TRANSPORTATION ENERGY CONSERVATION
DATA BOOK
A SELECTED, ANNOTATED BIBLIOGRAPHY

Edition 2

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OAK RIDGE NATIONAL LABORATORY
OPERATED BY UNION CARBIDE CORPORATION FOR THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
CONTRIBUTION ENERGY CONSERVATION DATA BOOK:  
A SELECTED, ANNOTATED BIBLIOGRAPHY  
EDITION 2  

E. B. Howard  
B. Y. Barber  
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C. C. Seaborn  

Energy Information Center, Information Center Complex  
Information Division  

Date Published:  October 1977  

Prepared for  
Data Analysis Branch  
Nonhighway Transport Systems and Special Projects  
Transportation Energy Conservation Division  
Office of Conservation  
Energy Research and Development Administration  

Prepared by the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee  37830  
operated by  
UNION CARBIDE CORPORATION  
for the  
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
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FOREWORD

Among the responsibilities of the Transportation Energy Conservation (TEC) Division of the Energy Research and Development Administration (ERDA) are the collection, research, and analysis of data on energy economy relative to transportation end use activities. The Division, therefore, requires information concerning the amount of energy used by the nation's transportation sector, and it is necessary to have a clear understanding of how this energy is distributed among the transportation modes.

In January 1976, the TEC Division of ERDA contracted with Oak Ridge National Laboratory (ORNL) to develop a data base which could be used by the TEC staff in their evaluation of current and proposed transportation-related technologies. The first edition of the Transportation Energy Conservation Data Book \(a\) was published in October 1976. Four quarterly supplements, \(b\) plus the Transportation Energy Conservation Data Book: Edition 1.5, \(a\) have been issued to augment that original document, each of which included an annotated bibliography documenting a comprehensive library of material relevant to transportation end use activities and energy conservation. This resource has developed to such an extent that an annotated bibliography is being made available under separate cover.


The library of material which this document identifies has developed in conjunction with the data collection and analysis activity underway in the Transportation Program at ORNL. Five hundred and sixty eight documents are included, and these represent those most current and/or most relevant to the analytic effort at ORNL.

Although the TEC Data Book Bibliography was developed primarily to be of assistance to the TEC Division, others may also be interested in the bibliographic resource this book documents. Presently, this resource is managed by the Energy Information Center of Oak Ridge National Laboratory. This first edition of the TEC Data Book Bibliography is being made available on a limited basis.

It is the intent of the Transportation Program at ORNL to document the resources relating to transportation that have been organized and developed. It is important to obtain a better understanding of resources available elsewhere, while also understanding the strengths and shortcomings of the resources of the ORNL Transportation Program. This volume is being released at this time not only to augment the Transportation Energy Conservation Data Book, Edition 2 but also to better document the developing resources at ORNL and to obtain the type of feedback from the user community that is essential to improving those resources and subsequently to improving the research effort at ORNL. Because of this, readers of this document are encouraged to communicate with the Energy Division, Oak Ridge National Laboratory, concerning shortcomings, emphases, and organization of this volume. Only through such user response will the resources of the Transportation Program continue to develop effectively.

Andrew S. Loebl, Project Director
(615)483-8611, ext. 3-0311
Data Management and Analysis Group
Energy Division
Oak Ridge National Laboratory
ABSTRACT

The 568 references in this bibliography reflect the continuing effort to compile information on energy conservation in the transportation field. The citations refer to both specific statistical information and general background coverage and were selected to be used in conjunction with the report Transportation Energy Conservation Data Book.

All references are abstracted and arranged alphabetically by author or corporate author if there is no personal author. In addition, a separate list of reports sponsored by the Energy Research and Development Administration, Division of Transportation Energy Conservation is included; indexes are provided by author, corporate author, sponsor, report number, keyword, and permuted title.

INTRODUCTION

This bibliography is a companion volume to the Transportation Energy Conservation Data Book, ORNL-5320. The Data Book provides a desk-top reference that contains statistics on major transportation modes, energy characteristics, energy conservation alternatives, and other applicable factors influencing performance in the transportation sector. The bibliography provides a desk-top compilation of references to information that covers the same subject areas. Both specific references to significant publications and general references that provide background information are cited.

The bibliography has been included in previous editions of the Data Book: Edition 1, ORNL-5198; Supplement 1, ORNL-5232; Supplement II, ORNL-5247; Supplement III, ORNL-5248; Supplement IV, ORNL-5249; and Edition 1.5, CONS/7405-1. References were presented in two sections; the first listed the more significant references and provided an abstract and the second title listed the more general ones. Edition 2 is being published separately due to growth, expansion in coverage, and the inclusion of indexes. Material from the previous editions has been updated, new references added since Supplement IV, and abstracts provided for all entries. The use of an asterisk (*) before a title
indicates citations considered of special interest.

The first section is a listing of the reports sponsored by the Energy Research and Development Administration, Division of Transportation Energy Conservation. These references are also incorporated into the main bibliography where the entries are arranged alphabetically by author or by corporate author if there is no personal author.

A data base that includes all references listed in this bibliography has been established on transportation energy conservation. The Keyword Index was constructed in order to query this data base for information retrieval and, therefore, differs from the structure of a subject index. For this reason, several keywords may appear incongruous to the subject scope, but serve to clearly define the use of the transportation information within a report.

The following indexes are included: (1) author, (2) corporate author, (3) sponsor, (4) keyword, (5) report number, and (6) permuted title.

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**AVAILABILITY OF REPORTS**

**GPO**
For sale by the Superintendent of Documents
Government Printing Office
Washington, D.C. 20402
(Prices subject to change)

**NTIS**
For sale by the National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

NTIS has adopted a single price schedule for its printed reports. The price schedule covers reports now in the collection and those yet to be acquired. A few reports will continue to be specially priced. The exceptions are publications of special technology groups and organizations for which NTIS acts as a sales agent and must honor that organization's price schedule.
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*For reports of 601 to 1000 pages, add $2.50 for each additional 100-page increment; for reports of more than 1000 pages, add $4.50 for each additional 100-page increment. Prices are subject to change.

Note: In a few incidences, the final edition of a report may not have been entered into the NTIS sales system. These reports are indicated as: NTIS (when available).

TIC Information available from the USERDA Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

If no availability is listed, inquire from the source issuing the document.
ACKNOWLEDGMENTS

The authors would like to acknowledge the support, helpful suggestions, and comments of Philip Patterson, ERDA monitor of the Transportation Energy Conservation Data Book Project and Andrew Loebl and Debora Shonka, Energy Division, authors of the Data Book. Faye Fletcher of the Information Center Complex, Information Division, carried out the computer production of the report.

Support for this project is provided by the Division of Transportation Office of Conservation, of the Energy Research and Development Administration.
Abstract: The Aerojet Liquid Rocket Company has completed a two and one-half year program to develop a low-emission, organic Rankine cycle automotive propulsion system. The automotive power plant uses an automotive Rankine cycle engine. The engine was designed, fabricated, and tested for 50 hours. Testing based on simulation of the Federal driving cycle demonstrated that exhaust pollutants less than one-half 1975-76 Federal Standards can be expected in vehicle application of this engine. Fuel economy was one-half the Federal Standards. Component performance was assessed and recommended areas of improvement defined. The program achieved its goal to demonstrate feasibility of the Rankine cycle engine characteristics. These engine characteristics were found which would preclude adapting the Rankine cycle engine to automotive use. Projections based on test results indicate performance and fuel economy may be improved further. (auth, abstract modified)

Availability: NTIS

Aerospace Corp., Environment and Energy Conservation Division, Mobile Systems Group
Address: Los Angeles, CA

Characterization of the U.S. Transportation System: Domestic Air Transportation (Passengers and Cargo), Highway Transportation (Autos, Trucks, Buses, Motorcycles, Bicycles), Pipeline Transportation Systems (Petroleum, Natural Gas, Water), Railroads (Freight and Passenger), Urban Rail Transit, and Water Transportation of Freight

Revision A, Rough Drafts, bound in 6 separate documents, approximately 490 p.

Mar 1977

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: These internal working papers provide data on the physical state, use, economics, and energy consumption and intensity of the U.S. transportation system, including modes of transportation: air transportation, highway transportation, pipeline transportation, rail transportation, urban rail transit, and water transportation. (71 references) (REL)

Availability: NTIS (when available)

Arnold, J. J.; Doggett, R. M.; Lands, J.
International Research and Technology Corp.
Address: 7655 Old Springhouse Rd., McLean, VA 22101

** TECSET: A Preprocessor for the Transportation Energy Conservation Network


22 Dec 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The Transportation Energy Conservation Network (TECNET) has been developed to provide EPA with an analytical tool capable of examining the total energy impacts of alternative transportation policies. This document describes the TECSET module, a centralized preprocessing system for the TECNET system. With the TECSET module a user may enter all parameter changes for each scenario run of the system. The TECSET module also provides linkage and feedbacks between other forecasting modules that make up the TECNET system (INFOC003, TRANS, and C dành the embodied energy component). The TECSET will be loaded with base-case data and provide possible changes in future transportation activity. These data include fuel consumption characteristics, travel characteristics, future market shares of automobiles by size class and engine type, and national use by transportation equipment manufacturers. Prior to relating scenario parameters to the various modules of TECNET, three types of preliminary computations will be made in the TECSET module: automobile travel and fuel use characteristics by size class and engine type, national pollution emissions by size class and engine type; and materials use by the automobile manufacturing industry. The report contains sections on the methodology and data requirements associated with each category of computation included in TECNET. These appendices are included: Sample Outputs of existing TECNET module; Market Shares; MPG Data; Emissions Data; and Derivation of Equations for Efficient Change Methodology (NY)

Availability: NTIS (when available)
Abstract: To resolve discrepancies in lead-acid battery efficiencies identified in an earlier General Research Corporation Electric Car Impact Study, a detailed simulation of electric vehicles, called ELVEC, was developed. In addition to the fractional Utilization battery model used in the previous study, two new models were incorporated in ELVEC. One of the new models allows battery recuperation during idle periods of a driving cycle. A detailed battery charging model was also included. Simulations with ELVEC of vehicle/driving cycle combinations previously studied revealed reasonable agreement with overall range and energy efficiencies, although battery charger efficiency was much lower than had been previously assumed (70% versus 97%). Average motor/drive efficiencies of 72% were calculated by ELVEC for both a two-passenger/residential and a four-passenger/metropolitan vehicle/driving cycle combination. The previous study had assumed fixed values of 63% and 72% for comparable measures. ELVEC simulations resulted in battery efficiencies of 76-77% for a 110% recharge for Residential, Metropolitan, and Federal driving cycles, compared with 46% for the previous study. (17 references) (auth)

