehicles unless he determines on the basis of responses to the solicitations for proposals for such contracts, under the provisions of (c) (1) and (c) (2), that lesser numbers of such vehicles which satisfy the applicable performance standards will be available within the delivery periods. All other provisions of subsection (c) shall apply.

SEC. 8. CONTRACTS.

(a) The Administrator shall provide funds, by contract, to initiate, continue, supplement, and maintain research, development, and demon-

stration activities which are necessary to carry out the purposes of the project. The Administrator may enter into such contracts with any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual.

(b) In addition to the requirements of sections 4 and 5, the Administrator, in the exercise of his duties and responsibilities under this section, shall consult with the Department of Transportation, the Environmental Protection Agency, the Federal Energy Administration, the National Aeronautics and Space Administration, the Department of Agriculture, and representatives of other appropriate Federal agencies, and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in electric and hybrid vehicle research, development, and demonstration.

(c) Each contract under this section shall be entered into in accordance with such rules as the Administrator may prescribe in accordance with the provisions of this section. Each application for funding shall be made in writing in such form and with such content and other submissions as the Administrator shall require. The Administrator may enter into contracts under this section without regard to section 3709 of the Revised Statutes (41 U.S.C. 5).

SEC. 9. ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESS.

(a) The Administrator shall take such steps as are feasible to assure that small business concerns have a realistic and adequate opportunity to participate in the project.

(b) To assist in accomplishing the objectives of subsection (a), the Administrator shall reserve, for contracts with small business concerns, a reasonable portion of the funds made available pursuant to this Act for research, development, or demonstration of electric or hybrid vehicles.

(c) The Administrator shall, in addition to the requirements set forth in subsections (a) and (b)—

(1) include in all contracts for research, development, or demonstration of electric or hybrid vehicles such terms, conditions, and payment schedules as may assist in meeting the needs of small business concerns, and shall take steps to avoid the inclusion in such contracts of any terms, conditions, or penalties which would tend to prevent such concerns from participating in the program under this Act; and

(2) make planning grants available to qualified small business concerns which require assistance in developing, submitting, and entering into such contracts.

SEC. 10. LOAN GUARANTEES.

(a) It is the policy of the Congress to assist in the introduction into the Nation's transportation fleet of electric and hybrid vehicles and to assure that qualified small business concerns and other qualified borrowers are not excluded from participation in such development due to lack of adequate capital. Accordingly, it is the policy of the Congress to provide guarantees of loans made for such purposes.

(b) In order to encourage the commercial production of electric and hybrid vehicles, the Administrator is authorized to guarantee, and to

enter into commitments to guarantee, principal and interest on loans made by lenders to qualified borrowers, primarily small business concerns, for the purposes of—

(1) research and development related to electric and hybrid vehicle technology;

(2) prototype development for such vehicles and parts thereof;

(3) construction of capital equipment related to research on, and development and production of, electric and hybrid vehicles and components; or

(4) initial operating expenses associated with the development and production of electric and hybrid vehicles and components.

(c) Any guarantee under this section shall apply only to so much of the principal amount of the loan involved as does not exceed 90 percentum of the aggregate cost of the activity with respect to which the loan is made.

(d) Loan guarantees under this section shall be on such terms and conditions as the Administrator determines, except that a guarantee shall be made under this section only if—

(1) the loan bears interest at a rate not to exceed such annual percent on the principal obligation outstanding as the Administrator determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed 15 years;

(3) in the judgment of the Administrator, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the activity with respect to which the loan is made;

(4) in the judgment of the Administrator, there is reasonable assurance of repayment of the loan by the qualified borrower; and

(5) no loan shall be guaranteed by the Administrator under subsection (b) unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant.

(e) (1) The amount of the guarantee of any loan shall not exceed \$3,000,000, unless the Administrator finds that a higher guarantee level for specific loan guarantees is necessary in order to carry out the purposes of this Act. If the Administrator makes such finding, he shall immediately report that finding to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate.

(2) The aggregate amount of guarantees outstanding under this section at any one time shall not exceed \$60,000,000.

(f) As used in this section, the term "qualified borrower" means any partnership, corporation, or other legal entity which (as determined by the Administrator) has presented satisfactory evidence of an interest in electric or hybrid vehicle technology and is capable of performing research or completing the development and production of electric or hybrid vehicles or any components thereof in an acceptable manner.

(g) (1) *With respect to any loan guaranteed pursuant to this section, the Administrator is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the Administrator finds—*

(A) *that the borrower is unable to meet interest charges, that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Federal Government in paying such interest will be less than that which would result in the event of a default; and*

(B) *that the amount of such interest charges which the Administrator is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.*

(2) *In the event of any default by a qualified borrower on a guaranteed loan, the Administrator is authorized to make payment in accordance with the guarantee, and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments (including any payment of interest under paragraph (1)) from such assets of the defaulting borrowers as are associated with the activity with respect to which the loan was made or from any other surety included in the terms of the guarantee.*

(h) *No loan guarantee shall be made, or interest assistance contracts entered into, pursuant to this section, after the expiration of the 5-year period following the date of enactment of this Act.*

(i) *An applicant seeking a guarantee under this section must be a citizen or national of the United States. A corporation, partnership, firm, or association shall not be deemed to be a citizen or national of the United States unless the Administrator determines that it satisfactorily meets all the requirements of section 2 of the Shipping Act of 1916 (46 U.S.C. 802), for determining such citizenship, except that the provisions in subsection (a) of such section 2 concerning (1) the citizenship of officers or directors of a corporation, and (2) the interest required to be owned in the case of a corporation, association, or partnership operating a vessel in the coastwise trade, shall not be applicable. The Administrator, in consultation with the Secretary of State, may waive such requirements in the case of a corporation, partnership, firm, or association, controlling interest in which is owned by citizens of countries which are participants in the International Energy Agreement.*

SEC. 11. USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES.

The Postmaster General of the United States Postal Service, the Administrator of the General Services Administration, the Secretary of Defense, and the heads of other Federal agencies shall—

(1) *carry out a study of the practicability of using electric and hybrid vehicles in the performance of some or all of the functions of their agencies; and*

(2) *arrange for the introduction of electric and hybrid vehicles into their fleets as soon as possible.*

For competitive procurement purposes in purchasing such vehicles,

life-cycle costing and any beneficial air pollution control characteristics of electric and hybrid vehicles shall be fully taken into account. If the head of the agency involved determines that electric or hybrid vehicles are technologically practicable, but that they are not completely economically competitive with conventional vehicles, the Administrator may, for purposes of the demonstration program described in section 7, pay to such agency the incremental costs of the electric or hybrid vehicles, including differential operating costs.

SEC. 12. PATENTS.

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), entered into, made, or issued by the Administrator pursuant to section 8 of this Act.

SEC. 13. STUDIES.

(a) The Administrator shall conduct a study to determine the existence of any tax, regulatory, traffic, urban design, rural electrical, or other institutional factor which tends or may tend to bias surface transportation systems toward vehicles of particular characteristics. The Administrator shall submit a report to the Congress on the findings and conclusions of such study, within 1 year after the date of the enactment of this Act. The report shall include any legislative or other recommendations of the Administrator.

(b) The Administrator shall conduct a continuing assessment of the long-range material demand and pollution effects which may result from or in connection with the electrification of urban traffic. Such assessment shall include a statement of the Administrator's current findings in each report submitted under section 14. Any environmental impact statement which may be filed under a Federal law with respect to research, development, or demonstration activities under this Act shall include reference to the matters which are subject to assessment under this subsection.

(c) The Administrator shall perform, or cause to be performed, studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technologies. A description, and a statement of the findings, of such studies and research activities shall be included in each report submitted under section 14.

(d) The Secretary shall conduct a study of the current and future applicability of safety standards and regulations to electric and hybrid vehicles. The Secretary shall report the results of such study to the Administrator and the Congress within 1 year after the date of enactment of this Act.

(e) The Administrator shall conduct a study to determine the overall effectiveness and feasibility of including regenerative braking systems on electric and other automobiles in order to recover energy. In such study the Administrator shall—

- (1) review the history of regenerative braking devices;
- (2) describe relevant experimental test data and theoretical calculations with respect to such devices;
- (3) assess the net energy impacts and cost effectiveness of such devices;

(4) examine present patents and patent policy regarding such devices; and

(5) determine whether regenerative braking should be used on some of the advanced electric or hybrid vehicles to be purchased or leased pursuant to section 7(c)(2). The Administrator shall submit a report to the Congress on the findings and conclusions of such study within 1 year after the date of enactment of this Act.

SEC. 14. ANNUAL REPORT

The Administrator shall submit to the Congress annually a report on all activities being undertaken or carried out pursuant to the provisions of this Act, including—

(1) such projections and estimates as may be necessary to evaluate the progress of the project and to indicate the extent to which, and the pace at which, the objectives of this Act are being achieved; and

(2) a statement of the extent to which imported automobile chassis or components are being used, or are desirable, for the production of vehicles under section 7, and of the extent to which restrictions imposed by law or regulation upon the importation or use of such chassis or components are impeding the achievement of the purposes of this Act.

Each such report shall also include any recommendations which the Administrator may deem appropriate for legislation or related action which might further the purposes of this Act.

SEC. 15. AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT.

(a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended (1) by redesignating subsection (d) thereof as subsection (e) thereof; and (2) by inserting immediately after subsection (c) thereof 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 ground propulsion systems research and development. Such development shall be conducted so as to contribute to the objectives of developing energy- and petroleum-conserving ground propulsion systems, and of minimizing the environmental degradation caused by such systems.”

(b) Section 102(e) of such Act, as redesignated by paragraph (1) of this subsection, is amended by striking out “and (c)” and inserting in lieu thereof “(c), and (d)”.

(c) Section 203 of such Act (42 U.S.C. 2473) is amended (A) by redesignating subsection (b) thereof as subsection (c) thereof, and (B) by inserting immediately after subsection (a) thereof the following new subsection:

“(b) The Administration shall, to the extent of appropriated funds, initiate, support, and carry out such research, development, demonstration, and other related activities in ground propulsion technologies as are provided for in sections 4 through 10 of the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976.”

SEC. 16. AUTHORIZATION FOR APPROPRIATIONS.

(a) *There are authorized to be appropriated to the Administrator, for purposes of carrying out this Act, (1) not to exceed \$30,000,000 for the fiscal year ending September 30, 1977, except that at least \$10,000,000 of such authorization shall be allocated for battery research and development; (2) not to exceed \$40,000,000 for the fiscal year ending September 30, 1978; (3) not to exceed \$25,000,000 for the fiscal year ending September 30, 1979; (4) not to exceed \$20,000,000 for the fiscal year ending September 30, 1980; and (5) not to exceed \$45,000,000 for the fiscal year ending September 30, 1981. Any amount appropriated pursuant to this section shall remain available until expended, and any amount authorized for any fiscal year prior to the fiscal year ending September 30, 1981, but not appropriated, may be appropriated for any succeeding fiscal year through the fiscal year ending September 30, 1983.*

(b) *Any moneys received by the Administrator from vehicle sales or leases or other activities under this Act may be retained and used for purposes of carrying out this Act, notwithstanding the provisions of section 3617 of the Revised Statutes (31 U.S.C. 484), and may remain available until expended; but the amount authorized to be appropriated for any fiscal year under subsection (a) shall be reduced by the amount of the moneys so received in that year.*

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 to the bill (H.R. 8800) to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles, 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 Electric and Hybrid Vehicle Research, Development and Demonstration Act is the result of a committee of conference designated to reconcile the differences between the House and Senate versions of H.R. 8800.

The major areas of difference between the House bill and the Senate amendment deal with the electric and hybrid vehicle demonstration program, particularly in the amount of time provided for specific demonstration activities, and the amount of discretion in the conduct of the demonstration left to the Administrator of the Energy Research and Development Administration (ERDA). The House bill includes a 4½-year demonstration schedule with scheduled events occurring at dates certain after enactment and with exact numbers of demonstration vehicles specified. The Senate amendment includes a 5-year demonstration schedule, with provision for extension to a maximum of 7 years. Dates after enactment of scheduled events and exact numbers of demonstration vehicles are specified, but provision is made for a time extension and changes in the number of vehicles delivered in the event of designated conditions. The conference substitute establishes a 6-year demonstration program with dates certain and exact numbers, but does provide flexibility for a time extension and number changes, conditioned upon specified events or determinations, and for the exercise of the Administrator's discretion in conducting the program.

The substitute reported by the committee of conference establishes within the Energy Research and Development Administration a comprehensive research and development project which will focus on basic and applied research on electric and hybrid vehicle batteries, controls,

motors, and overall vehicle design, with early emphasis on battery technology. The Energy Research and Development Administration shall also carry out a three-stage demonstration project to provide for (a) the development of baseline data to delineate the performance and other characteristics of existing electric and hybrid vehicle technology, (b) contracting for the purchase, or lease of 2,500 electric or hybrid vehicles which represent the best available state-of-the-art technology, and (c) contracting for the purchase or lease of 5,000 advanced electric or hybrid vehicles. Such advanced vehicles must represent a significant improvement over present state-of-the-art vehicles.

The Administrator shall, through contracts and loan guarantees, carry out the research, development, and demonstration project. The Administrator may utilize other Federal agencies to the extent they may have relevant expertise. The Administrator shall protect and enhance the participation of small businesses concerned with electric and hybrid vehicle technology. The Administrator shall reserve a reasonable portion of funds to be made available for the research, development, and demonstration project for contracts with such small businesses.

The Administrator must undertake a number of studies on various factors which may hinder or encourage the utilization of electric and hybrid vehicles. He shall also make annual reports on the progress of the project.

A total of \$160 million is authorized over 5 years to achieve the purposes of the project.

SHORT TITLE

House bill

The House bill provides that this act shall be cited as the "Electric Vehicle Research, Development and Demonstration Act of 1975".

Senate amendment

The Senate amendment provides that this act shall be cited as the "Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976".

Conference substitute

The committee of conference accepted the short title in the Senate amendment.