Availability: NTIS (when available)

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Collins, M.: Morecraft, L.
General Research Corp.
Address: P.O. Box 3587, Santa Barbara, CA 93105
*Applicability of Existing Regional Data to National Impact Analysis for Urban Electric Cars

Internal Memorandum No. IM-2045, 69 p.
Jun 1976
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: Previous electric car impact studies have focused on regional impacts. Some attention has been given to national impacts of regional use but little has been done to estimate the national impacts of national use. The purpose of this task is to set forth methods for deriving national impacts from the regional data and methodologies developed to date. Two models are proposed for estimating the national impact of electric cars on energy consumption and air pollution. The models use computerized data bases available from the Federal Power Commission (FPC), the Environmental Protection Agency (EPA), and the Edison Electric Institute to generate electric power load profiles, estimates of future emissions, and future electric power capacity and fuel consumption. The usefulness of regional data developed to date for Los Angeles, Philadelphia and St. Louis urban areas as a base for national projections is also investigated. It is found that only 17.6% of all electric power utilities in 1980 will have a fuel mix similar to the utilities serving Los Angeles, Philadelphia, or St. Louis. National projections of fuel consumption for generating rearge electricity cannot be based solely on the fuel mixes of the utilities serving the three regions previously investigated. A preliminary analysis of utility estimates of the mix of fuels available to recharge electric vehicles during off-peak hours indicates that electric vehicles will have a significant impact on energy consumption. . . . The relationship of urban area characteristics to pollution emissions and air quality is complex and it is difficult to permit clustering in terms of air pollution impact. . . . Data from the 1974 National Transportation Study depicting existing 1972 and planned 1980 transportation environments in a sample of urbanized areas is presented and reviewed (26 references)

Availability: NTIS (when available)
Abstract: This paper assesses the impacts of the development of synthetic liquid fuels from coal and oil shale; the fuels considered are synthetic crude oils from coal and oil shale and methanol from coal. Key issues examined in detail are the technology and all of its resource requirements; set energy analysis of the technology options, the environmental and social impacts of the implementation schedule, legal mechanisms for access to coal and oil shale resources, financial of a synthetic liquid fuels industry, decision making in the petrochemical industry, government incentive policies, technology and all of its environmental, national, and social impacts, and the effects of strip mining, urbanization of rural areas, air pollution control, and environmental effects and their availability, and population growth and boom town effects in previously rural areas. (GRA)

Availability: NTIS; also available at GPO $1.85 under ERDA No. ERDA-76-129-1 for Volume I, $8.98 for Volume II


Stanford Research Institute

Address: Menlo Park, CA 94025


May 1977

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The computerized Coal Resource Depletion model is used to examine two problems: coal resource depletion and regional boom-bust cycles associated with intensified coal production and conversion. The model inventories coal resources for each major coal region in the West and derives the quantities of coal extractable at different costs by three technologies: stripping, underground mining, and in-situ combustion. The basis for the computer model calculations is a realistic coal demand scenario from 1975 to 2050 in which 57% of the U.S. energy demand is supplied by coal in the year 2050. The coal demand scenario is examined in three variations that differ mainly in the location of the synthetic fuel plants: the Minemouth Scenario, in which coal conversion plants are located near the mines; the Dispersion Scenario, in which synfuel plants are located in towns and counties with an ample fuel supply; and the Limited Dispersion Scenario, in which synfuel plants are selectively allowed to locate at the mines. All of these scenarios indicate that the average high level of coal use, half of the U.S. coal would be depleted by 2050. Although the Dispersion Scenario avoids excessive environmental and social damage, the costs of synfuels would be higher. In the Limited Minemouth Scenario, judicious timing of plant locations allows annual growth in affected counties to be held at or below a manageable 5%. Currently there is no public or private agency to limit the rate of growth and thus avoid adverse environmental, economic, and social impacts. The state severance tax on coal extraction can be used as a blunt tool for control. Two results of this study point out three major policy questions: resource uncertainty, conversion plant location, and demand reduction. (BYR)

Doggert, R.M.

International Research and Technology Corp.

Address: Washington, DC

Energy Demand by the Transportation Sector in 1985 and 2000: A Comparison of Five Studies


11 May 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: Numerous studies of transportation energy use have been conducted in an effort to estimate the extent to which the future demand might be reduced through conservation initiatives and behavioral and institutional changes. Resources for the Future, Inc. (RFF), through a contract with the National Institute of Health, developed EPA's Strategic Environmental Assessment System (SEAS) to project energy demand out to the year 2025. The purpose of this paper is to compare and contrast two RFF projections with ten other projections: three by the Federal Energy Administration's Project Independence effort, three by the Energy Research and Development Administration (ERDA), three by the Ford Foundation Energy Policy Project (FPF), and a preliminary projection by the recently developed SEAS transportation energy demand module. Particular attention will be given to the basic methodology and underlying assumptions used in making each projection.

Availability: Energy Research and Development Administration, Division of Transportation Energy Conservation, Data Analysis Branch, Washington, DC

Doggert, R.M.; Kreyer, B.; Arnold, J.; Heller, F.; Kamara, S.; Poffe, R.J.; Chafee, S.A.

International Research and Technology Corp.

Address: 7655 Old Springhouse Road, McLean, VA 22102


In Volume 1: 38 p. in Volume 2: 116 p. in Volume 3

24 Jun 1977

Sponsor: Energy Research and Development Administration, Division of Transportation energy Conservation

Abstract: The purpose of the Transportation Energy Conservation Network (TECNET) is to provide an analytical tool capable of examining the total energy consequences of alternative transportation alternatives.

Unlike other well-known energy forecasting models, this study defines total energy consumption of the transportation sector as the sum of all energy consumed directly by vehicles plus the energy consumed indirectly by the production and maintenance of transportation equipment and infrastructure. Volume One of the TECNET final report shows the capabilities of the TECNET system by presenting the results of four energy scenarios that assume differing amounts and mixes of conservation. The energy, environmental, and economic impacts of the four scenarios are compared. Volume Two describes the main features of a system of data banks and manipulative programs.
developed to assist ERDA in evaluating alternative conservation technologies and strategies that could be introduced during the next 50 years. The hybrid vehicle concept is described that contains energy storage systems based on the technologies of the six forecasting modules that make up the TECHNET system: the INFORUM module, the core of the system which projects economic activity; TRANS, a module that estimates future direct transportation energy demands and mobile source emissions; TESCET, a pre-processor that manipulates transportation scenario parameters and then feeds information to INFORUM and TRANS; ERESGEN, which uses INFORUM outputs to estimate indirect energy requirements by the transportation sector; ENERGY, which estimates the direct energy requirements of non-transportation sectors; and RESGEN, which estimates stationary point source pollution emissions. Major findings of the study include: (1) indirect energy, use for transportation is large; if the total energy consumption (indirect and direct) of the transportation sector is considered, this sector is the single largest consumer of fuel in the U.S.; in the Consensus Case scenario, modest reductions in air emissions would occur; in the Consensus Case, a technology change to Stirling, Brayton, and electric cars would result in reductions in both mobile source and stationary source emissions; and, on an aggregate level of the comparative economic impacts of the four test scenarios are insignificant. (BTB)

Energy Research and Development Administration, Division of Transportation Energy Conservation Address: Washington, DC

Report No. ERDA 76-61, TEC-76/002, meeting held in Ann Arbor, Michigan, Nov. 17 and 18, 1975, 256 p.

Abstract: Status reports on ERDA programs for heat engine systems (including gas turbine development, including diesel engines, gas turbines, and Stirling engines; heat engine and alternative technology program progress; and alternative fuels utilization technology program progress; and alternative fuels utilization technologies and applications of these technologies to demonstrate the feasibility of these vehicles. The law requires that: (1) the Project be established within ERDA; (2) R & D be conducted on electric and hybrid vehicles; (3) a two-part demonstration involving up to 7,500 vehicles be conducted; (4) certain specified studies be conducted; and (5) a program of financial incentives be established. The legislative history of the Act is summarized, and ERDA's position on the Bill is reviewed. The domestic electric vehicle industry consists of small businesses. In Europe and Japan major vehicle manufacturers are involved in electric vehicle development programs, and are planning for the introduction of these vehicles could result in substantial petroleum savings, improvement in vehicle efficiency, and the ability to limit or control pollution from the transportation sector. The ERDA energy storage systerm R & D program covers electromagnetic (battery), mechanical (flywheels), chemical (hydrogen fuel), and thermal storage systems. The basic plan to transfer electric vehicle technology to private enterprise and potential vehicle users is outlined. The information base to be disseminated includes design, manufacturing, economic operation, environmental, and other data. In addition to the demonstration runs of 7,500 vehicles, other financial incentives are planned (i.e., encouragement and protection of small businesses and loan guarantees). The vehicle demonstration program calls for an early demonstration of up to 2,500 vehicles plus a second phase with 5,000 additional vehicles. The demonstration plan covers the number and selection of demonstration sites, data
requirements, vehicle user mix, financial arrangements, servicing and maintenance centers and adequate information requirements need to be planned. Safety considerations and regulations by other countries on electric vehicle suppliers, are under study. Specifically crashworthiness, fire protection, electrical dc shock protection, crash avoidance subsystems, placement of batteries, and containment of dangerous materials. Following the completion of the section P & E Program, the major factors that will affect the development of a commercial electric vehicle industry include: the market demand, investment in manufacturing facilities, development of a sales/service infrastructure, availability of raw material, impacts on the petroleum industry, and modification of existing tax structure to include operation of electric hybrid vehicles on public roads. (BYB)


Abstract: In an effort to stimulate and promote Availability: NTIS

Alternative Fuels Utilization Report

Energy Research and Development Administration, Division of Transportation Energy Conservation
Address: 2929 Plymouth Rd., Ann Arbor, MI 48105

Automotive Power Systems Contractors Coordination Meeting. Eighth Summary Report

Escher Technology Associates
Address: P.O. Box 189, St. Johns, MI 48879

Moving the Railroads Off of Oil: The Hydrogen Alternative

Report No. ETA PB-77 13, 42 p.
Jan 1977

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: Although there seems to be only two recognized alternative railroad fuels (synfuels from coal and shale and rail electrification), this report suggests a third option—hydrogen. The technical and economic feasibility of this option is discussed, and a demonstration program is outlined. The hydrogen-energy system concept is described. A feasibility study indicates that: (1) the hydrogen rail alternative appears to be sufficiently promising; (2) conversion of current diesel-electric motive power systems is thought to be technically feasible; and (3) the concept must be carried to the hardware demonstration level to warrant serious consideration by the railroad community. A major purpose of this report is to communicate the results of this feasibility study to the railroad industry. In addition, this report evaluates the possibility of converting locomotive engines to hydrogen fueling, defines an overall project technical plan, and assesses the relative economics of the hydrogen alternative as compared to synfuels and electrification alternatives. A tentative program approach is recommended to ERDA, including a demonstration program, limited development to support the demonstration, industry lead in the demonstration, with government support, and the inclusion of both freight and passenger service in the demonstration. Although the technical data base is currently inadequate, it is estimated that hydrogen-converted locomotive diesel engines are feasible and technically attractive. (5 references) (BYB)
Abstract: This study examines the economic and technological effects which would occur within the U.S. refining industry if, by the year 2000, the U.S. automotive fleet should require: more gasoline than currently projected; less gasoline than currently projected; or fuels other than gasoline—namely, diesel fuel or a "broadcut" fuel composed of crude oil in a very broad boiling range. The investigation was conducted by imposing various fuel demand forecasts (1975 through 2000) upon a mathematical model of the U.S. refining industry. Study results indicate that: (1) existing refining technology will not allow the U.S. refining industry to meet the demand imposed by introduction of an all-diesel auto fleet; (2) demands for "broadcut" fuel could be met, but the varying characteristics for this fuel would create fuel marketing and auto fuel system problems; and (3) all of the fuel demand patterns, earns stringable and important economic impacts on the refining industry. These impacts, however, are overshadowed by the effect which varying

Escher, W.J.D.; Ecklund, R.E.
Escher Technology Associates: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: Developments in the energy and environmental sectors have awakened interest in hydrogen-fueled internal combustion engines. Based on a 50-engine survey of recent U.S. research and demonstration activities, the technical status of hydrogen engines is summarized. A comparative hydrogen/conventional-fuel orientation is maintained in assessing basic fuel property, engine power and efficiency, emissions and general operating characteristics. Key theoretical and experimental results, and correlations where evident, are noted. Engine problems areas and their solutions are discussed, accompanied by some thoughts toward future development possibilities and supporting research needs. (14 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

Faucett (Jack) Associates Inc.
Address: 5454 Wisconsin Ave., Chevy Chase, MD 20015

* A Classification of the Transport Vehicle Stock for Use in National Energy Analysis

Report No. KANAP-77-159-1
9 Feb 1977
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This report examines each of the transportation modes to determine how the vehicle stock of each can most appropriately be characterized for purposes of transport sector energy analysis. This examination balances considerations of vehicular data availability, fuel economy similarity, functional similarity, relative importance among transport fuel users, and analytic efficiency. The number and variety of units in the nation's vehicle fleet is enormous, and it is recognized that developing a manageable characterization of the fleet necessarily involves losing accuracy about some of its parts. Nevertheless, is charting the long-term use of the nation's fuel requirements issues require a broad, transport-sector-wide perspective prior to more detailed, mode-specific analysis. The classification developed here is designed to aid in developing such sector-wide perspective on transport fuel use. The vehicle classes chosen for this classification include: 10 categories in rail transportation, 2 categories in urban mass transit, 2 categories in bus transportation other than transit, 5 water transportation categories, 8 automobile categories, 16 truck categories, and 5 pipeline categories. These categories form the basic frame of reference upon which will be applied developing stock, activity, and fuel-use projections for this study. (from summary)

Availability: Energy Research and Development Administration, Division of Transportation Energy Conservation, Data Analysis Branch, 20 Massachusetts Ave., Washington, DC 20545

Fox, J.G.
General Research Corp.
Address: P.O. Box 227, Santa Barbara, CA 93105

* Potential Applicability of a Lead-Acid Battery Powered Two-Passenger Electric Car

Internal Memorandum No. IR-2042, 63 p.
Jun 1976
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This paper assesses the potential and applicability of a two-passenger electric car. Information regarding the application of two-passenger electric cars sold recently in the United States was assessed, along with the results of market analyses, customer surveys, and testing reports. Operational costs are estimated for the two-passenger car characterized in an earlier study, and compared with costs of the same model and conventional internal combustion automobiles. Nationwide estimates of potential applications and markets, and levels of market penetration, are then developed for both electric cars. (17 references) (auth)

Availability: NTIS (when available)

Friederick, F.P.; Moore, J.F.; Bonner, J.S.; Dickson, J.C.; Karvelas, L.P.
Bonner and Moore Associates Inc.
Address: 500 Jefferson Bldg., Houston, TX 77002

* The Impact of Automotive Fuel Changes on the U.S. Refining Industry: An Economic/Technological Assessment

15 Nov 1975
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This study examines the economic and technological effects which would occur within the U.S. refining industry if, by the year 2000, the U.S. automotive fleet should require: more gasoline than currently projected; less gasoline than currently projected; or fuels other than gasoline—namely, diesel fuel or a "broadcut" fuel composed of crude oil in a very broad boiling range. The investigation was conducted by imposing various fuel demand forecasts (1975 through 2000) upon a mathematical model of the U.S. refining industry. Study results indicate that: (1) existing refining technology will not allow the U.S. refining industry to meet the demand imposed by introduction of an all-diesel auto fleet; (2) demands for "broadcut" fuel could be met, but the varying characteristics for this fuel would create fuel marketing and auto fuel system problems; and (3) all of the fuel demand patterns, earns stringable and important economic impacts on the refining industry. These impacts, however, are overshadowed by the effect which varying
Abstract: Existing regional impact studies were reviewed as a basis for national impact projection. These studies projected impacts of electric car use on energy, air quality, and the economy in three different urban regions: Los Angeles, St. Louis, and Philadelphia. Though these regions span a wide range of possibilities, the diversity of other urban regions in the U.S. was found to be so great that impacts previously calculated cannot accurately be extrapolated to a national total. Adequate data are readily available in machine-readable form, however, to facilitate development of a national aggregate from energy and air quality impact projections made individually for each large urban region. Data sources and data processing procedures for this purpose were planned. Furthermore, the regional results appear unsuitable for a national impact assessment because they are outdated. Prospects for future storage batteries have shifted towards longer operating life, together with relatively higher performance and lower cost for the near-term lead-acid system. Prospects for a viable electric car have thus been hampered. The growth planned by electric utilities, on the other hand, has recently slowed drastically, so that the availability of nuclear and other non-petroleum sources of electric power for recharging electric cars will be reduced relative to that projected in the regional studies. Finally a two-passenger, limited-performance electric car is now being merchandized with considerable success, pointing to new possibilities for economical, low-impact electric cars not considered in the regional studies. Preparations for the national impact assessment also included refinement of modeling and performance estimates for electric cars, consideration of the applicability of safety standards to electric cars, and impact analyses for an urban region uniquely suited to electric cars: Honolulu, Hawaii. (6 references) (auth)
Availability: NTIS (when available)

Johnson, M.; Graver, C.; Kuby, C.
General Research Corp.
Address: P.O. Box 3587, Santa Barbara, CA 93105
* Impact of Future Use of Electric Cars in the Honolulu Area

Internal Memorandum No. IM-2050, 167 p.
Aug '76
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation
Abstract: The energy, environmental, and economic impacts resulting from widespread use of electric cars is assessed for the island of Oahu. This report parallels previous reports dealing with electric car impacts on Los Angeles, St. Louis, and Philadelphia, and considers electric cars utilizing both lead-acid and advanced battery technologies. Transportation and population projections for Oahu are combined with energy, environmental, and economic projections to generate forecasts of baseline conditions both with and without electric cars. It is found that using electric cars on Oahu would save little or no petroleum. This consists with those for the regions previously studied, and stems from Oahu's total dependence on petroleum for electrical generation. Similarly, air quality impacts on Oahu would be minor. As with the other regions studied, this arises from current efforts to reduce emissions from conventional autos. The economic impacts of electric cars would also be minor. There would be small on-bill losses in the lower range of the salary spectrum. (28 references, [auth])
Availability: Print [then available]
The Demand for Automobiles: An Analysis

Abstract: The aim of this study on the demand for automobiles is to determine and analyze the fundamental elements of the household's automobile ownership decision by correlating supply characteristics with attributes of the household. These factors in the household consumption decision are concentrated on: the number of cars owned, their size, and whether they were bought new or used. This study analyzes data collected in two surveys: the Nationwide Personal Transportation Survey, conducted for the Federal Highway Administration in 1965-70; and the Survey of Consumer Finances, conducted by the University of Michigan Survey Research Center in 1970. Analysis of these data includes examination of the role of certain household characteristics (e.g., income, size, and location) in determining the household's automobile ownership decisions. This analysis of the demand for automobiles focuses on the demand for three basic characteristics: convenience (a function of a household's demand for travel); reliability (which refers to the risk of purchasing and owning older cars); and capacity, a peak demand problem. The household's tolerance for unfulfilled demands is related to income. The number of cars owned by a household is dependent on the volume of demands for automobile services, the extent of the conflict between them, and the household's tolerance for this conflict. Considering the demand for reliability, age and education of the household head seem to be strong indicators of attitudes towards the risk consciously associated with used vehicles. Younger households are more likely to prefer used cars than older households. There is evidence that suggests that households do consider their peak demands when making decisions about the size of a car. The disadvantages of larger cars seem to induce more one-car households to choose smaller cars than two-car households of the same size. Two-car families seem to fulfill a larger percentage of their demand for capacity by marked differentiation between their automobiles. Many two-car households have both new and used cars. Trucks can be considered as an extreme form of specialization. Trucks are used as partial substitutes for cars, but they rarely replace the automobile. Because most trips are less than a five mile distance, there could be a large market for electric vehicles among multiple car households. (14 references) (BYB)