FINDINGS AND POLICY

House bill

The House bill does not contain a specific section entitled "Findings and Policy," but does contain separate sections on Findings (section 2) and Policy and Goals (section 3). In section 2 of the House bill the Congress finds that vehicles propelled by electric power can satisfy many important transportation functions, and that such vehicles can meet these needs while utilizing less liquid fuel and emitting fewer pollutants and less noise than automobiles powered by internal combustion engines.

The House bill also finds that the economic, political and environmental consequences of demands to fuel the internal combustion engine have an adverse economic and political impact on individual citizens and the Nation as a whole. Such demands undermine our

balance of payments, contribute to inflationary trends, and inhibit energy conservation efforts.

In addition, the House bill finds that new propulsion technologies utilizing electric batteries have improved significantly and are likely to continue to improve during the next decade. A practical electric or hybrid vehicle would alleviate many of the problems to which the internal combustion engine now contributes. The House bill finds that the state of the automobile industry and the conditions of the marketplace are not conducive to developing a practical alternative to conventional vehicles without Federal assistance.

Section 3 of the House bill declares that the United States will follow a policy to encourage research, development, and demonstration designed to promote utilization of electric and hybrid vehicles where practicable and beneficial. The purposes of the Federal involvement in developing such alternative technologies are to promote conservation of liquid fuel and to reduce environmental pollution. The Federal effort should also direct itself towards removing institutional barriers to the introduction of electric and hybrid vehicles and to broadening the range of applications of such vehicles for use by consumers and industry.

Senate amendment

The Senate amendment is substantially similar to sections 2 and 3 of the House bill, except that it emphasizes the adverse effects on national security and foreign policy of our continued dependence on foreign sources of petroleum supplies. Like the House provision, the Senate amendment finds electric or hybrid vehicles desirable because they reduce consumption of liquid fuel and emit fewer environmental pollutants. The Senate amendment does not refer explicitly (as does the House bill) to the adverse effects of fuel imports on our balance of payments, the likelihood of indefinite liquid fuel shortages, or the need to alleviate the depressed state of the automobile industry.

Conference substitute

The committee of conference accepted the substance of the Senate amendment, which encompassed many findings from the House bill. The committee of conference also accepted the findings of the House bill that (1) the Nation's balance of payments is threatened by continued dependence on foreign sources for foreign petroleum, and (2) that the substitution of electric or hybrid vehicles for conventional vehicles should be actively promoted under Federal auspices where practical and beneficial.

DEFINITIONS

House bill

Among the terms defined in the House bill, of particular interest are the definitions of "electric vehicle", "hybrid vehicle", and "commercial electric or hybrid vehicle". "Electric vehicle" means a vehicle powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electric current, which may also include a non-electrical source of power designed to charge batteries. "Hybrid vehicle" is defined as a vehicle propelled by a combination of an electric motor and an internal combustion or

alternative engine. The term "commercial electric or hybrid vehicle" means a vehicle suitable for purposes of business or agricultural production on farms or rural transportation and commercial purposes in urban areas.

Senate amendment

The definitions in the Senate amendment are similar to those in the House bill. However, the Senate bill adds a definition of "an advanced electric or hybrid vehicle". An "advanced electric or hybrid vehicle" is a vehicle which minimizes the total amount of energy to be consumed during fabrication, operation, and disposal, and which represents a substantial improvement over existing electric or hybrid vehicles with respect to the total amount of energy so consumed. Such a vehicle must be capable of being mass produced and operated at a cost and in a manner which is sufficiently competitive to enable its production and sale in numbers representing a reasonable portion of the market. This vehicle also must be safe, damage-resistant, easy to repair, durable, and operate with sufficient performance with respect to acceleration, cold-weather starting, cruising speed, and other performance factors. Such vehicle must be able to be produced, operated, and disposed of in compliance with any applicable requirement of Federal law.

Conference substitute

The committee of conference accepted the definitions common to both the House and Senate versions. The Senate definition of an "advanced electric or hybrid vehicle" was also accepted.

DUTIES OF THE ADMINISTRATOR

House bill

The House bill directs the Administrator to establish promptly an electric vehicle research, development, and demonstration project within the Energy Research and Development Administration. The Administrator shall manage the project, but may enter into such arrangements and agreements with other Federal agencies as the Administrator deems necessary or appropriate to conduct parts or aspects of the project within the particular competence of such agencies. In carrying out his management duties, the Administrator has specific responsibility for various aspects of basic and applied research on electric and hybrid vehicle batteries, controls, motors, and overall vehicle design. He shall also demonstrate the feasibility of electric and hybrid vehicles by contracting for their practical manufacture and arrange with other government agencies and non-government entities for the operation of such vehicles.

He shall ascertain (a) consumer needs and desires in order to insure that the design of such vehicles match their potential market, and (b) various other factors which affect the manufacture and use of electric and hybrid vehicles.

Senate amendment

The Senate amendment is nearly identical to the House bill, except for the addition of a subsection which amends the National Aeronautics and Space Act of 1958.

Conference substitute

The committee of conference accepted the language common to the House and Senate versions regarding the duties of the Administrator. The conferees also decided that the subsection in the Senate bill which amended the National Aeronautics and Space Act should be made a separate section of the conference substitute.

Section 4(c) (5) of the conference substitute gives the ERDA Administrator specific responsibility for ascertaining long-term changes in *inter alia*, road design, urban planning, traffic management, and maintenance facilities needed to facilitate the manufacture and use of electric and hybrid vehicles. The assignment of ultimate responsibility to ERDA for these activities does not necessarily imply that the activities should be conducted directly or exclusively by the ERDA. These areas are examples of the parts of the program that the ERDA Administrator may appropriately delegate pursuant to an agreement with another agency with existing expertise. Such agreements are permitted by section 4(b) of the conference substitute, and coordination is encouraged by section 5 of the conference substitute. The Administrator may find it advisable to delegate certain portions of the studies mandated by section 13 to the Department of Transportation in addition to the study the Secretary of Transportation is required to conduct under section 13(d).

COORDINATION BETWEEN THE ADMINISTRATOR AND OTHER AGENCIES

House bill

No provision.

Senate amendment

The Senate amendment directs the Administrator of ERDA to consult and coordinate with the Secretary of the Department of Transportation (DOT) to the maximum extent practicable concerning any functions of the Administrator under this act which relate to the regulatory activities or other responsibilities of the Secretary, including safety and damageability programs. The Senate amendment also authorizes the Administrator, or any agency to which the Administrator has delegated responsibility for specified parts or aspects of the electric or hybrid vehicle project, to obtain the assistance of any other department, agency, or instrumentality of the Executive Branch on written request, on a reimbursable basis, and with the consent of the other department, agency, or instrumentality.

Conference substitute

The committee of conference accepted the provision contained in the Senate amendment. The conferees stress that a close working relationship between ERDA and DOT is highly important to the success of the project. The Administrator and the Secretary shall cooperate and insure that the expertise in each department is appropriately utilized.

RESEARCH AND DEVELOPMENT

House bill

The Administrator shall direct research and development relating to energy storage technology and overall design to promote energy

conservation. Other research objectives include design for maximum practical lifetime, ease of repair, and interchangeability and replaceability of parts. Research and development under this project shall seek optimum transportation-related energy use and minimum transportation-related degradation of the environment. The Administrator shall also investigate regenerative braking systems and may investigate flywheel and other such advanced energy storage systems.

Senate amendment

No specific provision.

Conference substitute

The committee of conference accepted the provisions of the House bill.

DEMONSTRATION PROJECT

House bill

Within 1 year after the enactment of this act, the Administrator shall contract for the production of a reasonable number of urban passenger and commercial electric vehicles for the purpose of evaluation tests of current state-of-the-art vehicles.

Within this same time period, the Administrator shall develop initial performance standards. Such standards shall take into account the factors of energy conservation, urban traffic characteristics, patterns of use for "second vehicles," consumer preferences, maintenance needs, battery recharging characteristics, agricultural requirements, demands for materials and their ability to be recycled, vehicle safety and insurability, and other relevant considerations, as they apply to or affect vehicles with electric or hybrid propulsion systems. Such performance standards are to be developed utilizing the best current state-of-the-art and the state-of-the-art expected to result from the research and development program mandated under this act.

Within 15 months of enactment, the Administrator shall contract for the production of at least 2,500 urban passenger and commercial electric vehicles which meet the initial performance standards. These performance standards shall be revised periodically, as the state-of-the-art improves. Within 42 months after the date of enactment, the Administrator shall contract for the production of 5,000 urban passenger and commercial electric or hybrid vehicles which have advanced components and designs. Before entering into such contracts, the Administrator shall notify the Congress of the performance standards as revised and then in effect. The Administrator shall provide for the introduction of electric and hybrid vehicles into the fleets of State and local governments and Federal agencies, and for citizens and businesses to use such vehicles in order to facilitate the evaluation of vehicle performance and consumer reaction to such vehicles. The Administrator shall arrange for demonstration maintenance projects and model training projects on maintenance procedures, and for the dissemination of data on electric and hybrid safety and operating characteristics to State and municipal consumer affairs agencies and groups, and Federal, State, and local farm and rural agencies and groups.

Senate amendment

Within 12 months of enactment, the Administrator of ERDA shall develop baseline data characterizing the best current state-of-the-art with respect to electric and hybrid vehicle technology. This baseline data shall serve in order to evaluate improvements in electric and hybrid vehicle technology, to assist in establishing the performance standards for the demonstration contracts, and otherwise to assist in carrying out the purposes of this act.

Within 18 months of enactment, the Administrator shall promulgate performance standards for state-of-the-art electric and hybrid vehicles for (1) personal use vehicles and (2) commercial electric or hybrid vehicles. Vehicles contracted for will, at a minimum, satisfy these performance standards.

Within 6 months of the date of promulgation of such performance standards, the Administrator shall contract for the purchase or lease of at least 2,500 electric or hybrid vehicles (or such other number as the Administrator determines is appropriate for the adequate demonstration of such vehicles) which satisfy such performance standards. Such contracts should represent a cross-section of the available technologies, and types and uses of such vehicles.

Within 54 months, the Administrator shall promulgate revised performance standards for advanced electric or hybrid vehicles which are to be substantial improvements over present state-of-the-art electric or hybrid vehicles. Within 6 months after the promulgation of performance standards for advanced electric or hybrid vehicles, the Administrator shall contract for the purchase or lease of at least 5,000 advanced electric or hybrid vehicles (or such other number as the Administrator determines is appropriate for the adequate demonstration of such vehicles) which satisfy the final performance standards. If no such vehicles satisfy such performance standards within such 5-year period, such contracts shall be entered into as soon as practicable thereafter, but no such contracts shall be entered into more than 7 years after the date of enactment of this act.

The Administrator shall arrange to make such vehicles available to Federal agencies, to State or local governments, and to citizens for individual or business use. Individuals and businesses involved shall be selected by an equitable process. The Administrator should take care that accurate and adequate data on vehicle performance, including representative geographical and climatological information and user reaction is thus obtained. The Administrator may pay the operating costs of such vehicles. The Administrator shall carry out demonstration maintenance projects and disseminate data on electric and hybrid vehicle safety, and other operating characteristics.

Conference substitute

The conference substitute sets forth a demonstration program which generally incorporates the dates and numbers certain approach of the House bill, but with the increased flexibility of the Senate amendment in terms of a lengthened schedule and provision for date and number changes in the event of specified determinations. The compromise establishes a program goal of demonstrating electric or hybrid vehicles

culminating with the delivery of 5,000 advanced electric or hybrid vehicles for demonstration of the improved technology within 6 years or with an extension within 6½ years after the date of enactment. Scheduled activities in the demonstration program preceding the delivery of 5,000 advanced vehicles are timed to provide administrative flexibility, but at the same time, realistically support this delivery objective.

Within 12 months after the date of enactment, the Administrator shall develop data characterizing the present state-of-the-art of electric and hybrid vehicles. Based on the belief that much relevant data is already available, such as the interim results of the U.S. Postal Service project and the existing ERDA electric vehicle program, the conferees urge the Administrator to strive for the earlier publication of this baseline data before the outside limit of 1 year. Early availability of the baseline data would enable the Administrator to use the time saved to provide more time for the other parts of the demonstration. In order to develop such data, the Administrator shall purchase or lease a reasonable number of such vehicles or enter into such arrangements as he deems necessary.

Within 15 months of enactment, the Administrator shall promulgate the first performance standards comprising (1) the best state-of-the-art in existence at such time and (2) the state-of-the-art projected to result from the research and development program prescribed under this act by the date for contracting. The provisions of the conference substitute for the first performance standards generally follow the House bill provisions; however, the committee of conference also provides that vehicle procurement cost should be taken carefully into account. Such performance standards shall represent the minimum level of performance required by any vehicle purchased or leased pursuant to this act. Again, the conferees urge the Administrator to strive for early promulgation of performance standards.

The conferees emphasize that the term "performance standard" does not mean a design specification. ERDA shall not design the vehicles to be contracted for under this section. Performance standards will specify minimum levels of performance which may include a series of designated categories, such as safety, battery cycles and range. The performance standards may also specify varying priorities for increased performance levels within and among the designated categories in order to provide a basis for choosing among technologies which exceed the minimum standards and to guide both those who respond to the subsequent solicitation for proposals and those who evaluate the proposals.

Within 6 months after the date of promulgation of the first performance standards, the Administrator shall contract for the purchase or lease of 2,500 electric or hybrid vehicles, which satisfy such performance standards. The committee of conference intends that the Administrator determine the proper combination of electric and hybrid vehicles.

The delivery of the 2,500 vehicles shall be completed within 39 months of the date of enactment. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 2,500 electric or hybrid vehicles, which satisfy such performance standards will be available within the delivery period, the

Administrator shall so notify the Congress and contract for the maximum number of such vehicles (up to 2,500) that will be available within the delivery period. Vehicles purchased or leased should represent a cross-section of the available technologies and types of uses. The conferees intended that this provision for such a cross-section will result in participation by a number of competent manufacturers. The Administrator shall supervise the demonstration of such vehicles and arrange to make such vehicles available to Federal agencies, to State or local governments, and to persons for individual or business use (including agricultural use). The Administrator shall make such vehicles available to individuals or businesses on an equitable basis consistent with the need to obtain accurate and adequate data to evaluate the performance of such vehicles.