Loebl, A.S.
Oak Ridge National Laboratory, Energy Division, Regional and Urban Studies Section
Address: Oak Ridge, TN 37830
* Transportation Energy Conservation Data Book: Supplement III

May 1977

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This document is Supplement III to Edition I of the Transportation Energy Conservation Data Book, which was published by Oak Ridge National Laboratory in October 1976. This series of documents is intended to provide a desk-top reference for use by the Transportation Energy Conservation Division of the Energy Research and Development Administration. The supplements contain statistics which expand and refine data presented in Edition I. A variety of tables, charts, maps, and graphs is used in this volume to present statistical data on energy use and energy-related activity in the transportation sector. A major emphasis in this document is on energy supply to the transportation sector. Data on characteristics of transportation modes, fuel consumption characteristics and conservation alternatives are also included in this supplement to provide users with updated information presented in Edition I. The glossary represents a significant expansion. A list of references is provided, an index, and an annotated bibliography (showing recent acquisitions) are included at the end of this supplement. (42 references) (auth)

Availability: NTIS

Loebl, A.S.; Bjornstad, D.J.; Burch, D.P.; Howard, E.B.; Hull, J.F.; Madevell, D.G.; Malthouse, N.S.; Ogle, M.C.
Oak Ridge National Laboratory, Energy Division, Regional and Urban Studies Section
Address: Oak Ridge, TN 37830
* Transportation Energy Conservation Data Book: Supplement III

Oct 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This document represents the initial effort of the Oak Ridge National Laboratory to develop a transportation energy conservation data book for use as a desk-top reference by the Transportation Energy Conservation Division of the Energy Research and Development Administration. It represents an assembly and display of statistics which characterize the major transportation modes and presents data on other factors which influence the transportation sector in the nation. Statistical data on energy use in the transportation sector are presented in the form of tables, graphs, and charts. The purpose of this publication is to present a large amount of relevant data in an easily retrievable and usable format. The following topics are covered in six chapters: Characteristics of Transportation Modes; Energy Characteristics, including energy consumption by source and by sector and energy intensiveness; Conservation Alternates; Government Impacts, including expenditures, regulations and research, development and demonstration spending; Energy Supply, including domestic petroleum production, prices, and projections; and Transportation Demand, including population characteristics and economic determinants. A bibliography of data sources is provided at the end of each chapter, and a more general bibliography is included at the end of the book. (154 references) (auth)

Availability: NTIS

Luchter, S.; Benner, R.A.
Energy Research and Development Administration, Division of Transportation Energy Conservation Administration, Washington, DC
* An Assessment of the Technology of Rankine Engines for Automobiles

Apr 1977

Abstract: During the past 7 years, much work has been accomplished in advancing the development of the Rankine-powered
Shoosha, D.B.
Oak Ridge National Laboratory
Address: Oak Ridge, TN 37830

Transportation Energy Conservation Data Book: Supplement II
Feb 1977
Sponsor: Energy Research and Development Administration, Division of Transportation
Energy Conservation

Abstract: This document is Supplement II to Edition I of the Transportation Energy Conservation Data Book, which was published in October, 1976, by Oak Ridge National Laboratory. The series of documents is intended to provide a desk-top reference for use by the Transportation Energy Conservation Division of the Energy Research and Development Administration. The supplements contain statistics which update and augment data presented in Edition I. Tables, graphs, and other visuals are used to present statistical data on energy use and related activity of the transportation sector. Data in this supplement concentrate on personal travel characteristics and fuel economy options for automobiles. A list of references is provided and an annotated bibliography and glossary is included at the end of this supplement. (auth)

Availability: NIAS

North Atlantic Treaty Organization, Committee on the Challenges of Modern Society

Fourth International Symposium on Automotive Propulsion Systems

Symposium held in Washington, DC on April 17-22, 1977, 5 volumes and several individually bound papers, v.p.

1977

Sponsor: Energy Research and Development Administration, Division of Transportation
Energy Conservation

Abstract: The purpose of this fourth international symposium was to exchange the most up-to-date technical and scientific information on the development and demonstration of energy-efficient, low-polluting vehicles. The proceedings are printed in five volumes and several individual papers not bound in the volumes. Sessions were included on Gas Turbines, Alternative Fuels, Diesel Engines, Stirling and Rankine Engines, Electric and Hybrid, Stratified Charge Engines, Spark Ignition Improvements, Automotive Emissions, Powertrain Components, and Vehicle Improvements. (BYB)

Availability: Supply of published volumes has been exhausted. Author preprints may be available

Purdue Univ., Institute for Interdisciplinary Engineering Studies, Opportunity and Risk Analysis Team
Address: Potter Center, West Lafayette, IN 47907

Electric and Hybrid Vehicle Research, Development, and Demonstration Act (PL-94-413) Bibliography

26 Mar 1977
Sponsor: Energy Research and Development Administration, Division of Transportation
Energy Conservation

Abstract: Over 150 publications on electric and electric hybrid vehicles are referenced in this bibliography. Citations are included for books; documents; papers; reports; journal, newspaper, and magazine articles; and test reports. This bibliography will be updated and revised periodically. (BYB)

Availability: E. E. Goodson, Purdue University, Institute for Interdisciplinary Engineering Studies, Opportunities and Risk Analysis Team, Potter Center, West Lafayette, IN 47907

* Transportation Energy Conservation Data Book: Supplement I

Nov 1976
Sponsor: Energy Research and Development Administration, Division of Transportation
Energy Conservation

Abstract: This document is Supplement I to Edition I of the Transportation Energy Conservation Data Book, which was published by Oak Ridge National Laboratory in October 1976. The first edition and this supplement are intended to provide a desk-top reference for use by the Transportation Energy Conservation Division of the Energy Research and Development Administration. This supplement contains statistics which update and augment data presented in Edition I. A variety of tables, charts, maps and graphs are used in this volume to present statistical data on energy use and energy related activity through the following topics: (1) Characteristics of Transportation Modes including information on Air, Rail, Water Vessels, and Pipelines; (2) Energy Characteristics including information on Energy Consumption and Energy Intensity; (3) Government Impacts and Government Regulations. A list of references is provided at the end of each chapter supplement, and an annotated bibliography and glossary is included at the end of the supplement. In particular, non-highway transportation activities received less emphasis than highway activities in Edition I. Therefore, this supplement presents additional data in this area. Also, detailed data on fuel consumption and energy intensiveness of the various modes is included in this document. Periodic updates will ensure the availability of recently released data. (auth)

Availability: NIAS
The Influence of Alternative Electrical Energy Growth Rates on Impacts of Future Use of Electric Cars in Three Metropolitan Areas

Stalb, B.
General Research Corp.
Address: P.O. Box 3587, Santa Barbara, CA 93105
* The Influence of Alternative Electrical Energy Growth Rates on Impacts of Future Use of Electric Cars in Three Metropolitan Areas

Abstract: This study reassesses estimates made in two previous General Research Corporation studies of the availability of electrical energy for the large-scale use of electric cars in the Los Angeles, St. Louis, and Philadelphia metropolitan areas. The study was made necessary because of recent rapid changes in projected future demand for electricity in almost all areas of the country. It was shown that in the past two to three years there has been a substantial reduction in the power company projections of the rate of growth in the demand for electricity in all three regions. There is evidence, however, that such projections are not consistent with each other and that considerable uncertainty exists. This uncertainty is naturally reflected in any estimates of the energy available for automotive use. In this and in previous studies the energy for electric car recharge is assumed to come from the late-night "troughs" in the power companies' daily load profiles. It was shown that the problems associated with assuring that recharge occurs only at off-peak hours are such that there can be no assurance that the large-scale use of electric cars will not require an increase in installed generating capacity. ... The effect on petroleum usage in each area was determined assuming that electric cars replace, to varying degrees, the conventional internal-combustion-engine automobiles now in use. (9 references) (auth)

Availability: NTIS (when available)

Idaho National Engineering Laboratory; Billings, MT; General Research Corp.
* Guide for the Conversion to and Maintenance of Hydrogen-Fueled, Spark-Ignited Engines

Jan 1977
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: In recent years there has been much research on the operation of internal combustion engines using hydrogen fuel. Many different paths have been explored in attempts to eliminate the problems found by early researchers and devise a workable engine and fuel storage system. In the 1930's there were many engines putting out useful work using hydrogen, either as the fuel or as a fuel supplement, in Germany and possibly elsewhere. However, due to certain problems and circumstances, including the damage to German industry in World War II, hydrogen as a fuel fell into disuse. This paper is presented as a guide to one approach to the conversion of an internal combustion engine to hydrogen fuel. It includes knowledge gained from the authors' own experiences and from the study of the work of others. It discusses the safety aspects, conversion, operation, and maintenance of the engine. It is hoped that this guide will be useful to those beginning work in the field of hydrogen engines and that it might suggest areas for further research. (16 references) (auth)

Availability: NTIS
syncrude/gasoline, methanol, methane, hydrogen, and Fischer-Tropsch gasoline.

Energy analysis results showed that Fischer-Tropsch gasoline consumes the most energy in production, followed by electricity, hydrogen, methanol, methane, and syncrude/gasoline. Again, consideration of automotive energy efficiency leads to these results: electricity is lowest in energy use, followed by syncrude/gasoline; Fischer-Tropsch gasoline is the highest in energy use; and methanol, methane, and hydrogen are in between. This comparison of economic and energy analyses of coal-based automotive energy options shows that options with the highest costs also require high levels of energy consumption. Economic and energy analyses provide similar results when the systems studied are capital- and energy-intensive, as is the case in the systems studied in this report. A comparison of economic and energy analyses of systems that are less energy and capital-intensive may show a different trend. (59 references) (BYB)

Address: Suite 886, 1901 N. Pt. Myer Drive, Arlington, VA 22209

Final Report on Existing Data on Vehicle-Miles Traveled in the United States

60 p., Jul 1977

Sponsor: Oak Ridge National Laboratory; Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The report documents Vehicle-Mile Statistics for air, highway and rail transportation of passengers and freight. The report is intended as a guide to those who use VMT (vehicle-miles traveled) data and need further information on the background of published VMT statistics. The study involved reviewing published sources and tracing the VMT data to its original sources. The report presents an understanding of the scope, definition and methods of collection of VMT statistics. Personal interviews with Federal and state government officials, as well as representatives of private institutions which publish VMT statistics have been conducted to gain this understanding. (15 references) (from Foreword)
BIBLIOGRAPHY
Organic Rankine Cycle Automotive Propulsion
Aerojet Liquid Rocket Co.