Within 48 months, the Administrator shall revise the performance standards to reflect the criteria for advanced electric or hybrid vehicles. Such vehicles shall represent a significant improvement over present state-of-the-art electric or hybrid vehicles regarding energy consumption and other operating characteristics.

Within 6 months of the promulgation of the performance standards for advanced electric or hybrid vehicles, the Administrator shall contract to purchase or lease 5,000 advanced electric or hybrid vehicles, which satisfy the updated performance standards for advanced vehicles. Delivery of such vehicles shall be completed within 72 months after the date of enactment of this act.

If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 5,000 advanced electric or hybrid vehicles which satisfy the performance standards will be available within the delivery period, the Administrator shall so notify the Congress and contract for the maximum number of such vehicles (up to 5,000) that will be available. The Administrator shall extend such delivery period an additional 6 months, if he finds and notifies Congress that such extension would result in the delivery of additional vehicles toward the 5,000 total that would otherwise be unavailable during the specified delivery period. The advanced electric or hybrid vehicles purchased or leased should, to the extent practicable, represent a cross-section of the available technologies and types of uses of such vehicles. The conferees intend that this provision for such a cross-section will result in participation by a number of competent manufacturers. The Administrator shall supervise the demonstration of such vehicles and arrange to make such vehicles available to Federal agencies, to State or local governments, and to persons for individual or business use (including agricultural use). The Administrator shall make such vehicles available to individuals or businesses on an equitable basis consistent with the need to obtain accurate and adequate data to evaluate the performance of such vehicles. The Administrator may pay the differential operating costs of such vehicles, where necessary for the purposes of the demonstration project. Such payments should be of short duration and in any case should not be for more than 4 years. The Administrator shall also carry out demonstration maintenance and training projects with respect to upkeep procedures, and disseminate information on such vehicles' safety and other characteristics to Federal, State and local consumer groups and the general public.

Subsection (e) specifies procedures by which the Administrator shall avoid or minimize the displacement of private purchases of electric and hybrid vehicles for use in the United States resulting from the Federal purchase or lease of vehicles under subsections (c)(1) and (c)(2) to support the demonstration project. Subsection (e)(1) requires the Administrator to make determinations on displacement at least 60 days prior to entering into contracts for electric and hybrid vehicles under subsection (c)(1) and for advanced electric and hybrid vehicles under subsection (c)(2). Subsection (e)(1)(A) specifies that the Administrator first shall determine if the Federal purchase or lease of the specified numbers of vehicles (2,500 or 5,000) will, with high probability, displace the normal level of private procurement of vehicles, which could meet the applicable performance standards, for use in the United States. This determination will be in the form of the number of vehicles which will, with high probability, be displaced.

The Administrator, in determining the likelihood of displacement, shall make a demonstrable attempt to ascertain the number of electric and hybrid vehicles which would have been procured by the private sector in the absence of the contracting requirements of section 7(c)(1) and (c)(2) of the conference substitute. In making such determination, the Administrator shall examine the productive capacity of electric and hybrid vehicle manufacturers, past and projected sales estimates, projected demand for such vehicles, and such other information as the Administrator deems relevant.

In determining displacement, it is important to note that the conference substitute refers only to the displacement of electric and hybrid vehicles used within the United States which conform to the applicable performance standards of subsection (b) of the conference substitute.

The Administrator will then, under subsection (e)(1)(B), determine the extent, if any, to which the displacement determined in (e)(1)(A) is necessary to carry out the purposes of the act in the demonstration project. In determining such necessity, the Administrator must fully consider the purposes of the demonstration program including the public interest benefits of demonstrating electric and hybrid vehicles.

The committee of conference recognizes the demonstration project is a critical part of the act. A demonstration project will insure that present and future state-of-the-art electric vehicles will be put into use in different regions of the country, so that their performance can be evaluated under various driving conditions (such as diverse climatological, topographical, and geographical circumstances) and for various business and personal uses. Such utilization will serve not only to evaluate technical performance and identify problems, but also acquaint the public with this mode of propulsion and ascertain consumer preferences and reservations. It is hoped that the resulting consumer awareness and the creation of an electric vehicle "second car" market will advance the state-of-the-art, thereby permitting the Nation to reduce its dependence on foreign sources of petroleum. Proper conduct of the demonstration project shall insure that sufficient numbers of different vehicle types shall be purchased or leased to gather enough data to permit proper evaluation. In order to realize these important benefits, some displacement may be necessary.

The conferees are convinced that the numbers of electric or hybrid vehicles (2,500) and advanced electric or hybrid vehicles (5,000) to conduct properly the demonstration project are realistic and desirable targets which must not be reduced without clear cause.

The results of the Administrator's determination will be a number of vehicles to be contracted for, taking into account both displacement and the purposes of the act. The Administrator will transmit this determination with any relevant supporting information to the House Committee on Science and Technology and the Senate Committee on Commerce. The determination must be made and transmitted with supporting information at least 60 days before he contracts for such vehicles. The 60-day period will provide the Committees with an opportunity to review the determination and information before the Administrator proceeds with the reduced number of purchases.

Subsection (e) (2) directs the Administrator to use the new number of vehicles for purposes of solicitations under subsection (c) (1) and (c) (2) in place of the vehicle numbers (2,500 and 5,000 respectively) in those subsections. However, the numbers for which the Administrator must solicit proposals shall not be less than 1,000 and 2,500, for subsections (c) (1) and (c) (2) respectively, notwithstanding the Administrator's determination under subsection (e) (1). The numbers to be used in subsections (c) (1) and (c) (2) therefore shall be the higher of the numbers determined under subsection (e) (1) and 1,000 or 2,500, respectively. The procedures in subsections (c) (1) and (c) (2) for reduction of the number of vehicles contracted for in the event of insufficient proposals meeting applicable performance standards and all other procedures therein shall apply even if maximum numbers specified in subsections (c) (1) or (c) (2) to be contracted for is altered as a result of this subsection.

The conferees selected the 1,000 and 2,500 vehicle level, notwithstanding displacement, to insure that there is a minimum demonstration under this act.

Where the total number of demonstration vehicles is reduced because of the Administrator's determination on displacement, the Administrator shall attempt to obtain on a voluntary basis or for reasonable compensation the participation of private purchasers of comparable vehicles in the performance measurement and maintenance data aspects of the demonstration program, in order to achieve the statistical data base which would be available in the absence of this displacement.

The schedule in the conference substitute for delivery of the advanced electric or hybrid vehicles could result in first demonstration of these vehicles in the 1983-84 timeframe. These time requirements should be considered as outside deadlines and the conferees encourage ERDA to make every effort to achieve initial demonstration of advanced vehicles which satisfy the applicable performance standards at the earliest possible date. Certainly, the planning for demonstration activities should not proceed on the basis of merely scheduling for the statutory deadlines. While the schedule may be demanding at certain points, the conferees believe that it is realistic and includes enough leeway for ERDA to move on a faster schedule. Of course, the conferees intend that ERDA will keep the Congress fully and cur-

rently informed on the progress of the demonstration, and in particular any scheduling difficulties which may arise under section 7.

CONTRACTS

House bill

No provision.

Senate amendment

The Senate amendment states that funds shall be provided by contract to initiate, continue, supplement, and maintain research, development, and demonstration programs for activities necessary to the purposes of the program. The Administrator shall consult with specified agencies and establish procedures for periodic consultation with representatives of science, industry, and other groups which have special relevant expertise. Each contract shall be made in writing and in accordance with rules prescribed by the Administrator. Section 3709 of the revised statutes (41 U.S.C. 5) need not apply to contracts under this section.

Conference substitute

The committee of conference adopted the language of the Senate amendment.

ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESS

House bill

The Administrator of the Energy Research and Development Administration shall reserve for contracts with small business concerns, a reasonable portion of the funds made available for the demonstration. The Administrator shall take into account the special needs of small business concerns in all contracts, terms, conditions, and payment schedules and avoid the inclusion in all such contracts of any provision which would impede participation by such small business concerns. The Administrator shall make planning grants available to qualified small business concerns.

Senate amendment

The House bill and Senate amendment contain essentially similar provisions regarding small business enterprises. The Senate amendment, however, states that such reservation of funds should be for research and development, as well as the demonstration program.

Conference substitute

The committee of conference accepted the House and Senate provisions to include the reservation of funds for small businesses for the research, development, and demonstration project. The conferees intend that the Administrator provide planning grants to small businesses, but only where such small businesses evidence satisfactory interest in and capability for research, development, or demonstration of electric or hybrid vehicle technology. The conferees intend that while a reasonable portion of funds should be reserved for small businesses, if sufficient proposals from small businesses which fulfill the requirements of the act are not forthcoming, the Administrator may make the funds available to other qualified

persons for the research, development and demonstration project. The conference substitute provides that the Administrator in consultation with the Small Business Administration shall define small business for the purposes of this act.

LOAN GUARANTEES

House bill

The House bill directs the Administrator to guarantee principal and interest on loans made to qualified borrowers (primarily small business concerns) for research and development related to electric and hybrid vehicle technology, prototype development for such vehicles and their components, construction of capital equipment related to research, or initial operating expenses associated with such development and production.

Such guarantees are to be limited to no more than 90 percent of the total cost of the activity with respect to which the loan is made. The Administrator shall fix the terms and conditions of the loan guarantees except that (1) the loan guarantee must bear interest at a rate which reasonably compares with rates prevailing in the private sector for similar loans and risks; (2) maturity may not exceed 15 years; (3) the amount of the loan (when combined with other resources) must be sufficient to carry out the activity for which the loan is made; and there must be reasonable assurance of repayment. Loan guarantees for any single borrower shall be limited to \$3 million, and the aggregate amount of guarantees outstanding at any one time is limited to \$60 million. The House bill limits loan guarantees to citizens or nationals of the United States. The House bill authorizes the Administrator to enter into contracts to pay interest due on guaranteed loans which the borrower cannot pay if the Administrator finds it is in the public interest to permit the borrower to continue with the project, and if the Administrator determines that the probable Federal cost of the interest payment will be less than the cost which would result from a default. In the event of a default, the House bill authorizes the Administrator to make payments on defaulted loan guarantees and directs the Attorney General to take appropriate action to recover any such payments from assets associated with the loan activities or other contractual surety.

Senate amendment

Under the Senate amendment, the Administrator is authorized to guarantee, and make commitments to guarantee, the interest, and the principal balance of, loans and other obligations to facilitate those projects involving research or development of electric or hybrid vehicles.

Applications shall be made in writing to the Administrator in accordance with his requirements and conditions. Modifications may be made to the provisions of the guarantee if the Administrator finds that the modification is equitable, not prejudicial to the interests of the United States, and has been consented to by the holder of the obligation. Guarantees may be made to a variety of agencies, institutions, and individuals.

All guarantees issued by the Administrator shall constitute general obligations of the United States backed with the full faith and credit of the United States. No obligation shall be guaranteed unless the

Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant. The Senate bill places no limitation on the citizenship or nationality for eligibility for loan guarantees under this act. Sixty million dollars is authorized to pay the interest on and the principal balance of any obligation guaranteed by the Administrator on which the obligor has defaulted. The outstanding indebtedness guaranteed shall not exceed \$60 million.

Conference substitute

The conference substitute substantially follows the House bill with three significant modifications. First, the language of the Senate amendment which requires that "no obligation shall be guaranteed by the Administrator unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant" was accepted by the conference. Second, the conferees agreed that loan guarantees should be limited to \$3 million per single qualified borrower, unless the Administrator finds that a higher guarantee level for a specific loan guarantee is necessary in order to carry out the act. If the Administrator makes such finding, he is immediately to notify the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate. The conferees intend that such higher loan guarantee be given only in those few circumstances where the Administrator finds it necessary to carry out a large, but promising research, development, or demonstration project.

Third, the committee of conference narrowed the House bill's restriction on the nationality of an applicant for a loan guarantee.

The Administrator shall direct careful attention to overseeing such loan guarantees, and only such funds as are necessary to meet a reasonably expectable default rate should be held in reserve so as not to compromise the project's goals.

USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES

House bill

The heads of the United States Postal Service, the General Services Administration, the Secretary of Defense, and other Federal agencies shall arrange to introduce electric and hybrid vehicles into their fleets as soon as possible. For competitive procurement purposes, life-cycle costing and the beneficial emission characteristics of electric and hybrid vehicles shall be fully taken into account. In any case where the head of the agency determines electric or hybrid vehicles are practical, but not economically competitive with conventional vehicles, the Administrator may pay the incremental costs of the electric or hybrid vehicles as part of the demonstration program to assure that the maximum number of electric and hybrid vehicles are placed in use by Federal agencies.

Senate amendment

The Senate amendment is substantially similar to the House bill. In the Senate amendment the various agencies shall carry out a study of the practicability of electric and hybrid vehicle use in the perform-

ance of some or all of the functions of their agencies and are to arrange for the introduction of such vehicles into their fleets to the maximum extent practicable. If he deems it necessary for the purposes of the demonstration program, the Administrator may pay the incremental costs of electric and hybrid vehicles, including operating costs, where such vehicles are practicable but not completely economically competitive with conventional vehicles.

Conference substitute

The conference substitute substantially accepted the language of the House and Senate bills. The various agencies are directed to carry out studies of the practicability of utilizing electric and hybrid vehicles to perform some or all of the vehicular functions of their agencies and to arrange for the introduction of electric or hybrid vehicles into their fleet where such vehicles can be so used as soon as possible. If the head of an agency determines that electric or hybrid vehicles are technologically practicable, but not completely economically competitive with conventional vehicles, the Administrator may pay for purposes of the demonstration project the incremental costs of the electric or hybrid vehicles, including differential operating costs.

PATENTS

House bill

The House bill contains no patent provision, although it is assumed that section 9 of the Federal Nonnuclear Energy Research and Development Act would apply to any contract or grant entered into under this act.

Senate amendment

The Senate amendment included language which was virtually identical to section 9 of the Federal Nonnuclear Energy Research and Development Act relating to patents. Under the provisions, title to inventions made or conceived under the program would lie with the United States with the appropriate waiver provision to assure the commercial availability of the technology.

Moreover, the Senate amendment provides for compulsory licensing of patents when the Administrator determines that it is reasonably necessary to the development, demonstration, or commercial application of any electric or hybrid vehicle invention, process or system or component thereof. When the necessary finding by the Administrator is made, the district courts are authorized to order that the patent be licensed at such reasonable royalty fee schedule and on such reasonable nondiscriminatory terms and conditions as the court shall determine.

Conference substitute

The conference substitute explicitly provides that the patent policy of the Federal Nonnuclear Energy Research and Development Act of 1974 will apply to any contract entered into, made, or issued by the Administrator pursuant to section 8 of this act. In administering waivers under the patent provisions, the conferees intended that the Administrator take care to recognize the benefits of involving small business in the projects envisioned by this act, and grant waivers where reasonable in recognition of this policy. There is no mandatory licensing provision.

STUDIES

House bill

The House bill directs the Administrator to study any tax, regulatory, traffic, urban design, or other institutional factor which may bias surface transportation systems toward particular types of vehicles, and to report to the Congress on findings and conclusions within 1 year after the enactment of the act.

The Administrator shall conduct a continuing assessment of the long-range effects of demand for materials and pollution which may result from the electrification of urban traffic. A statement of his findings thereon shall be included in his annual report (and in any environmental impact statement filed under Federal law with respect to activities under this legislation). The Administrator is also to perform studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technology.

The Secretary of Transportation is directed to study the current and future applicability of safety standards and regulations for electric and hybrid vehicles, and to report to the Administrator and to the Congress within 240 days after the enactment of this act.

Senate amendment

The Senate amendment is essentially similar to the House bill. However, the Administrator shall carry out an additional study to determine the overall effectiveness and feasibility of including regenerative braking systems for electric vehicles and other automobiles. The Administrator shall submit this report to the Congress 1 year after the date of enactment of this act. The Senate amendment also gives the Secretary of Transportation 1 year to carry out a study on safety.

Conference substitute

The committee of conference accepted the House and Senate language with the additions and changes noted in the Senate amendment. The conferees feel that the Secretary's report will provide important guidance for the Administrator in promulgating performance standards for the demonstration program. The conferees urge that the DOT report be completed as soon as possible to accomplish the purposes of this act.

REPORT TO CONGRESS

House bill

The House bill requires a semiannual report to the Congress on all activities undertaken or carried out pursuant to this legislation. The Administrator shall also forward to the Congress any recommendations for legislation or other actions he deems necessary to further the purposes of this act.

Senate amendment

The Senate amendment requires a report and materials similar to those required by the House provisions; however, the Senate amendment calls for an annual report.

Conference substitute

The committee of conference accepted language common to the House and Senate versions but calls for an annual report. The committee of conference intends that the annual report should be in the nature

of an evaluation of the progress of the project and should include (1) projections and estimates as to the extent to which the purposes of the act are being achieved, (2) an assessment of the progress and projections of the ability to meet the timetables set forth in the act, and (3) if any difficulties in meeting the timetables are encountered, a detailed analysis of the reasons for such difficulty and projected timetables that might be required and a justification for such projections.

AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT

House bill

No provision.

Senate amendment

Section 4 of the Senate amendment amends the National Aeronautics and Space Act of 1958. The Senate amendment recognizes NASA's expertise and competence in scientific and engineering systems as well as in the development of propulsion systems. The Administrator may utilize NASA's capabilities to further the purposes of the demonstration program.

Conference substitute

The committee of conference agreed to adopt the Senate provision, but decided to create a separate section 15 to amend the National Aeronautics and Space Act. The committee agreed that the Administrator of ERDA should take full advantage of the special knowledge, experience, and competence within NASA; however, NASA under this authority shall not establish a separate program under this act for any research, development, and demonstration and shall confine itself to the duties and projects which the Administrator may assign. The conferees intend this amendment will insure that NASA is eligible for "pass-through" funds from ERDA. The inclusion of the amendments to the National Aeronautics and Space Act does not affect the eligibility of any other Federal agency for funds on a "pass-through" basis.

AUTHORIZATION FOR APPROPRIATION

House bill

The House bill authorizes to be appropriated for purposes of this Act not more than: \$10 million for the fiscal year 1976 and the 3-month transition period following; \$40 million for the fiscal year 1977; \$30 million for the fiscal year 1978; \$60 million for the fiscal year 1979, and; \$20 million for the fiscal year 1980.

Senate amendment

The Senate amendment provides authorization for not more than: \$10 million for the fiscal year ending September 30, 1977; \$40 million for the fiscal year ending September 30, 1978; \$25 million for the fiscal year ending September 30, 1979; \$25 million for the fiscal year ending September 30, 1980, and; \$60 million for the fiscal year ending September 30, 1981.

Conference substitute

The conference substitute authorizes not more than: \$30 million for the fiscal year ending September 30, 1977; \$40 million for the fiscal

year ending September 30, 1978; \$25 million for the fiscal year ending September 30, 1979; \$20 million for the fiscal year ending September 30, 1980, and; \$45 million for the fiscal year ending September 30, 1981. Recognizing the importance of battery technology to the success of the demonstration program, the committee of conference specified that at least \$10 million of the funds authorized for the fiscal year 1977 shall be allocated for battery 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.



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ELECTRIC AND HYBRID VEHICLE
RESEARCH, DEVELOPMENT, AND
DEMONSTRATION ACT OF 1976

REPORT

OF THE

SENATE COMMITTEE ON COMMERCE

ON

S. 1632

TO AUTHORIZE IN THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION A FEDERAL PROGRAM OF RESEARCH, DEVELOPMENT, AND DEMONSTRATION DESIGNED TO PROMOTE ELECTRIC VEHICLE TECHNOLOGIES AND TO DEMONSTRATE THE COMMERCIAL FEASIBILITY OF ELECTRIC VEHICLES



MAY 13, 1976.—Ordered to be printed

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CONTENTS

	Page
Purpose and summary.....	1
Background and need.....	2
Meeting the need.....	6
Description	9
Legislative background.....	11
Section-by-section analysis.....	12
Changes in existing law.....	20
Estimated costs.....	20
Text of S. 1632 as reported.....	20
Agency comments.....	35

ELECTRIC AND HYBRID VEHICLE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1976

MAY 13, 1976.—Ordered to be printed

Mr. Moss, from the Committee on Commerce,
submitted the following

REPORT

[To accompany S. 1632]

The Committee on Commerce, to which was referred the bill (S. 1632) to authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles, having considered the same, reports favorably thereon with an amendment and recommends that the bill as amended do pass.

PURPOSE AND SUMMARY

The purpose of S. 1632 is to establish a program of research and development on electric and hybrid vehicles and to provide a program for the demonstration of existing and advanced electric and hybrid vehicle technology. The program would be administered by the Energy Research and Development Administration.

In order to accomplish this purpose, the legislation contains the following features:

1. An R. & D. program which would focus on basic and applied research on electric and hybrid vehicle batteries, controls, motors, and overall vehicle design.

2. A three-stage demonstration program providing for (a) the development of baseline data as to existing electric and hybrid vehicle technology, (b) the production or leasing of electric and hybrid vehicles utilizing presently available technology, and (c) a similar program for the production or leasing of advanced electric and hybrid vehicles.

3. Direction that the Administrator protect and enhance the participation of small business enterprises concerned with electric and hybrid vehicle research, development, and demonstration.

4. Application of the patent provisions of the Federal Non-Nuclear Energy Research and Development Act of 1974 with the addition of mandatory licensing of background necessary to conduct research, development, and commercialize the technology developed under this authority.

5. The Administration is required to undertake a number of studies concerning various factors which may tend to hinder or to create incentives with respect to the utilization of electric and hybrid vehicles.

6. A total authorization of \$160 million over 5 years to finance the program.

BACKGROUND AND NEED

1. *Historical Trends.*—At the turn of the century, electric vehicle technology was a major competitor for the personal transportation market. In fact, in the early 1900's, there were more electric vehicles on the road than gasoline powered vehicles. However, with the improvement of internal combustion engine technology, and the growing availability of inexpensive petroleum, the electric vehicle market virtually collapsed.

In the 1960's interest in the potential of electric vehicles again began to grow due to the public's deep concern about air pollution caused by our transportation fleet. As a National Academy of Science study, for example, noted:

In principle, battery powered electric vehicles provide an attractive alternative to conventional vehicles powered by spark ignition engines. Batteries can be pollution free and provide efficient, silent and responsive power. The use of electrically rechargeable batteries shifts the source of pollution away from the densely populated areas to the power generating stations where emissions can be effectively and economically controlled.

A number of studies also pointed out that the recharging of electric vehicles during nighttime off-peak hours, could provide the potential for a far more efficient use of this Nation's electric generating capacity, and that the present capacities of our electric generating plants could readily accommodate the introduction of a major electric vehicle fleet. A 1974 report to the National Research Council's Committee on Motor Vehicle Emissions, stated:

... if all driving in the United States were by electric cars—approximately 10^{12} miles per year—requiring about 0.4 kilowatt hours/mile, the nighttime average electric generating capacity required for charging would be about 150,000 megawatts. This is not much greater than the present nighttime excess generating capacity in the United States. Gradual introduction of electric vehicles should result in demands less than the excess capacity.

Despite these potential advantages, it was the OPEC oil embargo that greatly intensified the focus on electric and hybrid vehicles due to their potential as a major petroleum saving option. The OPEC embargo forcefully underscored the fact that the United States was dangerously dependent on foreign sources of petroleum. Since the lifting of the embargo, this dependence has continued to grow.

In 1950, the United States imported about 900,000 barrels of oil per day. By 1975, this amount had increased approximately 700 percent to 6.3 million barrels per day. Thus, the United States imports approximately 40 percent of its oil—more than 30 percent of it from the Middle East—and it has been projected that our dependence on foreign oil could reach as high as 50 percent as early as 1977.

In examining the causes of this dangerous dependence, the role of the transportation sector is clearly of crucial importance. The automobile is the single largest end user of petroleum. It accounts for nearly 40 percent of present petroleum consumption in the United States. This amounts to approximately 6.3 million barrels a day, which about equals the amount of oil we are presently importing from other countries.

To counteract our growing petroleum dependence and as part of our national energy program, the Congress passed the Energy Policy and Conservation Act of 1975 (Public Law 94-163). Title V of this legislation is directed toward reducing the impact of the transportation sector on this Nation's energy utilization by mandating improvements in the fuel economy of our domestic automotive transportation fleet. Even with these mandatory fuel efficiency improvements, however, our automotive fleet will continue to have a significant impact on our need for petroleum imports. Projected increases in population and car ownership, coupled with an expected continuing decline in domestic petroleum resources, strongly suggest that our automotive fleet will continue to place major demands on our national petroleum requirements. Therefore, limiting the extent of the dependence of our transportation fleet on petroleum fuels could make a major contribution to minimizing our dependence on foreign sources of energy.

2. *Fuel Substitutability.*—In this regard, electric vehicles appear to have advantages over internal combustion engines relying on synthetic fuels derived from our abundant coal resources. Dr. Paul S. Nelson, manager of the energy storage programs at the Argonne National Laboratory, for instance, has written:

The electric car has several advantages over synthetically fueled cars. The electric car would use 20 percent to 50 percent less fuel in the form of coal and result in less air pollution. The electric car would require less capital for expansion of industry and would need less Government subsidy than coal liquefaction plants which would require multi-billion-dollar support from the Government.

In fact, the electric vehicle which can utilize more abundant and virtually inexhaustible domestic supplies of energy including solar, hydro, coal, geothermal, nuclear, wind and tidal power to generate its electricity offers the potential of reducing our transportation fleets

petroleum dependence by hundreds of millions of barrels a year. Senate Commerce Committee hearings on electric and hybrid vehicle technology strongly suggest that rapid and forceful action by the Federal Government can help to insure that electric and hybrid vehicles can begin to have an impact on petroleum use not in the distant future, but in the next few years.

3. *Electric and Hybrid Applications.*—In the near term, the electric and hybrid vehicle is most likely to provide the public a transportation option in the so-called “second car” and short haul commercial market. This market, however, comprises a major part of the United States transportation fleet. It has been estimated that more than 28 percent of all households in the United States own two or more cars. More than 5 percent of such households own three or more cars. Almost 28 million cars on the road today fall within this second or third car category.

Surveys on the driving patterns of this Nation’s 118 million licensed drivers also suggests a potential important role for electric and hybrid vehicles. It has been determined that approximately 54 percent of all automotive trips in the United States are 5 miles or less, and 74 percent of these trips are for less than 10 miles. The second car is typically used for these types of extremely short trips, such as to a shopping center, a doctor’s office, or to bring children to and from school. Clearly, for such trips, it is unnecessary to have a car with enormous range and high speed performance. A 1974 study carried out by the General Research Corporation for the Environmental Protection Agency, on the potential for electric vehicle use in the Los Angeles region, underscores this point. It concluded:

Electric car range and performance can be adequate for substantial urban use. Even limited-range lead-acid battery cars could replace a million second cars in the Los Angeles area in 1980—17 percent of all area cars—with little sacrifice in typical driving patterns.

If adequate impetus is given to battery research, development, and improvement in electric and hybrid vehicle configurations, major improvements in the range and performance of electric and hybrid vehicles are possible in the near term. Dr. Paul A. Nelson of the Argonne National Laboratory, in a recent memorandum to Senator Moss noted:

Presently available batteries, such as lead acid, nickel/zinc or nickel/iron can be improved in the near future within the proposed terms of the Electric Vehicle Act to increase the range of present electric vehicles by a factor of two or three.

Dr. Nelson pointed out that such vehicles could have a range of up to 100 miles without recharging, and census surveys have estimated that less than 2 percent of all auto trips in the United States are more than 50 miles in length.