Abstract: The Aerojet Liquid Rocket Company has supported a study on the Organic Rankine cycle engine. Several engine characteristics were found which would preclude adapting the Rankine cycle engine to automotive use. These sections based on test results indicate performance and fuel economy may be improved further. (auth, abstract modified)

Availability: NTIS

Aerospace Corp., Environment and Energy Conservation Division, Mobile Systems Group

Abstract: An economic analysis of the junk automobile recycling system shows that the generation of stripped automobile hulls by scrap processors. The portable flattener has reduced the transportation cost of shipping hulls to processors. The two new technologies have eliminated the net cost of shipping stripped hulls so frequently incurred by wreckers in the past. The elimination of this cost eliminates the economic incentive for excessive wrecker inventories. Unfortunately, the incentive for last owners to abandon their cars does not appear to have been eliminated by the new technologies. The last owner of an automobile with no spare parts value is still likely to incur a cost by delivering his automobile to the recycling system. Although a subsidy payment is probably unnecessary to reduce excessive wrecker inventories, such a payment might be one solution to the problem of automobile abandonment. However, there are a wide variety of subsidy programs that could be introduced. Before any Federal subsidy program is introduced to reduce automobile abandonment, it is recommended that the program be tested on a limited basis in many different parts of the country. (38 references) (auth)

Availability: GPO $2.35, Catalog No. 128.27:8596, Stock No. 2404-01405

Aerocycle Cycle Automotive Propulsion System - Turbine Expander, Final Report


Abstract: The Aerojet Liquid Rocket Company has completed a two and one-half year program to develop a low emission, organic turbine Rankine cycle automotive engine. The automotive power plant uses a turbine expander and a proprietary organic working fluid. A Chevrolet Impala was used as the reference vehicle for configuration control and performance evaluation. A prototype engine was designed, fabricated, and tested for 50 hours. Testing based on simulation of the Federal driving cycle indicated that exhaust pollutants from the engine was one-half the Federal Standards. Component performance was assessed and recommended areas of improvement defined. The program achieved its goal to demonstrate feasibility of the organic Rankine cycle engine. No engine characteristics were found which would preclude adapting the Rankine cycle engine to automotive use. (auth, abstract modified)

Availability: NTIS

Conversion of a Small Car to LNG: What Are the Problems and What Can It Do for Economy and Emissions?


Abstract: A two liter compact car originally designed to run on gasoline has been converted to run on LNG. Comparative measurements of fuel economy and exhaust emissions were made for the same car running on each fuel under normal on-the-road and simulated taxi service. When tuned to its maximum economy configuration the LNG car gave significant improvements in fuel economy when expressed on an energy basis. For inter-urban journeys the savings would be of the order of 5% and for taxi type service in excess of 20%. Whether or not these savings would justify fleet conversion would depend on local fuel cost and taxation conditions. When set for maximum economy the LNG car gave significantly lower emissions of CO and hydrocarbons than its gasoline counterpart. Emissions of NOX were, however, higher with LNG than with gasoline. A tenfold reduction in NOX emissions could be obtained by re-tuning the LNG engine to run at air/fuel ratios up to 30:1. Hydrocarbon emissions with this configuration were, however, quite high and would require supplementary means of control. When tuned to operate at very weak air/fuel mixtures the current regulated emissions were 10 to 15% less economical than when tuned for maximum economy. Although technically possible, the use of LNG is likely to be restricted by supply and distribution

Author: W.S. Barrow, G.A.; Mills, W.B.

Shell Research Ltd.

Address: United Kingdom

Sponsor: Society of Automotive Engineers
The Calculation of the Flow Field Past a Van with the Aid of a Panel Method

Alden, J.T.

Sponsor: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

The Self-Supporting Tire: A New Concept in Vehicle Mobility

Ahlert, S.-R.; Hucho, N.-H.

Sponsor: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75
<9> Editorial.
and (2) by late 1973 the shortage was due to insufficient refinery capacity and was deepened by the Arab oil embargo. The book names are cited and figures to expose the operations of the oil giants and recommends legislation for this area. (TIC)
Availability: Indiana University Press, Bloomington, IN $10.00

<10>
Alt, C.
Federal Energy Administration, Office of Policy and Analysis, Office of Data, and Analysis, Office of Oil and Gas Analysis
Address: Washington, DC 20461
Analysis of the 1974/1975 Decline in Petroleum Consumption
Report No. PB-251957, FEA/B-76/184, 28 p. 9 Mar 1976
Abstract: Relative to pre-embargo forecasts, U.S. petroleum product consumption has declined considerably during the last 2 years. A number of factors contributed to the observed decline. This paper provides quantitative, empirical support for the separate influences, such as higher prices and adverse macroeconomic changes. The current analysis is based on simulations using FEA's short-term petroleum forecasting model. The results of the analysis suggested that higher product prices accounted for the largest part of the 1974 decline, while adverse macroeconomic shifts (such as lower real growth in gross national product (GNP)), accounted for the largest part of the 1975 decline in petroleum product consumption.
Availability: NTIS

<11>
American Gas Association, Dept. of Statistics
Address: 1515 Wilson Blvd., Arlington, VA 22209
Abstract: These publications contain both current and historical facts and figures about the gas utility industry. The gas utility industry includes all regulated distribution and transmission companies and excludes producers. Statistics for the given year and summary data for earlier years are shown. Five year summary data from 1965 to 1970 (to 1970 for 1971, 1972, and 1973 Data) are also included for comparative analysis.
These issues of Gas Facts are comprised of at least twelve sections and a glossary of terms relating to the gas industry. The sections are arranged to follow the standard sequence of the industry's operations. The first section serves as an overall review of the year and the events affecting the gas utility industry most importantly. The subsequent sections detail current and historical data pertinent to the industry and encompasses reserves, production, transmission and distribution, storage, customers, sales and revenues. The remaining sections pertain to financial information, construction, labor, prices, and appliance data trends. All data are relevant to the operations of a segment of the gas utility industry as it existed during any year in question. Accordingly, time series analysis is not completely valid for comparison with individual company statistics over a period of years. The number and size of companies included in a given segment of the industry has varied from one year to another, according to A.G.A.

<9> CONT.

definitions as explained in the Glossary. (Auth, from Introduction)

<12>
American Institute of Chemical Engineers
Eleventh Internation Energy Conversion Engineering Conference Proceedings. Volumes I and II
Conference held at the Sahara Tahoe Hotel, State Line, Nevada, on September 12-17, 1976, 2,011 p.
Sponsor: American Institute of Chemical Engineers
American Petroleum Institute
Address: 2101 L St., Northwest, Washington, DC 20037

Standard Definitions for Petroleum Statistics

Abstract: In pursuit of mutual industry-government objectives, representatives of industry, various trade associations, and Federal and state agencies directly concerned with petroleum statistics were brought together in an Ad Hoc Task Group on Definitions chaired by a representative of the American Petroleum Institute. The efforts of this group have resulted in this edition of standard definitions, which includes the most important terms used in reporting statistical information on reserves and production (Part I), wells and drilling as related to crude oil, natural gas, and natural gas liquids (Part II), and products (Part III). The immediate purpose of this report is to provide a basis for the identification and evaluation of changes that need to be made in order to achieve standardization. Decisions as to the appropriate time to revise data collection procedures and reporting formats must be left to the discretion of the particular agencies involved. It follows, therefore, that from the point of view of the user of petroleum statistics, this report will serve primarily as a guide for the identification of deficiencies in various statistical series or the determination of their suitability for particular requirements. Subsequent editions of Technical Report No. 1 will be expanded to include standard definitions for terms used in reporting statistical information pertaining to transportation, marketing, etc. (from Preface)
Availability: $10.00

American Public Transit Association
Address: Suite 1200, 1100 17th St. NW, Washington, DC 20036

Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration Administration
Abstract: This is a compilation of the material that was presented at the Urban Mass Transportation Administration/Urban Mass Transit Association Research and Development Priorities Conference. It contains a foreword, a summary and set of recommendations for each of the nine workshop sessions held during the conference. In addition, talks given at the general, luncheon and breakfast sessions are included. The material specifically addresses the following aspects of urban transportation research and development: bus and paratransit technology; rail transit technology; new systems and automation; socioeconomic research and special projects; service, safety and self-sustaining demonstration projects; priorities and balance in UMTA research and development; delivery systems for putting results of research and development to service; transit management; and planning methodology. Among the speakers whose remarks are included are the American Public Transit Association Chairman Dr. William J. Ronan, Urban Mass Transportation Administration Administrator Robert E. Patricelli and Congressman Jack Edwards. (GBA)
Availability: NTIS

American Public Transit Association
Address: 1100 17th St. NW, Suite 1200, Washington, DC 20036

United States Transit Industry Market Forecast
37 p.
Aug 1976
Abstract: This report is based on survey responses from 101 United States transit systems. These 101 transit systems operate 57.3% of all U.S. transit vehicles. Each transit system respondent reported minimum and maximum anticipated purchases of transit vehicles, fare collection equipment, and communication and location-monitoring equipment for calendar years 1976 thru 1980. Some respondents also provided estimates of long range vehicle purchases for calendar years 1981 thru 1985. Among the findings are the following: from 1976 through 1980, the average annual demand for new transit buses will range between 4,786 and 6,759 buses per year; ... from 1976 through 1980 the average annual demand for new heavy rail cars will fall between 246 and 302 vehicles; average annual demand for new light rail cars, during the same period will be between 81 and 91 cars; anticipated annual demand for new commuter rail cars, from 1976 through 1980, averages from 49 to 79 cars; and long-range vehicle demand, from 1981 through 1990, is projected to range between 3,222 and 4,771 transit buses, 26 and 339 heavy rail cars, and 12 and 57 light rail vehicles, on an annual basis. (from Summary and Findings)

American Public Transit Association, Statistical Dept.
Address: 1100 17th St. NW, Suite 1200, Washington, DC 20036