Testimony at Senate Commerce Committee hearings also indicated that advanced batteries such as lithium sulfur and sodium sulfur could develop sufficiently high performance and range to power vehicles 200 or more miles between recharges. Increases in the range of electric vehicles are also possible through improvements in vehicle

configurations, the use of regenerative braking and various hybrid systems. Thus, there is reason to believe that electric and hybrid vehicles could satisfy a significant part of this country's second car needs in the future.

Another major near term market for electric and hybrid vehicles is in the area of short-haul commercial technology such as post office delivery vehicles, milk trucks, buses, et cetera. The electric vehicle is particularly adapted to fixed route, moderate speed, stop and start configurations. Unlike gasoline powered vehicles, electric vehicles do utilize energy when they are stopped at a red light, stuck in traffic, or idling while deliveries are being made.

4. *Foreign Electric Vehicle Programs.*—Already in Great Britain, it is estimated that there are more than 130,000 electric vehicles being operated, 70,000 of which are utilized as milk delivery vans or for other short-haul commercial delivery purposes.

In order to take advantage of the potential of electric and hybrid vehicles, a number of foreign governments have begun vigorous programs to stimulate electric and hybrid vehicle development within their countries. A recent survey carried out for the Defense Department found that the United Kingdom, Japan, West Germany, the Union of Soviet Socialist Republics, France, Italy and Sweden all have undertaken significant programs to accelerate electric vehicle development. The Japanese Government, in particular, has had since 1971 a major electric vehicle program.

In analyzing these developments, the survey for the Defense Department concluded that foreign nations in the future will take the lead in electric vehicle manufacture:

By 1985 the Japanese and the United Kingdom will be the free world's largest producers and exporters of 1- to 10-ton electric vehicles.

Therefore, without an active Federal Government program, the United States may begin to slip behind foreign development in the area of electric and hybrid vehicle research and development.

5. *Summary.*—Reducing the amount of petroleum consumed by the U.S. motor vehicle fleet would limit the need to import corresponding quantities of petroleum, which, in turn, would reduce the flow of U.S. dollars overseas, and would allow a greater freedom of action in foreign policy.

The savings in foreign payments are quite significant. A study by Argonne National Laboratory has conservatively estimated that:

The development of economically competitive electric automobiles would reduce the demand for oil and, thus the need for oil imports. The introduction of electric cars by about 1985 and a gradual buildup to a total of 18,000,000 cars on the road by the year 2000 would result in a cumulative savings of petroleum of 1.3 billion barrels.

Even at today's price of \$13 per barrel of imported oil, such a reduction corresponds to a cumulative savings in foreign payments of \$16.9 billion.

The electric vehicle can provide the American public with an adaptable, quiet, nonpolluting vehicle, which is not dependent on

petroleum fuels. These vehicles can play an important role in this Nation's energy conservation programs, while continuing to provide much of the flexibility and freedom that the public has come to expect of its personal transportation systems.

MEETING THE NEED

The Federal Government will have to carry out a significant program of research, development, and demonstration of electric and hybrid vehicles, if these vehicles are rapidly to become a meaningful option to assist in counteracting this Nation's dependency on foreign sources of petroleum. Despite the fact that a large number of private companies have demonstrated a significant interest in the development of electric and hybrid vehicle technologies—several companies are already actively selling such vehicles—it is generally agreed that without Federal assistance and incentives, the rate of introduction of such vehicles into our transportation fleet will be slow. The high cost and risk of rapidly bringing out new transportation technology, the enormous present investment by the major automobile manufacturers in the internal combustion engine configuration, and the reluctance of the public to utilize new technology until its reliability is fully demonstrated, all stand in the way of accelerated electric and hybrid vehicle development. Access to capital markets to maintain significant research and development programs also continues to present difficulties in an area which is still considered speculative.

1. *Research and Development Program*

During the hearings on S. 1632, the Electric and Hybrid Vehicle Research, Development, and Demonstrations Act. There was considerable support for an accelerated Federal electric and hybrid vehicle research and development program. General Motors in a written submission, stated :

Electrode processes, electrode catalysis, development of better battery material, and improved cell durability are areas which now represent critical bottlenecks in the industry's efforts on battery-powered cars. Government support of research in these areas will supplement rather than duplicate the efforts of industry and thus make real contributions to progress.

If electric and hybrid vehicle research and development is to be accelerated to a point where these vehicles will make a near-term contribution to the Nation's energy conservation effort, the Federal Government will have to supplement the present expenditures of private industry.

A recent study by ERDA, for example, estimated that in 1975 industry expended in the United States about \$7.5 million on electric vehicles research and development.

In testimony before the Commerce Committee, Mr. Austin Heller, the Assistant Administrator for Conservation of the Energy Research

and Development Administration, when asked whether the research and development funding levels in S. 1632, the Electric and Hybrid Vehicle Research, Development, and Demonstration Act, were adequate, responded that in a 5-year program ERDA could spend up to \$150 million for battery development." ERDA, in a later, more detailed submission to the committee provided an outline of what a comprehensive Federal research and development program would entail:

The battery is the primary component on which to focus R. & D. efforts. It is generally agreed that strong Federal support is needed. However, improvements in any single component of vehicles, such as the battery, cannot alone assure the development of a successful vehicle. * * * The electric vehicle should be treated as a total system. Significant gains can be made in range and performance with existing batteries through vehicle design and optimization of the electrical and mechanical subsystems for electric propulsion use. A comprehensive research and development program would provide for battery development, mechanical and structural systems, electrical components and controls, recharging systems, auxiliary systems, thermal storage, heat engine and mechanical systems for hybrids, vehicle design studies, functional and economic analysis, technology implementation studies and impact assessments.

2. The Demonstration Program

An electric and hybrid vehicle demonstration program administered by the Federal Government could also accelerate the development and acceptance of such vehicle technologies by the general public. Such a program would have at least four major benefits. First, baseline data would be developed on electric and hybrid vehicle performance characteristics. In Senate Commerce Committee hearings, it was clearly stated that it was necessary to develop such data in order to reasonably measure the progress of this technology. Second, public awareness of the characteristics and utility of electric and hybrid vehicles would be significantly increased, and public reaction to such vehicles could be gauged in various transportation, geographical, and climatological circumstances. Third, the activity of private industry in the electric and hybrid vehicle area would be stimulated. Fourth, a demonstration would serve to identify institutional and other barriers that might limit the introduction of such vehicles efficiently into our present transportation fleet.

In the hearings on S. 1632 and H.R. 8800, ERDA testified that the demonstration aspects of the bill as introduced were overly rigid and inflexible. In order to provide flexibility to ERDA in the administration of this demonstration program a number of modifications to S. 1632 were adopted by the Commerce Committee.

The time for the demonstration program, for example, has been lengthened in order to provide a better opportunity to utilize the best available technology and to evaluate and respond to the data as it is developed.

In the first stage of the demonstration program, the Administrator of ERDA is to, within 12 months of enactment, develop baseline data on the present state of the art of electric and hybrid vehicles. In the Commerce Committee hearings on this legislation, it was clearly stated that there is still much confusion concerning the performance characteristics of present electric and hybrid vehicles, and it is necessary to develop baseline data in order to reasonably measure the progress of this technology in the future. In order to develop this baseline data, the Administrator of ERDA is given a great deal of flexibility. The Administrator may develop this data by purchasing or leasing a reasonable number of electric and hybrid vehicles or entering into "such other arrangements as the Administrator deems necessary to carry out the purposes" of the baseline study.

The period of time for the second stage of the demonstration program also has been extended. Completion of this stage is lengthened from the 15 months provided in the House legislation and the 18 months provided in the original version of S. 1632 to up to 24 months. The Administrator also is given greater flexibility as to the number of vehicles to be purchased or leased under the act. In the second stage, the Administrator is directed to purchase or lease "at least 2,500 electric or hybrid vehicles (or such other numbers as as Administrator determines is appropriate for the adequate demonstration of such vehicles)." (Emphasis added.) The Administrator is directed to the extent practicable to utilize a number of different state of the art technologies, to develop geographic and climatological data, and to obtain adequate consumer reaction to the performance of such vehicles. Purchase or lease of at least 2,500 vehicles in the Committee's opinion, would allow for demonstration of a number of state of the art vehicles from various manufacturers and data to estimate how these vehicles are likely to perform in various transportation circumstances. If the ERDA Administrator, however, determines that a lesser or greater number of vehicles should be utilized for this stage of the demonstration the bill provides for such flexibility.

The third stage of the demonstration program requires that performance standards for advanced electric and hybrid vehicles be promulgated within 54 months of enactment of S. 1632, and that the ERDA administrator shall contract to purchase or lease "at least 5,000 advanced electric or hybrid vehicles (or such other number as the Administrator determines is appropriate for the adequate demonstration of such vehicles)" which satisfy such performance standards, within five years from the date of enactment of S. 1632. In S. 1632 "advanced electric or hybrid vehicle" is defined to mean a vehicle which represents a "substantial improvement over existing electric and hybrid vehicles" with respect to their performance and other specified characteristics. Therefore, in the event there are no such vehicles which satisfy these performance standards within the five-year period, the Administrator is directed to contract for such vehicles "as soon as it is practicable, except that no such contracts shall be

entered into 7 years after the date of enactment" of this legislation. The time periods for the third stage of the demonstration program have been lengthened from the 42 months provided for this phase in H.R. 8800 and the three years that had been designated for this purpose in the original version of S. 1632. The Administrator again is given maximum flexibility to carry out this stage of the demonstration. The Administrator is allowed leeway to decide the proper number of vehicles which should be demonstrated and is not required to buy any vehicle unless it is a substantial improvement over the present state of the art.

In carrying out the demonstration program, the Administrator of ERDA is directed, to the extent practicable, to contract for vehicles which represent a cross-section of the applicable available technologies and types of uses for such vehicles. Furthermore, the Administrator is directed to assure that the individuals and businesses involved in the demonstration shall be selected by an equitable process which assures that the Administrator will receive accurate and adequate data on vehicle performance including representative geographic and climatological information and data on user reaction to the utilization of such vehicles. The Administrator, if he determines that it is necessary for the development of such data, may emphasize fleet applications, where centralized maintenance and monitoring of such vehicles can be undertaken, or other applications, which the Administrator determines will provide the best and most accurate data on the performance of such vehicles. The hearings in the Commerce Committee suggest that the time periods allocated for the demonstration program in S. 1632 will provide adequate time for improvement in electric and hybrid technology and for demonstration of meaningful improvements in electric and hybrid vehicles.

3. *Funding*

In funding the research, development, and demonstration programs, ERDA is authorized \$160 million. Sixty million dollars of this authorization is designated for loan guarantees. The \$60 million will have to be expended by ERDA only if there is a default on loans that have been guaranteed by the Federal Government. Generally default rates for such loans have been low. Furthermore, no loan shall be guaranteed by the Administrator of ERDA unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant.

4. *Lead Agency*

ERDA, which is presently carrying out the primary electric and hybrid vehicle work within the Federal government will be the lead agency for the total research, development and demonstration program mandated in S. 1632.

DESCRIPTION

S. 1632 establishes an accelerated research and development program focused on electric and hybrid vehicles. The legislation also mandates a three-stage electric and hybrid vehicle demonstration program. The total program will be under the direction of the Energy Research and Development Administration.

1. Electric and hybrid vehicle research and development program

With enactment of S. 1632, an electric and hybrid vehicle research development and demonstration program will be established as an organizational entity within ERDA. This program would focus on basic and applied research on electric and hybrid vehicle batteries, controls, and motors. ERDA also will focus on optimizing overall electric and hybrid vehicle design.

2. Three-stage demonstration program

Stage one: Within 12 months of enactment of S. 1632, the Administrator of ERDA is directed to develop comprehensive baseline data on the state of the art of present electric and hybrid vehicles. To develop such data, the Administrator may purchase or lease a reasonable number of electric and hybrid vehicles or enter into such other arrangements as the Administrator deems necessary to develop this baseline data.

Stage two: Within 18 months of enactment of S. 1632 and by utilizing the above data and other information available to the Administrator of ERDA, performance standards shall be developed for present state of the art electric and hybrid vehicles. Within an additional 6 months, the Administrator of ERDA is directed to purchase or lease at least 2,500 electric and hybrid vehicles (or such other number as the Administrator determines is appropriate for the adequate demonstration of such vehicles), which satisfies the above performance standards in order to demonstrate the present state of the art of such vehicles. Comprehensive data will be collected on the performance of such vehicles, including representative geographical and climatological information and data on user reaction to the utilization of electric and hybrid vehicles.

Stage three: Within 54 months of enactment, performance standards for advanced electric and hybrid vehicles will be promulgated for the final purchase and demonstration under this act. Any vehicle so purchased or leased must represent a substantial improvement over current electric and hybrid vehicle technology. Within an additional 6 months, the Administrator is directed to contract for the purchase or lease of at least 5,000 advanced electric or hybrid vehicles (or such other numbers as the Administrator determines is appropriate for the adequate demonstration of such vehicles which satisfies such performance standards. If at that time, vehicles satisfying these performance standards are not available, the Administrator is directed to contract for such vehicles as soon as it is practicable, but not later than an additional 24 months.

3. Protection of small business

In contracting under this act, the Administrator of ERDA is directed to take steps to assure that small business concerns have realistic and adequate opportunities to participate in the research, development, and demonstration programs mandated under this act. In carrying out these purposes, the Administrator is directed to reserve for contracts with small business concerns a reasonable proportion of the funds made available pursuant to this act. In addition, the Administrator is directed to include in all contracts for research, develop-

ment, and demonstration of electric or hybrid vehicles, such terms, conditions, and payment schedules as may assist in meeting the needs of small business concerns, and shall make planning grants available to qualified small business concerns which require assistance in developing, submitting, and entering into such contracts.

4. *Patents*

The patent section is essentially identical to that in the Federal Non-Nuclear Energy Research and Development Act of 1974, except for the addition of mandatory licensing of background necessary to implement the technology developed under this act.