* Transit Fact Book
Mar 1976
Abstract: Trends in U.S. urban mass transportation are summarized in this annual publication. During the period from 1980 to 1975 total U.S. vehicle miles traveled by railroad, trolley, or motor bus declined, while operating revenue nearby tripled and passenger revenue increased by a factor of two and a half. Total rail vehicle miles were cut to a third of the 1940 1.3 billion miles, with almost all the cut in the light rail category. Heavy and light rail reversed position in total revenue, from 1980 through 1990, is anticipated to range between 3,222 and 4,771 transit buses, 26 and 339 heavy rail cars, and 12 and 57 light rail vehicles, on an annual basis.
Address: 1616 P Street NW, Washington, DC 20036

**American Trucking Trends 1975**
38 p.
1975

Abstract: Truck use in the United States has grown every year from 1965, when there were 1,400 registered trucks, to 1974, when an estimated 25.5 million. Statistics are given for all phases of the trucking industry, including freight, revenue and costs, taxes, safety, and truck characteristics. Trucks represented more than 14% of the ton-miles of regulated intercity freight transportation in 1974 and earned 55% ($22.4 billion) of freight transportation revenues. The industry paid an estimated $7.1 billion in taxes and helped 95.2% of its revenues for operating expenses. Wages, which average 6.7% higher than the total transportation industry, account for 53.1% of the revenue. Trucks covered 258 billion miles and had an accident rate per million vehicle-miles of 13.8, compared with 22.92 for passenger cars. Trends in various phases of the industry are shown in graphs. (DCK)


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<189>
American Waterways Operators Inc.
Address: 1600 Wilson Blvd., Suite 1011, Arlington, VA 22209

Inland Waterborne Commerce Statistics: 1975
Annual publication, 39 p.
Apr 1977

Abstract: The barge and towing industry's share of the nation's transportation output totaled 610,638,675 net tons in 1975, which represents 65 percent of total domestic marine transportation. Data in this report graphically illustrate the importance of the industry to the nation's economy and well-being. They also illustrate the dependence of production industry and the consuming public on barge transportation. In spite of inflationary pressures, which have led to spiraling operating costs and a low margin of profit, the industry managed to hold the line on the overall cost of barge transportation. (The average cost remained at four to five miles per ton-mile). Included in this report on inland waterborne commerce statistics are total tonnages moved and total mileage of service performed nationally, and by individual waterways. The report also shows the total number of vessels in operation and a comparison of transport services performed by the various modes. The data is compiled from the latest reports issued by the Waterborne Commerce Statistics Center of the Army Corps of Engineers. (from introduction)

Availability: NTIS
<21>
CONT.

Automotive Engineering, 84(5), pp. 46-47, 70
(March 1976); article based on SAE paper 760121
presented at Society of Automotive Engineers
Annual Meeting, Detroit, Feb. 23-27, 1976

Abstract: A gasoline/electric parallel hybrid drive train is proposed to increase fuel
economy of vans, buses, and large passenger
cars, while meeting 1975-76 federal emissions
standards by using external controls.

Computer simulation studies and dynamometer
tests on a prototype system indicate that a
30 to 100% improvement in fuel economy can be
realized. Problems with this hybrid vehicle include
high initial cost, reduced driving range at very low speeds, and reduced
capability to supply vehicle auxiliaries at
standstill. Development problems are listed,
and results of dynamometer tests are
detailed. (BYB)

<22>

Anonymous

Alternative Aircraft Powerplants

Automotive Engineering, 84(7), pp. 54-57 (July
1976); article based on SAE paper 760316,
"Alternative Concepts for Advanced Energy
Conservation Transport Engines," presented at
the Air Transportation Meeting, May 18-20,
1976, New York City

Jul 1976

Abstract: As in other sectors of the economy, the
air transportation industry is under pressure
to make fuel economy improvements. This
article summarizes a recent evaluation of
these alternative aircraft powerplants concepts:
heat exchanger cycles,
unconventional arrangements (e.g., geared
fans), and turboprops. Evaluation of the
potential benefits of these powerplants is
made in terms of fuel consumption and direct
operating costs. (BYB)

<23>

Anonymous

Electric Vehicle Development

Automotive Engineering, 84(8), pp. 39-43 (Aug.
1976); article based on four papers presented
at the Fourth International Electric Vehicle
Symposium, Dusseldorf, Aug. 17-Sept. 2, 1976,
and re-presented at Convergence 76, Dearborn,
Sept. 20-22, 1976. Titles of these four papers are:
"Development of a High Performance Lightweight Hybrid Electric Vehicle" by R.H. Guess and E.L. Lustenader;
"Computer Simulation of Automobile Drive
Patterns for Defining Battery Requirements
for Electric Cars" by Hirohiko Imai; and "Controls for Electric Vehicles" by Gene E. Smith.

Aug 1976

Abstract: Recent developments in electric
vehicles are described in this article. The
battery-powered electric vehicle has been
limited by its operating range for the last
50 years. Although batteries have been
improved, they are still the main constraint.
Operating range is being improved through vehicle
design—use of lighter materials,
decreases in aerodynamic drag, reductions in
spin losses by using better bearings and
gears, and lower rolling resistance through
the use of radial tires. Range is dependent on
the battery and on vehicle operation.

Improvements in range have been achieved by
doubling the ratio of battery weight to gross vehicle weight from 25 to 50%, by removing
peak currents from the battery, and by
regenerative braking. Although maximizing
the range has been emphasized, increasing the
range will make the car more attractive up to
the point where intracity driving needs are
satisfied. Further increases will not make
the car more marketable until it can reach
the range of intercity travel and replace the
conventional car. Energy storage devices
under study include the main propulsion
lead/acid battery package, the nickel/cadmium
battery, flywheel energy storage, and the
battery/flywheel combined. A recent
development in control, the chopper
(interrupted control method in which the
voltage can be varied over an infinite
range), has improved efficiency. The compact
passenger car developed by Toyota Motors
has a maximum speed of 95 km/h or more, acceleration
performance of 2.1 sec or less from
standsstill to 30 km/h, and a driving range of
180 km at a constant speed of 40 km. (BYB)

<24>

Anonymous

Designing an All-Electric Taxi

Automotive Engineering, 84(3), pp. 46-47, 70
(Mar 1976); article based on SAE paper
760124 "A Purpose-Built Taxi," presented at
the Society of Automotive Engineers
Automotive Engineering Congress and
Exposition, Detroit, Feb. 23-27, 1976

Mar 1976

Abstract: An electric vehicle was designed to
serve as a London taxi, having a working
range of 100 miles and a top speed of 55 mph.
The design of the taxi was controlled by
these parameters: battery size, size and
layout of related components, and police
regulations. Construction of the vehicle
took into consideration: low interior noise
level; inexpensive body cooling; present and
potential crash protection regulations; and
minimum time for repairs, particularly
accident damage. The construction of this
prototype verified that it is feasible to
make an electric vehicle using currently
available lead/acid batteries and improved
electric drive. Tests have shown that this
electric taxi will have one-fifth the fuel
costs of a diesel taxi. (BYB)

<25>

Anonymous

Alternative Powerplants and Energy Conservation

Automotive Engineering, 84(3), pp. 32-33, 68;
article based on a paper presented at the Energy
Transportation Forum of the Society of
Automotive Engineers Automobile Engineering
and Manufacturing Meeting, Detroit, Oct. 15,
1975

Mar 1976

Abstract: Although some of the alternative
automobile engines under study (gas turbine,
Stirling, Rankine, diesel, electric, hybrid,
stratified-charge, and Wankel powerplants)
offer benefits from decreased fuel
consumption, the total life-cycle cost of the
vehicle and its fuel should be the main
consideration in deciding which systems
should be used. The internal combustion engine
(ICE) has become an increasingly efficient
user of gasoline in production. Each
alternative engine at this time is
inferior to the conventional ICE in at least
one vital area, and most of these
deficiencies are in areas related to consumer
acceptance. The investment risks of
marketing an alternative engine would have a
substantial impact on any firm's economic
well-being. Likewise, marketing a new fuel
for a new powerplant (such as a "broadcast
distilled fuel" requiring less refining than
gasoline) would entail a large investment
Guide to Energy Conservation Literature

April 1977

Abstract: The Guide consists of a bibliography on fuel conservation and efficient use of energy. The documents cited include technical and scientific journal articles, population and trade journal articles, newspaper articles, bibliographic publications, published and unpublished reports and symposia papers, symposia proceedings, monographs, public documents, and books. Each citation lists the title, author, publication description, institution or corporate author, and category and key words, which describe the document's subject matter. These indexes are provided: Category, Keyword, Author, and Institution/Corporate Indexes. Definitions of the key words as they are used in this bibliography are given.

Availability: $25.00

Argonne National Laboratory
Address: 9700 S. Cass Ave., Argonne, IL 60439

Jul 1976
Sponsor: Energy Research and Development Administration

Abstract: This report describes the research and management efforts of the program at Argonne National Laboratory (ANL) on lithium/metal sulfide batteries during the period April-June 1976. These batteries are being developed for energy storage on utility networks and for electric-vehicle propulsion. The present cells, which operate at 400-450 degrees C, are vertically oriented, prismatic cells with a central positive electrode of FeS or FeS2, two facing negative electrodes of lithium-aluminum alloy, and an electrolyte of molten LiCl-KCl. Electrodes and cells are being fabricated by several industrial firms under contracts with ANL. These firms are also participating in developing fabrication methods that are amenable to mass production. Cells produced under the first contracts are being tested and evaluated--as single cells and as two- and three-cell batteries. New electrode and cell designs are being developed and tested at ANL, and promising designs will be incorporated in the industrially fabricated cells. The concepts receiving major attention include the fabrication of electrodes in the uncharged state (positive electrodes of Li2S and Fe and negative electrodes of porous metal), the use of carbon-based current-collector structures in the positive electrode, the fabrication of electrodes by hot-pressing active materials and electrolyte, and the use of additives to improve electrode and cell performance. In cooperation with industrial firms, efforts are also under way to develop improved cell feedthroughs and electrode separators. Design work is in progress on a 30-kWh battery for a small four-passenger vehicle; this effort includes design calculations and setting specifications for the vehicle. Other battery engineering work is directed to the development of monitoring and cycling equipment and battery components. Cell chemistry studies in support of electrode and cell development include the wetting of materials by molten LiCl-KCl and potentiometric measurements on molten sulfide phases. Work is continuing on the development of alternative secondary cell systems with calcium-, magnesium-, or sodium-based negative electrodes.