5. *Studies*

Within 1 year after the date of enactment of S. 1632, the Administrator of ERDA shall conduct a study to determine the existence of any tax, regulatory traffic, urban design, rural electrical, and other institutional factors which tend or may tend to bias surface transportation systems toward vehicles' of particular characteristics, and shall report the results of such study to the Congress.

The Administrator shall also perform, or cause to be performed, studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technologies.

The Administrator shall also conduct a continuing assessment of the long range materials demands and pollution factors which may result from or in connection with the electrification of urban traffic. He shall include a statement of his current findings in regard to such matters in each report submitted to the Congress on the progress of S. 1632.

Within 1 year after enactment of S. 1632, the Secretary of Transportation shall conduct a study on the current and future applicability of safety standards and regulations to electric and hybrid vehicles, and shall report the results of such study to the Congress.

6. *Authorization for appropriations*

\$160 million is authorized for the research, development, and demonstration activities to be carried out under this act. Up to \$60 million of this authorization can be utilized for loan guarantees. No loan shall be guaranteed by the Administrator of ERDA under S. 1632, unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant.

LEGISLATIVE BACKGROUND

S. 1632 was introduced on May 5 (legislative day April 21), 1975, by Senator Moss with the cosponsorship of Senator Humphrey. S. 1632 was counterpart legislation to H.R. 5470, which later was modified to become H.R. 8800, which passed the House 308-60 on September 5, 1975. Hearings were held by the Senate Commerce Committee on S. 1632 on October 7 and 10, 1975. S. 1632 was considered by the Senate Commerce Committee in executive session on April 29, and favorably reported with an amendment in the nature of a substitute on May 4, 1976.

SECTION-BY-SECTION ANALYSIS

SECTION 1. SHORT TITLE

The short title of the bill is the "Electric and Hybrid Vehicle Research Development, and Demonstration Act of 1976".

SECTION 2. DECLARATION OF POLICY

Subsection (a) sets forth congressional findings and declarations. The subsection specifies that petroleum usage must be reduced; that our dependence on foreign supplies is growing, and that the expeditious introduction of electric and hybrid motor vehicles could reduce petroleum usage and dependence on foreign supplies due to the fact that transportation is the largest single user of petroleum.

The introduction of electric and hybrid vehicles is practical and advantageous as such vehicles could replace vehicles currently in use for short haul and certain rural and agricultural applications. Electric and hybrid vehicles are becoming more reliable and practical due to technical advances. Energy conservation is served by electric vehicles in that they use little or no energy while idling and their power requirements could be satisfied during offpeak hours.

Electric and hybrid vehicles do not emit significant pollutants and stationary sources of pollutants emitted by electrical generating plants are potentially easier to control than present automotive pollution.

Finally, this subsection states that the introduction of electric and hybrid vehicles will be facilitated by a Federal program of research, development, and demonstration.

Subsection (b) states that the purpose of the act is to encourage and support research and development of such vehicles to demonstrate their practicability, and to facilitate and remove barriers to the use of such vehicles.

SECTION 3. DEFINITIONS

This section sets forth definitions used throughout the act. An electric vehicle is defined to be a vehicle which is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include a nonelectrical source of power designed to charge batteries and their components. Hybrid vehicle is defined to be a vehicle propelled by a combination of an electric motor and an internal combustion engine or other power source and their components.

Of particular interest is the definition of an "advanced electric or hybrid vehicle" which forms the basis for the largest contracts for purchase or lease under the demonstration provisions of section 7(c). Thus, the definition delineates the goal of this legislation in terms of advanced electric or hybrid vehicles.

An advanced electric or hybrid vehicle is one which minimizes the total amount of energy to be consumed with respect to its fabrication, operation and disposal. Such vehicles also must represent a "substantial improvement over existing electric and hybrid vehicles". Such vehicles must also be able to be mass produced and operated in a manner which is sufficiently competitive to enable such vehicles to be produced and sold in numbers representing a reasonable portion of the

market. This would entail improvements in range and speed and would probably comprise improvements in the rate of recharging and other matters which would make electric and hybrid vehicles more competitive with internal combustion engine vehicles. It must be capable of being mass produced and operated at a cost which is sufficiently competitive to enable it to be produced and sold in numbers representing a "reasonable portion of the automobile market". The vehicle must be safe, damage resistant, easy to repair, durable, and to operate with sufficient performance. At a minimum, it must be produced, distributed, operated and disposed of in compliance with any applicable requirements of Federal law.

SECTION 4. ELECTRIC AND HYBRID VEHICLE PROGRAM

Subsection (a) requires the Administrator to promptly establish the electric and hybrid vehicle research, development and demonstration program within the Energy Research and Development Administration.

Subsection (b) places the management of the project with the Administrator, who may enter into arrangements and agreements with the National Aeronautics and Space Administration and other Federal agencies as are necessary or appropriate for the conduct by them of parts or aspects of the project which are within their particular competence.

Subsection (b) also amends the National Aeronautics and Space Act of 1958 to require that the unique competence of NASA be directed towards ground propulsion systems research and development. The provision is included in this bill in order to ensure that existing programs of ground propulsion research and development within NASA will continue to be able to be authorized. The provision is not intended to increase NASA's mandate in this area, nor is it intended that NASA duplicate programs established in ERDA under this authority or other agencies activities in the ground propulsion area mandated in other legislation.

Subsection (b) also adds an additional subsection to section 203 of the National Aeronautics and Space Act to authorize NASA to enter into arrangements and agreements with ERDA under the direct authority of sections 4 through 8 of this legislation.

Subsection (c) establishes the responsibilities of the ERDA Administrator in carrying out the programs described in this section. Included are responsibilities to promote research, determine optimum vehicle design, conduct demonstrations of vehicle feasibility, ascertain consumer needs and desires, and ascertain what long-term changes in road design, urban planning, and other institutional factors are needed to facilitate electric and hybrid vehicle development. The results of such activities are to be reported in accordance with sections 11 and 12 of this bill.

SECTION 5. COORDINATION BETWEEN THE ADMINISTRATOR AND OTHER AGENCIES

This section establishes the relationship between ERDA and other Federal agencies, specifically the Department of Transportation, in carrying out the program.

Subsection (a) states that while overall management responsibility resides with the ERDA Administrator, the Administrator is to consult and coordinate to the maximum extent practicable with the Secretary of Transportation with respect to the Administrator's functions under this act which relate to the Secretary's regulatory and other responsibilities. Furthermore, the Administrator may utilize the Department of Transportation or other Federal agencies to the extent that such agency or agencies have capabilities which would contribute to the attainment of the purposes of the Act.

Subsection (b) authorizes the Administrator to obtain the assistance of any other department, agency, or instrumentality of the Executive Branch upon written request on a reimbursable basis and with the consent of the other department, agency, or instrumentality in order to carry out his duties under this act.

SECTION 6. DEMONSTRATION

This section mandates a demonstration program which is designed to demonstrate not only that technical feasibility and commercial applications of existing electric and hybrid vehicle technology but also would provide for demonstration of advanced technology which is to be developed under this Act.

Subsection (a) requires the Administrator to develop baseline data characterizing the state of the art with respect to present electric and hybrid vehicle technology. The data is to serve as baseline data in order to evaluate improvements in electric and hybrid vehicle technology, to establish performance standards which form the basis for the demonstration contracts and to otherwise assist in carrying out the purposes of this section. The ERDA Administrator is authorized to purchase or lease a reasonable number of such vehicles or enter into such other arrangements as the Administrator deems necessary to establish the baseline data.

Subsection (b) requires the Administrator to promulgate rules establishing performance standards. The performance standards will form the basis for judging whether or not vehicles should be contracted for under subsection (c). Consequently, the performance standards will be developed 6 months prior to the first contract for the purchase or lease of vehicles under subsection (c). The first performance standards are to be promulgated for state of the art electric and hybrid vehicles within 18 months after the date of enactment. In addition, these performance standards are to be revised and amended not later than 6 months prior to the effective date of the requirement for the second contract for purchase or lease of vehicles, also under subsection (c). The second set of performance standards will be for "advanced electric or hybrid vehicles" as defined in section 3 of the act.

Separate performance standards are to be established with respect to personal use vehicles and commercial vehicles. The performance standards are to represent the minimum level of performance for vehicles contracted for and are to be set at those levels which the Administrator determines are necessary to promote the acquisition and use of such vehicles for transportation purposes within the capability of electric and hybrid vehicles.

Subsection (c) establishes the program for contracts entered into by the Administrator for the purchase or lease of electric or hybrid vehicles.

The first contract requirements will be effective 6 months after the date of the initial performance standards specified under subsection (b). The contract shall provide for the purchase or lease of at least 2,500 electric or hybrid vehicles which satisfy the performance standards promulgated pursuant to subsection (b). Importantly, provision is made so that the Administrator may choose a different number of vehicles to be contracted for. That number is to be set at that level which the Administrator determines is appropriate for the adequate demonstration of such vehicles. That number could be greater than or less than 2,500 vehicles, as the Administrator so determines. In order to provide the broadest practicable demonstration of technologies, the provision also requires that "to the extent practicable, such contracts should represent a cross-section of the available technologies and types of uses for such vehicles." The Administrator, if he determines that it is necessary for the development of such data, may emphasize fleet applications, where centralized maintenance and monitoring can be undertaken, or other applications, which the Administrator determines will provide the best and most accurate information on the performance of such vehicles.

The second requirement with respect to contracts for the purchase or lease of advanced vehicles occurs within 5 years after the date of enactment of the act. The purpose of this second "buy" is to provide an incentive for the development of advanced electric or hybrid vehicles by providing an assured market for them. The provision calls for the purchase or lease of at least 5,000 advanced electric or hybrid vehicles, although, as is the case with the initial purchase or lease, the Administrator may select such other number as he determines is appropriate to adequately demonstrate such vehicles.

Vehicles purchased or leased under this provision must satisfy the standards for performance established under subsection (b) for advanced electric and hybrid vehicles. As the advanced electric or hybrid vehicles purchased or leased under this section must represent substantial advances over existing vehicles, provision is made for an extension of the 5-year contract period to not more than 7 years after the date of enactment of this act. This is to allow time for such vehicles to comply with the performance standards for advanced electric or hybrid vehicles if they are not able to conform to such standards at the expiration of the 5-year period.

Subsection (d) specifies the manner in which vehicles contracted for under subsection (c) are to be made available for the demonstration program. The provision states that the vehicles shall be made available to Federal, State, and local agencies, and for individual or business use. The individuals and businesses involved shall be selected by an equitable process which will assure the receipt of accurate and adequate data with respect to the demonstration. A representative mix of geographical and climatological conditions is to be selected. The Administrator is also authorized to pay operating costs only to the extent necessary to assure the adequate demonstration of the vehicles.

If the Administrator determines that it would facilitate the demonstration program's receipt of reliable data on maintenance and other characteristics of electric and hybrid vehicles, the Administrator may place special emphasis on fleet or other special applications of electric and hybrid vehicles in furtherance of the demonstration program.

Subsection (d) also provides for demonstration maintenance projects and training with respect to electric and hybrid vehicle maintenance.

Finally, subsection (d) provides for the dissemination of data on electric and hybrid vehicle safety and operating characteristics to various agencies and groups and to the public.

SECTION 7. CONTRACTS

Subsection (a) requires the Administrator to provide funds by contract for research, development, and demonstration necessary to carry out the purposes of the act as specified in section 4. The contracts may be made with Federal agencies, laboratories, universities, nonprofit organizations, industrial organizations, public or private agencies, institutions, organizations, corporations, partnerships, or individuals.

Subsection (b) requires the Administrator to consult with DOT, the Environmental Protection Agency, the Federal Energy Administration, NASA, and other appropriate Federal agencies, and to establish procedures for periodic consultation with representatives of science, industry, and other relevant groups and individuals.

Subsection (c) gives the Administrator rulemaking authority with respect to the issuance of contracts and specifies that each application for funding shall be made in accordance with the Administrator's requirements.

Subsection (d) requires the Administrator to take steps necessary to assure that small business concerns have a realistic and adequate opportunity to participate in programs under the act. In addition the Administrator is to reserve a reasonable portion of the funds made available for contracts for small business concerns. The provision also directs the Administrator to make provision in contracts in order to meet the needs of small business concerns and to avoid contract provisions which would tend to prevent such concerns from participating under the act. Planning grants are also authorized for small business concerns for the purpose of assisting them in contracting with the Administrator.

SECTION 8. OBLIGATION GUARANTEES

This section establishes a procedure for guaranteeing obligations of persons participating in programs under the act.

Subsection (a) establishes the general provisions with respect to loan guarantees by stating that it is the policy of the Congress to assist in the commercial development of electric and hybrid vehicles and to assure that qualified small business and other qualified borrowers are not excluded from participation due to a lack of adequate capital. The Administrator is authorized to guarantee, and make commitments to guarantee, the interest and principal of loans and other

obligations for those projects involving research or development of electric or hybrid vehicles.

Applications are to be made in writing to the Administrator in accordance with the Administrator's requirements and in order to reasonably protect the interests of the United States. Terms and conditions shall be established pursuant to regulations of the Administrator. Modifications may be made to the provisions of a guarantee if the Administrator finds that the modification is equitable, not prejudicial to the interest of the United States, and has been consented to by the holder of the obligation. Guarantees may be made broadly to a variety of agencies, institutions, and individuals. In addition, all guarantees issued by the Administrator shall constitute general obligations of the United States backed by the full faith and credit of the United States.

SECTION 9. 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, and the Senate-passed National Fuels and Energy Conservation Act of 1973.

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 rights 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, paid-up 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 given under this title under very narrowly defined circumstances. To summarize, 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 non-exclusive 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 10. USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES

The Postmaster General of the U.S. Postal Service, the Administrator of General Services Administration, the Secretary of Defense, and the heads of all other agencies shall carry out a survey of the applicability of electric and hybrid vehicles for their agencies and shall



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 authorize in the Energy Research and Development Administration a Federal program of research, development, and demonstration designed to promote electric vehicle technologies and to demonstrate the commercial feasibility of electric vehicles.