Availability: NTIS

Applied Nucleonics Company Inc., Energy Division
Address: 1701 Colorado Avenue, Santa Monica, CA 90404
Guide to Energy Conservation Literature

TECSMT: A Preprocessor for the Transportation Energy Conservation Network

22 Dec 1976
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The Transportation Energy Conservation Network (TECNET) has been developed to provide EDA with an analytical tool capable of examining the total energy impacts of alternative transportation policies. This document describes the TECNET module, a centralized preprocessing unit for the TECNET system. With the TECNET module a user may enter all parameter changes for each scenario run of the system. The TECNET module also provides linkages and feedbacks between other forecasting modules that make up the TECNET system (INFOBET, TRANS, and ERBOB28), the embodied energy component. The TECNET will be loaded with base-case data regarding possible changes in future transportation activity. These data include fuel consumption characteristics, travel characteristics, future market shares of automobiles by size class and engine type,
Abstract: This report presents data on automobile and materials use by transportation equipment manufacturers. Prior to relying scenario parameters to the various modules of TECHNET, three types of preliminary computations will be made in the TECHSET module: automobile travel and fuel use characteristics by size class and engine type; automobile pollution emissions by size class and engine type; and materials used by the automobile manufacturing industry. The report contains sections on the methodology and data requirements associated with each category of computation included in TECHSET. These appendices are included: Sample Outputs of existing TECHSET module; Market Shares; MPG Data; Emissions Data; and Derivation of Equations for Coefficient Change Methodology. (BTB)

Availability: NTIS

Abstract: These annual reports present summaries of railroad operations in 1975, 1976 and prior years for the U.S. as a whole and for the Eastern, Southern, and Western Districts. Data are included on financial results: traffic; train-miles and car-miles; operating averages; plant and equipment; capital expenditures; employment and wages; indexes of charge-out prices and wage rates; and Amtrak and the Auto-Train. (BTB)

Availability: NTIS

Abstract: Data collected in this survey were used to study the effect of selected variables on car ownership. The first part of the report relates car ownership to such household characteristics as place of residence of principal driver, incorporated places and unincorporated areas, and size of the standard metropolitan statistical areas; income, and household composition including number of occupants and number of licensed drivers. The second part of the report relates car ownership to characteristics of the automobile including age of the automobile and automobile ownership rates by place of residence and household income. The third part of the report relates car ownership to characteristics of vehicle trips and vehicle-miles of travel and non-trip and person-miles of travel. Daily trip generation rates and miles of travel per household are included. (from Description of Data)

Availability: NTIS

Abstract: This report presents data collected in this survey were used to study the effect of selected variables on car ownership. The first part of the report relates car ownership to such household characteristics as place of residence of principal driver, incorporated places and unincorporated areas, and size of the standard metropolitan statistical areas; income, and household composition including number of occupants and number of licensed drivers. The second part of the report relates car ownership to characteristics of the automobile including age of the automobile and automobile ownership rates by place of residence and household income. The third part of the report relates car ownership to characteristics of vehicle trips and vehicle-miles of travel and non-trip and person-miles of travel. Daily trip generation rates and miles of travel per household are included. (from Description of Data)
Cont.

1975

Abstract: Pipeline transportation of crude petroleum and petroleum products in 1973 totaled 87.4% of the 1.9 billion net tons transported by rail. This represents a 4.4% increase over 1972. In ton-miles, pipelines transported 60.2% of the 880.9 billion ton-miles, compared to 35.3% by water, 2.9% by truck, and 1.4% by rail carriers. Tables show the shift in transportation modes since 1938, with an increase for pipelines and motor carriers and a decrease for water and rail carriers. (0 references) (BC)

Availability: Association of Oil Pipe Lines, Suite 1208, 1725 K Street, NW, Washington, DC 20006

Austin, T.C.; Hellman, K.H.
U.S. Environmental Protection Agency
Fuel Economy of the 1975 Models


Sponsor: Society of Automotive Engineers

Abstract: The fuel economy data obtained from the emission tests run by the U.S. Environmental Protection Agency (EPA) have been used to show passenger car fuel economy trends from model year 1957 to present. This paper adds the 1975 model year to the historical trend and compares and contrasts the EPA's results with those developed by the U.S. Environmental Protection Agency (EPA). The EPA's results are compared to the 1974 data and model mix comparisons to determine the change in fuel economy for the fleet as a whole and for each of the 13 major manufacturers who were certified as of the time this paper was prepared. The net change in fuel economy for the fleet has been estimated at 8.1% comparing the 1975 models to the 1974 models assuming no model mix change occurs. The majority of this change, 11.2%, is attributable to emission control systems refinements and engine optimization. General Motors is responsible for the majority of the fleet average improvement due to the combination of emission control systems, especially as a source of environmental pollution; examine the basic principles of energy conversion and storage; and compare the most promising of the alternates in terms of performance and, insofar as possible, cost. (From book jacket)

Availability: Council of Planning Librarians Exchange

Mar 1977

Abstract: Citations to 60 publications containing energy data are presented in this bibliography. The types of statistics covered in each source are described. A subject index is provided. (FTS)

Availability: Council of Planning Librarians, P.O. Box 229, Monticello, IL 61856 $2.00

Ayers, R.U.; McKenna, R.P.
Resources for the Future Inc.; International Research and Technology Inc.

Alternatives to the Internal Combustion Engine, Impacts on Environmental Quality


1972

Abstract: In this book the authors take a comprehensive look at existing and potential power plants for private cars and other vehicles. They bring together and analyze the great mass of available technological and economic data from the standpoint of the environmental effects of the alternatives considered. These possibilities include not only fundamental improvements in the present-day internal combustion engine, but also other sources such as steam and electricity. The authors trace the development of the internal combustion engine, especially as a source of environmental pollution; examine the basic principles of energy conversion and storage; and compare the most promising of the alternatives in terms of performance and, insofar as possible, cost. (From book jacket)

Availability: Council of Planning Librarians Exchange

Mar 1977

Abstract: Citations to 60 publications containing energy data are presented in this bibliography. The types of statistics covered in each source are described. A subject index is provided. (FTS)

Availability: Council of Planning Librarians, P.O. Box 229, Monticello, IL 61856 $2.00
Abstract: One approach being considered to reduce passenger car use of diesel engines instead of gasoline engines. This paper presents the results of a study exploring the potential passenger car demand for diesel fuel and the implication of this demand on the petroleum industry processing requirements. In addition, an evaluation of the relative economy, performance and emissions of diesel-powered cars versus gasoline-powered cars is presented. An estimate of the net energy utilization in terms of both miles traveled per barrel of crude and crude savings for various degrees of diesel engine penetration in the automobile market is given. For example, if in the distant future diesel comprised 35-40% of the car population, there could be a 9-10% increase in passenger car mileage at constant crude oil consumption or a 1.32-4% reduction in crude oil usage at constant passenger car mileage. It is also noted that the refining industry will incur costs associated with the shift to processing larger quantities of diesel fuel and that this may result in a reduction in the current cost advantage of diesel fuel compared to gasoline.

Availability: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096

<39>

<40>

Ball, G.A.; Gunaer, J.I.; Sebestyen, T.M.
Chrysler Corp.; Energy Research and Development Administration
The ERDA/Chrysler Upgraded Gas Turbine Engine: Objectives and Design
1976
Sponsor: Society of Automotive Engineers
Abstract: Under a contract which began in November 1972, Chrysler Corporation has been conducting an automotive gas turbine improvement program for the Division of Transportation of the Energy Research and Development Administration. The final task of this program is to design, build, and demonstrate an upgraded engine. The design has been accomplished and is described in this paper. It utilizes a number of improvements developed and verified on the Chrysler Sixth Generation "Baseline" engines, e.g., variable inlet guide vanes, water injection, ceramic regenerators, an integrated electronic control system, a free-turbine arrangement, a low emissions fixed geometry burner, and lineless insulation. Aerodynamic details to meet higher efficiency component specifications were provided by NASA (National Aeronautics and Space Administration) Lewis. The design also incorporates a gas bearing on the rotor and improvements in arrangements and mechanical design. A vehicle system incorporating this engine should operate with fuel economy double that of the baseline engine system and demonstrate emissions levels within the current 1976 Federal Standards. (10 references; 86 figures) (auth)

Availability: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096

<41>

Barry, R.G.; Basella, A.; Smith, B.B.
Mohr Research and Development Corp.
Potential Passenger Car Demand for Diesel Fuel and Refining Implications
1977
Sponsor: Society of Automotive Engineers

Abstract: One approach being considered to reduce passenger car use of diesel engines instead of gasoline engines. This paper presents the results of a study exploring the potential passenger car demand for diesel fuel and the implication of this demand on the petroleum industry processing requirements. In addition, an evaluation of the relative economy, performance and emissions of diesel-powered cars versus gasoline-powered cars is presented. An estimate of the net energy utilization in terms of both miles traveled per barrel of crude and crude savings for various degrees of diesel engine penetration in the automobile market is given. For example, if in the distant future diesel comprised 35-40% of the car population, there could be a 9-10% increase in passenger car mileage at constant crude oil consumption or a 1.32-4% reduction in crude oil usage at constant passenger car mileage. It is also noted that the refining industry will incur costs associated with the shift to processing larger quantities of diesel fuel and that this may result in a reduction in the current cost advantage of diesel fuel compared to gasoline. (10 references; 86 figures) (auth)

Availability: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096

<42>

Basham, W.M.; Powel, S.; Gould, H.M.
U.S. Dept. of Transportation, Transportation Systems Center
Monitoring report - Automobile Voluntary Fuel Economy Improvement Program
April 1976
Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology
Abstract: On October 8, 1974, President Ford announced the goal of a 5% improvement in fuel economy of automobiles to be achieved in the 1980 new car fleet compared to 14.0 mpg for 1974. The Secretary of Transportation was given the lead in developing the program to evaluate manufacturers' progress to achieve their fuel economy goals, to make periodic analyses of future plans of each manufacturer, and to report findings to the Energy Resource Council. This report discusses the domestic manufacturers' progress to date, reviews the manufacturers' future plans in general, and assesses the likelihood of their meeting the goals. (GRA)