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 "Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976."

SEC. 2. FINDINGS AND POLICY.

(a) The Congress finds and declares that—

(1) the Nation's dependence on foreign sources of petroleum must be reduced, as such dependence jeopardizes national security, inhibits foreign policy, and undermines economic well-being;

(2) the Nation's balance of payments is threatened by the need to import oil for the production of liquid fuel for gasoline-powered vehicles;

(3) the single largest use of petroleum supplies is in the field of transportation, for gasoline- and diesel-powered motor vehicles;

(4) the expeditious introduction of electric and hybrid vehicles into the Nation's transportation fleet would substantially reduce such use and dependence;

(5) such introduction is practicable and would be advantageous because—

(A) most urban driving consists of short trips, which are within the capability of electric and hybrid vehicles;

(B) much rural and agricultural driving of automobiles, tractors, and trucks is within the capability of such vehicles;

(C) electric and hybrid vehicles are more reliable and practical now than in the past because propulsion, control, and battery technologies have improved, and further significant improvements in such technologies are possible in the near term;

(D) electric and hybrid vehicles use little or no energy when stopped in traffic, in contrast to conventional automobiles and trucks;

(E) the power requirements of such vehicles could be satisfied by charging them during off-peak periods when existing electric generating plants are underutilized, thereby permitting more efficient use of existing generating capacity;

(F) such vehicles do not emit any significant pollutants or noise; and

(G) it is environmentally desirable for transportation systems to be powered from central sources, because pollutants emitted from stationary sources (such as electric generating plants) are potentially easier to control than pollutants emitted from moving vehicles; and

(6) the introduction of electric and hybrid vehicles would be facilitated by the establishment of a Federal program of research,



development, and demonstration to explore electric and hybrid vehicle technologies.

(b) It is therefore declared to be the policy of the Congress in this Act to—

(1) encourage and support accelerated research into, and development of, electric and hybrid vehicle technologies;

(2) demonstrate the economic and technological practicability of electric and hybrid vehicles for personal and commercial use in urban areas and for agricultural and personal use in rural areas;

(3) facilitate, and remove barriers to, the use of electric and hybrid vehicles in lieu of gasoline- and diesel-powered motor vehicles, where practicable; and

(4) promote the substitution of electric and hybrid vehicles for many gasoline- and diesel-powered vehicles currently used in routine short-haul, low-load applications, where such substitution would be beneficial.

SEC. 3. DEFINITIONS.

As used in this Act, the term—

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

(2) "advanced electric or hybrid vehicle" means a vehicle which—

(A) minimizes the total amount of energy to be consumed with respect to its fabrication, operation, and disposal, and represents a substantial improvement over existing electric and hybrid vehicles with respect to the total amount of energy so consumed;

(B) is capable of being mass-produced and operated at a cost and in a manner which is sufficiently competitive to enable it to be produced and sold in numbers representing a reasonable portion of the market;

(C) is safe, damage-resistant, easy to repair, durable, and operates with sufficient performance with respect to acceleration, cold-weather starting, cruising speed, and other performance factors; and

(D) at a minimum, can be produced, distributed, operated, and disposed of in compliance with any applicable requirement of Federal law;

(3) "commercial electric or hybrid vehicle" includes any electric or hybrid vehicle which can be used (A) for business or agricultural production purposes on farms (e.g. tractors and trucks) or in rural areas, or (B) for commercial purposes in urban areas;

(4) "electric vehicle" means a vehicle which is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include a nonelectrical source of power designed to charge batteries and components thereof;

(5) "hybrid vehicle" means a vehicle propelled by a combination of an electric motor and an internal combustion engine or other power source and components thereof;

(6) "project" means the Electric and Hybrid Vehicle Research, Development, and Demonstration Project established under section 4(a);

H. R. 8800—3

- (7) "Secretary" means the Secretary of Transportation; and
- (8) "small business concern" shall have the meaning prescribed by the Administrator after consultation with the Small Business Administration.

SEC. 4. DUTIES OF THE ADMINISTRATOR.

(a) The Administrator shall promptly establish, as an organizational entity within the Energy Research and Development Administration, the Electric and Hybrid Vehicle Research, Development, and Demonstration Project.

(b) The Administrator shall have the responsibility for the overall management of the project. The Administrator may enter into any agreement or other arrangement with the National Aeronautics and Space Administration, the Department of Transportation, the National Science Foundation, the Environmental Protection Agency, the Department of Housing and Urban Development, the Department of Agriculture, or any other Federal agency, pursuant to which such agency shall conduct such specified parts or aspects of the project as the Administrator deems necessary or appropriate and within the particular competence of such agency, to the extent that such agency has capabilities which would enable it to contribute to the success of the project and the attainment of the purposes of this Act.

(c) In providing for the effective management of this project, the Administrator shall have specific responsibility to—

(1) promote basic and applied research on electric and hybrid vehicle batteries, controls, and motors;

(2) determine optimum overall electric and hybrid vehicle design;

(3) conduct demonstration projects with respect to the feasibility of commercial electric and hybrid vehicles (A) by ~~contracting~~ the purchase or lease of electric and hybrid vehicles for practical use, and (B) by entering into arrangements, with other governmental entities and with nongovernmental entities, for the operation of such vehicles;

(4) ascertain consumer needs and desires so as to match the design of electric and hybrid vehicles to their potential market; and

(5) ascertain the long-term changes in road design, urban planning, traffic management, maintenance facilities, utility rate structures, and tax policies which are needed to facilitate the manufacture and use of electric and hybrid vehicles in accordance with sections 13 and 14.

SEC. 5. COORDINATION BETWEEN THE ADMINISTRATOR AND OTHER AGENCIES.

(a) In carrying out the project established under section 4, the Administrator shall, to the maximum extent practicable, consult and coordinate with the Secretary, with respect to any functions of the Administrator under this Act which relate to regulatory activities or other responsibilities of the Secretary, including safety and damageability programs.

(b) Each department, agency, and instrumentality of the executive branch of the Federal Government shall carefully consider any written request from the Administrator, or the head of any agency to which the Administrator has delegated responsibility for specified parts or aspects of the project, to furnish such assistance, on a reimbursable basis, as the Administrator or such head deems necessary to

carry out the project and to achieve the purposes of this Act. Such assistance may include transfer of personnel with their consent and without prejudice to their position and rating.

SEC. 6. RESEARCH AND DEVELOPMENT.

The Administrator, acting through appropriate agencies and contractors, shall initiate and provide for the conduct of research and development in areas related to electric and hybrid vehicles, including—

- (1) energy storage technology, including batteries and their potential for convenient recharging;
- (2) vehicle control systems and overall design for energy conservation, including the use of regenerative braking;
- (3) urban design and traffic management to promote maximum transportation-related energy conservation and minimum transportation-related degradation of the environment; and
- (4) vehicle design which emphasizes durability, length of practical lifetime, ease of repair, and interchangeability and replaceability of parts.

SEC. 7. DEMONSTRATIONS.

(a) Within 12 months after the date of enactment of this Act, the Administrator shall develop data characterizing the present state-of-the-art with respect to electric and hybrid vehicles. The data so developed shall serve as baseline data to be utilized in order (1) to compare improvements in electric and hybrid vehicle technologies; (2) to assist in establishing the performance standards under subsection (b) (1); and (3) to otherwise assist in carrying out the purposes of this section. In developing any such data, the Administrator shall purchase or lease a reasonable number of such vehicles or enter into such other arrangements as the Administrator deems necessary to carry out the subsection.

(b) (1) Within 15 months after the date of enactment of this Act, the Administrator shall promulgate rules establishing performance standards for electric and hybrid vehicles to be purchased or leased pursuant to subsection (c) (1). The standards so developed shall take into account the factors of energy conservation, urban traffic characteristics, patterns of use for "second" vehicles, consumer preferences, maintenance needs, battery recharging characteristics, agricultural requirements, materials demand and their ability to be recycled, vehicle safety and insurability, cost, and other relevant considerations, as such factors and considerations particularly apply to or affect vehicles with electric or hybrid propulsion systems. Such standards are to be developed taking into account (A) the best current state-of-the-art, and (B) reasonable estimates as to the future state-of-the-art, based on projections of results from the research and development conducted under section 6. In developing such standards, the Administrator shall consult with appropriate experts concerning design needs for electric and hybrid vehicles which are compatible with long-range urban planning, traffic management, and vehicle safety.

(2) Separate performance standards shall be established under paragraph (1) with respect to (A) electric or hybrid vehicles for personal use, and (B) commercial electric or hybrid vehicles. Such performance standards shall represent the minimum level of performance which is required with respect to any vehicles purchased or leased pursuant to subsection (c). Initial performance standards under paragraph (b) (1) shall be set at such levels as the Administrator determines are neces-

sary to promote the acquisition and use of such vehicles for transportation purposes which are within the capability (as determined by the Administrator) of electric and hybrid vehicles.

(3) Such performance standards shall be revised, by rule, periodically as the state-of-the-art improves, except that rules promulgated under paragraph (1) shall be amended not later than 6 months prior to the date for contracts specified in subsection (c) (2).

(4) Before entering into contracts for the production of vehicles under subsection (c) (2), the Administrator shall transmit to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, the performance standards developed under paragraph (1), as revised and currently in effect.

(c) (1) The Administrator shall, within 6 months after the date of promulgation of performance standards pursuant to subsection (b) (1), contract for the purchase or lease of 2,500 electric or hybrid vehicles which satisfy the performance standards set forth under subsection (b) (1). The delivery of such vehicles shall be completed within 39 months after the date of enactment of this Act. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 2,500 of the electric or hybrid vehicles which satisfy performance standards under subsection (b) (1) will be available within such delivery period, the Administrator shall (A) immediately forward this information along with a detailed justification of such determination to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, and (B) contract for the purchase or lease of the maximum number of such vehicles (up to 2,500) that will be available within such delivery period. To the extent practicable, vehicles purchased or leased under such contracts shall represent a cross-section of the available technologies and types of uses of such vehicles.

(2) (A) The Administrator shall, within 6 months after the required amendment of such standards pursuant to subsection (b) (3), and not later than 54 months after the date of enactment of this Act, contract for the purchase or lease of 5,000 advanced electric or hybrid vehicles, which satisfy such amended standards. The final delivery of such vehicles shall be completed within 72 months after the date of enactment of this Act. If the Administrator determines, on the basis of responses to the solicitation for proposals for such contracts, that less than 5,000 of the electric and hybrid vehicles which satisfy performance standards set forth under subsection (b) (3) will be available within the delivery period (including any extension under subparagraph (B)), the Administrator shall (i) immediately forward this information along with a detailed justification of such determination to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate, and (ii) contract for the purchase or lease of the maximum number of such vehicles (up to 5,000) that will be available during such delivery period. To the extent practicable, vehicles purchased or leased under such contracts shall represent a cross-section of the available technologies and types of uses of such vehicles.

(B) The Administrator shall extend the delivery period for such vehicles for a period not to exceed 6 additional months, if he finds that such an extension in delivery date would result in the deliv-

ery of advanced electric and hybrid vehicles which would add to the total number of vehicles to be purchased or leased (up to 5,000) and which would not otherwise be available. If the Administrator finds that such an extension is appropriate and necessary for the delivery of such vehicles, he shall so notify the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate.

(d) The Administrator, in supervising the demonstration of vehicles acquired under subsection (c), shall make such arrangements as may be necessary or appropriate—

(1) (A) to make such vehicles available to Federal agencies and to State or local governments and other persons for individual or business use (including farms). The individuals and businesses involved shall be selected by an equitable process which assures that the Administrator will receive accurate and adequate data on vehicle performance, including representative geographical and climatological information and data on user reaction to the utilization of electric and hybrid vehicles. Such individuals and businesses shall be given the option of purchasing or leasing such vehicles under terms and conditions which will promote their widespread use;

(B) to pay the differential operating costs of such vehicles to the extent necessary to assure the adequate demonstration of such vehicles;

(2) for demonstration maintenance projects, including maintenance organization and equipment needs and model training projects for maintenance procedures; and

(3) for the dissemination of data on electric and hybrid vehicle safety and operating characteristics (including nontechnical descriptive data which shall be made available by the Government Printing Office) (A) to Federal, State, and local consumer affairs agencies and groups; (B) to Federal, State, and local agricultural and rural agencies and groups; and (C) to the public.

(e) (1) At least 60 days prior to entering into any contract for the purchase or lease of any electric or hybrid vehicle under subsection (c) (1) or any advanced electric or hybrid vehicle under subsection (c) (2), the Administrator shall determine (A) if the purchase or lease of the number of such vehicles specified in such subsection (c) (1) or (c) (2) will, with high probability, displace the normal level of private procurement of such vehicles which would conform to the applicable performance standards promulgated pursuant to subsection (b) and which would be used in the United States, and (B) if such displacement will occur, the necessary extent of such displacement in order to carry out the purposes of this Act. At the time any such determination is made, the Administrator shall transmit such determination, along with all relevant information in support thereof, to the Committee on Science and Technology of the House of Representatives and the Committee on Commerce of the Senate.

(2) The Administrator shall reduce the number of vehicles for which he shall contract for the purchase or lease under subsection (c) (1) or (c) (2) by the number determined under paragraph (1) (A) as modified by paragraph (1) (B), except in no event shall he contract for the purchase or lease pursuant to subsection (c) (1) of less than 1,000 electric or hybrid vehicles, and in no event shall he contract

for the purchase or lease pursuant to subsection (c) (2) of less than 2,500 advanced electric or hybrid vehicles unless he determines on the basis of responses to the solicitations for proposals for such contracts, under the provisions of (c) (1) and (c) (2), that lesser numbers of such vehicles which satisfy the applicable performance standards will be available within the delivery periods. All other provisions of subsection (c) shall apply.

SEC. 8. CONTRACTS.

(a) The Administrator shall provide funds, by contract, to initiate, continue, supplement, and maintain research, development, and demonstration activities which are necessary to carry out the purposes of the project. The Administrator may enter into such contracts with any Federal agency, laboratory, university, nonprofit organization, industrial organization, public or private agency, institution, organization, corporation, partnership, or individual.

(b) In addition to the requirements of sections 4 and 5, the Administrator, in the exercise of his duties and responsibilities under this section, shall consult with the Department of Transportation, the Environmental Protection Agency, the Federal Energy Administration, the National Aeronautics and Space Administration, the Department of Agriculture, and representatives of other appropriate Federal agencies, and shall establish procedures for periodic consultation with representatives of science, industry, and such other groups as may have special expertise in electric and hybrid vehicle research, development, and demonstration.

(c) Each contract under this section shall be entered into in accordance with such rules as the Administrator may prescribe in accordance with the provisions of this section. Each application for funding shall be made in writing in such form and with such content and other submissions as the Administrator shall require. The Administrator may enter into contracts under this section without regard to section 3709 of the Revised Statutes (41 U.S.C. 5).

SEC. 9. ENCOURAGEMENT AND PROTECTION OF SMALL BUSINESS.

(a) The Administrator shall take such steps as are feasible to assure that small business concerns have a realistic and adequate opportunity to participate in the project.

(b) To assist in accomplishing the objectives of subsection (a), the Administrator shall reserve, for contracts with small business concerns, a reasonable portion of the funds made available pursuant to this Act for research, development, or demonstration of electric or hybrid vehicles.

(c) The Administrator shall, in addition to the requirements set forth in subsections (a) and (b)—

(1) include in all contracts for research, development, or demonstration of electric or hybrid vehicles such terms, conditions, and payment schedules as may assist in meeting the needs of small business concerns, and shall take steps to avoid the inclusion in such contracts of any terms, conditions, or penalties which would tend to prevent such concerns from participating in the program under this Act; and

(2) make planning grants available to qualified small business concerns which require assistance in developing, submitting, and entering into such contracts.

SEC. 10. LOAN GUARANTEES.

(a) It is the policy of the Congress to assist in the introduction into the Nation's transportation fleet of electric and hybrid vehicles and to assure that qualified small business concerns and other qualified borrowers are not excluded from participation in such development due to lack of adequate capital. Accordingly, it is the policy of the Congress to provide guarantees of loans made for such purposes.

(b) In order to encourage the commercial production of electric and hybrid vehicles, the Administrator is authorized to guarantee, and to enter into commitments to guarantee, principal and interest on loans made by lenders to qualified borrowers, primarily small business concerns, for the purposes of—

- (1) research and development related to electric and hybrid vehicle technology;
- (2) prototype development for such vehicles and parts thereof;
- (3) construction of capital equipment related to research on, and development and production of, electric and hybrid vehicles and components; or
- (4) initial operating expenses associated with the development and production of electric and hybrid vehicles and components.

(c) Any guarantee under this section shall apply only to so much of the principal amount of the loan involved as does not exceed 90 percentum of the aggregate cost of the activity with respect to which the loan is made.

(d) Loan guarantees under this section shall be on such terms and conditions as the Administrator determines, except that a guarantee shall be made under this section only if—

(1) the loan bears interest at a rate not to exceed such annual percent on the principal obligation outstanding as the Administrator determines to be reasonable, taking into account the range of interest rates prevailing in the private sector for similar loans and risks by the United States;

(2) the terms of such loan require full repayment over a period not to exceed 15 years;

(3) in the judgment of the Administrator, the amount of the loan (when combined with amounts available to the qualified borrower from other sources) will be sufficient to carry out the activity with respect to which the loan is made;

(4) in the judgment of the Administrator, there is reasonable assurance of repayment of the loan by the qualified borrower; and

(5) no loan shall be guaranteed by the Administrator under subsection (b) unless the Administrator finds that no other reasonable means of financing or refinancing is reasonably available to the applicant.

(e)(1) The amount of the guarantee of any loan shall not exceed \$3,000,000, unless the Administrator finds that a higher guarantee level for specific loan guarantees is necessary in order to carry out the purposes of this Act. If the Administrator makes such finding, he shall immediately report that finding to the Speaker of the House of Representatives, the President of the Senate, the Committee on Science and Technology of the House of Representatives, and the Committee on Commerce of the Senate.

(2) The aggregate amount of guarantees outstanding under this section at any one time shall not exceed \$60,000,000.

(f) As used in this section, the term "qualified borrower" means any partnership, corporation, or other legal entity which (as determined by the Administrator) has presented satisfactory evidence of an interest in electric or hybrid vehicle technology and is capable of

performing research or completing the development and production of electric or hybrid vehicles or any components thereof in an acceptable manner.

(g) (1) With respect to any loan guaranteed pursuant to this section, the Administrator is authorized to enter into a contract to pay, and to pay, the lender for and on behalf of the borrower the interest charges which become due and payable on the unpaid balance of any such loan if the Administrator finds—

(A) that the borrower is unable to meet interest charges, that it is in the public interest to permit the borrower to continue to pursue the purposes of his project, and that the probable net cost to the Federal Government in paying such interest will be less than that which would result in the event of a default; and

(B) that the amount of such interest charges which the Administrator is authorized to pay shall be no greater than the amount of interest which the borrower is obligated to pay under the loan agreement.

(2) In the event of any default by a qualified borrower on a guaranteed loan, the Administrator is authorized to make payment in accordance with the guarantee, and the Attorney General shall take such action as may be appropriate to recover the amounts of such payments (including any payment of interest under paragraph (1)) from such assets of the defaulting borrowers as are associated with the activity with respect to which the loan was made or from any other surety included in the terms of the guarantee.

(h) No loan guarantee shall be made, or interest assistance contracts entered into, pursuant to this section, after the expiration of the 5-year period following the date of enactment of this Act.

(i) An applicant seeking a guarantee under this section must be a citizen or national of the United States. A corporation, partnership, firm, or association shall not be deemed to be a citizen or national of the United States unless the Administrator determines that it satisfactorily meets all the requirements of section 2 of the Shipping Act of 1916 (46 U.S.C. 802), for determining such citizenship, except that the provisions in subsection (a) of such section 2 concerning (1) the citizenship of officers or directors of a corporation, and (2) the interest required to be owned in the case of a corporation, association, or partnership operating a vessel in the coastwise trade, shall not be applicable. The Administrator, in consultation with the Secretary of State, may waive such requirements in the case of a corporation, partnership, firm, or association, controlling interest in which is owned by citizens of countries which are participants in the International Energy Agreement.

SEC. 11. USE OF ELECTRIC AND HYBRID VEHICLES BY FEDERAL AGENCIES.

The Postmaster General of the United States Postal Service, the Administrator of the General Services Administration, the Secretary of Defense, and the heads of other Federal agencies shall—

(1) carry out a study of the practicability of using electric and hybrid vehicles in the performance of some or all of the functions of their agencies; and

(2) arrange for the introduction of electric and hybrid vehicles into their fleets as soon as possible.

For competitive procurement purposes in purchasing such vehicles, life-cycle costing and any beneficial air pollution control characteristics of electric and hybrid vehicles shall be fully taken into account.

If the head of the agency involved determines that electric or hybrid vehicles are technologically practicable, but that they are not completely economically competitive with conventional vehicles, the Administrator may, for purposes of the demonstration program described in section 7, pay to such agency the incremental costs of the electric or hybrid vehicles, including differential operating costs.

SEC. 12. PATENTS.

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), entered into, made, or issued by the Administrator pursuant to section 8 of this Act.

SEC. 13. STUDIES.

(a) The Administrator shall conduct a study to determine the existence of any tax, regulatory, traffic, urban design, rural electrical, or other institutional factor which tends or may tend to bias surface transportation systems toward vehicles of particular characteristics. The Administrator shall submit a report to the Congress on the findings and conclusions of such study, within 1 year after the date of the enactment of this Act. The report shall include any legislative or other recommendations of the Administrator.

(b) The Administrator shall conduct a continuing assessment of the long-range material demand and pollution effects which may result from or in connection with the electrification of urban traffic. Such assessment shall include a statement of the Administrator's current findings in each report submitted under section 14. Any environmental impact statement which may be filed under a Federal law with respect to research, development, or demonstration activities under this Act shall include reference to the matters which are sub-

assessment under this section.

(c) The Administrator shall perform, or cause to be performed, studies and research on incentives to promote broader utilization and consumer acceptance of electric and hybrid vehicle technologies. A description and a statement of the findings of such studies and research activities shall be included in each report submitted under section 14.

(d) The Secretary shall conduct a study of the current and future applicability of safety standards and regulations to electric and hybrid vehicles. The Secretary shall report the results of such study to the Administrator and the Congress within 1 year after the date of enactment of this Act.

(e) The Administrator shall conduct a study to determine the overall effectiveness and feasibility of including regenerative braking systems on electric and other automobiles in order to recover energy. In such study the Administrator shall—

- (1) review the history of regenerative braking devices;
- (2) describe relevant experimental test data and theoretical calculations with respect to such devices;
- (3) assess the net energy impacts and cost effectiveness of such devices;
- (4) examine present patents and patent policy regarding such devices; and
- (5) determine whether regenerative braking should be used on some of the advanced electric or hybrid vehicles to be purchased or leased pursuant to section 7(c)(2). The Administrator shall submit a report to the Congress on the findings and conclusions of such study within 1 year after the date of enactment of this Act.

SEC. 14. ANNUAL REPORT.

The Administrator shall submit to the Congress annually a report on all activities being undertaken or carried out pursuant to the provisions of this Act, including—

(1) such projections and estimates as may be necessary to evaluate the progress of the project and to indicate the extent to which, and the pace at which, the objectives of this Act are being achieved; and

(2) a statement of the extent to which imported automobile chassis or components are being used, or are desirable, for the production of vehicles under section 7, and of the extent to which restrictions imposed by law or regulation upon the importation or use of such chassis or components are impeding the achievement of the purposes of this Act.

Each such report shall also include any recommendations which the Administrator may deem appropriate for legislation or related action which might further the purposes of this Act.

SEC. 15. AMENDMENTS TO THE NATIONAL AERONAUTICS AND SPACE ACT.

(a) Section 102 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451) is amended (1) by redesignating subsection (d) thereof as subsection (e) thereof; and (2) by inserting immediately after subsection (c) thereof 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 ground propulsion systems research and development. Such development shall be conducted so as to contribute to the objectives of developing energy- and petroleum-conserving ground propulsion systems, and of minimizing the environmental degradation caused by such systems.”.

(b) Section 102(e) of such Act, as redesignated by paragraph (1) of this subsection, is amended by striking out “and (c)” and inserting in lieu thereof “(c), and (d)”.

(c) Section 203 of such Act (42 U.S.C. 2473) is amended (A) by redesignating subsection (b) thereof as subsection (c) thereof, and (B) by inserting immediately after subsection (a) thereof the following new subsection:

“(b) The Administration shall, to the extent of appropriated funds, initiate, support, and carry out such research, development, demonstration, and other related activities in ground propulsion technologies as are provided for in sections 4 through 10 of the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976.”.

SEC. 16. AUTHORIZATION FOR APPROPRIATIONS.

(a) There are authorized to be appropriated to the Administrator, for purposes of carrying out this Act, (1) not to exceed \$30,000,000 for the fiscal year ending September 30, 1977, except that at least \$10,000,000 of such authorization shall be allocated for battery research and development; (2) not to exceed \$40,000,000 for the fiscal year ending September 30, 1978; (3) not to exceed \$25,000,000 for the fiscal year ending September 30, 1979; (4) not to exceed \$20,000,000 for the fiscal year ending September 30, 1980; and (5) not to exceed \$45,000,000 for the fiscal year ending September 30, 1981. Any amount appropri-

H. R. 8800—12

ated pursuant to this section shall remain available until expended, and any amount authorized for any fiscal year prior to the fiscal year ending September 30, 1981, but not appropriated, may be appropriated for any succeeding fiscal year through the fiscal year ending September 30, 1983.

(b) Any moneys received by the Administrator from vehicle sales or leases or other activities under this Act may be retained and used for purposes of carrying out this Act, notwithstanding the provisions of section 3617 of the Revised Statutes (31 U.S.C. 484), and may remain available until expended; but the amount authorized to be appropriated for any fiscal year under subsection (a) shall be reduced by the amount of the moneys so received in that year.

Speaker of the House of Representatives.

*Vice President of the United States and
President of the Senate.*

SEPTEMBER 13, 1976

Office of the White House Press Secretary

THE WHITE HOUSE

TO THE HOUSE OF REPRESENTATIVES:

I am returning, without my approval, H.R. 8800, the "Electric and Hybrid Vehicle Research, Development and Demonstration Act of 1976."

This bill would establish a five-year, \$160 million research, development and demonstration project within the Energy Research and Development Administration (ERDA) to promote the development of an electric vehicle that could function as a practical alternative to the gasoline-powered automobile. One of the major objectives of the project would be the development and purchase by the Federal government of some 7,500 demonstration electric vehicles. Such development would cover some of the areas private industry stands ready to pursue.

It is well documented that technological breakthroughs in battery research are necessary before the electric vehicle can become a viable option. It is simply premature and wasteful for the Federal government to engage in a massive demonstration program -- such as that intended by the bill -- before the required improvements in batteries for such vehicles are developed.

ERDA already has adequate authority under the Energy Reorganization Act of 1974 and the Federal Non-nuclear Energy Research and Development Act of 1974 to conduct an appropriate electric vehicle development program. Under my fiscal year 1977 budget, ERDA will focus on the research areas that inhibit the development of practical electric vehicles, for wide-spread use by the motoring public. Included is an emphasis on advanced battery technology.

Even assuming proper technological advances, the development of a completely new automobile for large-scale production is a monumental task requiring extensive investment of money and years of development. While the Government can play an important role in exploring particular phases of electric vehicle feasibility -- especially in the critical area of battery research -- it must be recognized that private industry already has substantial experience and interest in the development of practical electric vehicle transportation. I am not prepared to commit the Federal government to this type of a massive spending program which I believe private industry is best able to undertake.

GERALD R. FORD



THE WHITE HOUSE,

September 13, 1976.

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