Availability: NTIS

<43>

Beauchey, N.H.; Frank, A.A.
Wisconsin Univ., Engineering Experiment Station
Dec 1974
Sponsor: U.S. Dept. of Transportation, Office of the Secretary
Abstract: Computer simulation programs have been developed, based on experimental data as well as...
Abstract: This book presents the results of a three-year program. The program's efforts have been organized into three major tasks: (1) Modeling of Transient Emissions; (2) Fuel Economy Improvement by Straightforward Drivetrain Changes; and (3) Studies of Vehicles with Energy Storage Flywheels. In task one, a technique has been developed that gives a significant improvement in the modeling of transient emissions on a continuous basis. The technique is based on the use of a Dynamic Average Emission Flow Map for each of the three pollutants, developed from emissions data recorded on a continuous basis from a vehicle being driven over a driving cycle on a chassis dynamometer. Significant improvements have been shown to be obtainable in task two by adding a fourth overdrive gear and a torque converter that locks-up in all gears above first. These are changes that require no new technology and could be implemented within a short period of time. In task three design studies have shown that a 50% to 100% better improvement in fuel mileage over the EPA-CVS city driving cycle should be obtainable by using a hybrid powerplant consisting of an IC engine, a flywheel, and a continuously-variable transmission (CVT). The CVT has been found to be the system component for which efficiency improvements would be most significant. Preliminary design work has been done for a demonstration (GRA, abstract modified)

Availability: NTIS
The Production and consumption of Automobiles, An Energy Analysis of the Manufacture, Discard and Reuse of the Automobile and its Component Materials

Report to the Illinois Institute for Environmental Quality, 73 p.
Jul 1972
Sponsor: Illinois Institute for Environmental Quality

Abstract: The manufacture, discard and recycling of automobiles is analyzed in terms of its consumption of energy and thermodynamic potential. The entire production process breaks into the major steps of primary materials recovery, materials finishing, fabrication, use, reprocessing, degradation and disposal. Each of these is broken further into smaller components for which energy and free energy (thermodynamic potential) consumption can be evaluated, for both real practice and ideal limits. The cost of an average automobile is approximately 37 thousand kilowatt-hours, in terms of thermodynamic potential. This is comparable to the annual energy consumption of the vehicle. Specific policies aimed at increasing the thrifty use of thermodynamic potential are examined; maximum recycling, which can save almost 30% of the energy cost, and extending vehicle life, which can save about 60% of the energy cost if the vehicle life is tripled. Areas are identified in which improved technological development can be expected to provide significant savings of energy and thermodynamic potential.

Bensch, D.A., Jr, U.S. Dept. of Transportation, Federal Highway Administration, Office of Highway Planning, Program Management Division
Address: 400 Seventh St. SW, Washington, DC 20590
Nationale Personal Transportation Study: Transportation Characteristics of School Children. Report No. 4
Jul 1972
Abstract: This report presents data on travel patterns to school of students between 5 and 18 years of age in kindergarten through grade 12. Only students living at home at the time the survey were included in the data. These data were collected in section V of the Nationwide Personal Transportation Survey conducted by the Bureau of the Census for the Federal Highway Administration in 1969-1970. For the analysis in this report, students were classified according to three grade levels: elementary (kindergarten through sixth); intermediate (seventh and eighth); and senior (ninth through twelfth). For each grade level, home-to-school travel by various modes of transportation is analyzed in terms of distance to school (miles) and time from home-to-school (minutes). These comparisons are shown separately for residents of all areas and places and for students attending public and private schools, by grade level and distance from home-to-school.

Availability: NTIS

Bilingings, E.R. Bilingings Energy Research Corp.
Address: Provo, UT 84601
Hydrogen Fuel in the Subcompact Automobile

Paper No. 760572, presented at the Fuels and Lubricants Meeting, St. Louis, Missouri, June 7-10, 1976, 12 p.
1976
Sponsor: Society of Automotive Engineers
Abstract: Recent advances in hydrogen energy technology have made possible the consideration of a subcompact automobile utilizing metal hydrides, or powdered hydrogen storage, and a low cost electrolyzer for vehicle recharging. Basic considerations of the metal hydride automotive system are discussed regarding various vehicular prototypes. Particular emphasis is placed on a hydrogen minicar application. Utilizing a low cost electrolyzer and utility grid electricity for vehicle recharging, it is possible to make a comparison of the metal hydride hydrogen engine system with other electric vehicles on the basis of storage weight, vehicle range, and cost of operation.

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

Address: 2500 Artesia Boulevard, Redondo Beach, CA 90278
Monthly journal
Abstract: As a monthly management magazine for car and light truck fleet operators, this journal provides articles and news relevant to vehicle fleet businesses. Regular features in each issue are included on current gasoline prices, calendar of events; fleet news; lease/rental situation; light truck, van, and recreational vehicle news; new products and used car prices. A special industry report with results of a lease- rental survey is provided biennially.
Another special issue contains the annual fleet Fact Book featuring statistics; a fleet directory; a fleet auto guide; and information on state automobile insurance, registration, and tax facts, 1976 fleet car specifications, Automotive Fleet's Association Guide, and National Auto Auction Association; a leasing/rental directory; and a directory of fleet-minded dealers. (BTB)

Availability: Editorial and Executive Offices, Tobit Publishing Co. $10.00 per yr.; $1.00, single copy; $5.00, special issues.

Abstract: These reports are the first two volumes of a series that compares measures of performance of public and private transportation modes providing intercity passenger transportation in the U.S. The purpose of these studies is to obtain comprehensive information on these transportation modes in order to understand the position of each mode within the U.S. transportation system and to evaluate how well each mode provides passenger travel service. Intercity passenger transportation is defined as travel between two cities located at least 100 miles apart. The first volume compares the service and economic performance of the modes on a national basis and in 12 city pairs. "Energy Comparison, Volume Two of the study, presents statistics of transportation energy consumption and details main energy efficiency comparisons. Modal source data and a city pair study provide a basis for the findings and are included in this volume. Inadequacies of available transportation energy data and the limitations of the city pair study are identified. The transportation sector accounts for about 3.5% of total U.S. energy consumption and 50% of the petroleum consumption. From 1968 to 1973 petroleum consumption by the transportation sector increased at an annual rate of 5.6% attributed to highway transportation. The energy analysis shows that buses are the most fuel efficient mode at all ranges, and that airplanes, automobiles, and trains have comparable efficiency levels, except at short distances where trains can be more efficient. (BTB)

Bohl, D.R.; Russell, M.
Southern Illinois Univ.
Address: Carbondale, IL
U.S. Energy Policy, Alternatives for Security
1975
Sponsor: Resources for the Future Inc.; National Science Foundation; U.S. House of Representatives, Committee on Banking, Currency and Housing, Ad Hoc Subcommittee on Domestic and International Monetary Aspects of Energy and Natural Resource Pricing
Abstract: The thesis of this book is that energy policy should focus on two goals - energy security and an optimal level of energy consumption. The conclusion is reached that complete energy self-sufficiency is an unacceptable expensive goal unless the world price for petroleum remains about $10/bbl. Several policies are recommended if energy security is to be accomplished through reduced reliance on foreign energy sources: 1) enhanced oil storage to relax the political threat of an embargo; 2) increased shut-in capacity; 3) encouragement of domestic energy production through government supported research and through stand-by tariffs, and 4) establishment of an energy consumption tax to finance government energy activities and to reduce energy consumption. The concept of energy and economic interdependence between the U.S. and the oil-exporting countries is also studied. (BTB)
Availability: Johns Hopkins University Press $5.00

Bonner and Moore Associates Inc.
Address: 2000 Jefferson Building, Houston, TX 77002
Overview and Review of Motor Gasoline Desulfurization. Volume 1
Report No. BEERC/RI-76/17(Vol. 1), 72 p.
Dec 1976
Sponsor: Energy Research and Development Administration, Bartlesville Energy Research Center
Abstract: This general technology used to desulfurize motor gasoline is described, and previous studies on gasoline desulfurization are reviewed. Methods that refiners could employ to lower the sulfur content of gasoline are discussed. The relationship of these methods to other product sulfur levels is examined. Three basic desulfurization methods (which can be used independently or in combination) are covered: 1) avoiding the use of high-sulfur blend stock to make motor gasoline, 2) desulfurizing the blend stock, and 3) desulfurizing the feed to the units that produce the blend stock. Proven, published methods that refiners might be interested in are included in the discussion. The five studies on gasoline desulfurization that are reviewed and compared are: the National Petroleum Refiners Association's "U.S. Domestic Petroleum Refining Industry's Capability to Manufacture Low-Sulfur Unleaded Motor Gasoline"; Pullman Kellogg's study prepared for the Environmental Protection Agency, "Production of Low-Sulfur Gasoline"; the Arthur D. Little study, "The Impact of Producing Low Sulfur Unleaded Motor Gasoline on the Petroleum Refining Industry: Volume I - Study Results and Planning Assumptions"; Battelle Columbus Laboratories' study, "The Economic Impact of Environmental Regulations on the Petroleum Industry-Phase II Study, Project HE-2"; and Texaco's "Opportunities for Energy Savings in Transportation." Appendices provide information on sulfur compounds in gasoline and on generic processes for desulfurizing gasoline. (53 references) (BTB)
Availability: $115

Bonner and Moore Associates Inc.
Address: 2000 Jefferson Building, Houston, TX 77002
Motor Gasoline Desulfurization Study. Volume 2
Dec 15/6
Sponsor: Energy Research and Development Administration, Bartlesville Energy Research Center
Abstract: Results of this study show that the cost of desulfurizing unleaded gasoline to .a
Abstract: The results of a contract with the NASA Ames Advanced Concepts and Missions Division confirmed the economic desirability of lower design cruise speeds and higher aspect-ratio wings compared to designs developed in the hypersonic era of low fuel price. Evaluation of potential fuel conservation for short-haul aircraft showed that an interaction of airfoil technology and desirable engine characteristics is important: the supercritical airfoil permits higher aspect ratio wings with lower sweep; these, in turn, lower the cruise thrust requirements so that engines with higher bypass ratios are better matched in terms of lapse rate; lower cruise speeds which are also better for fuel and operating cost economy push the desired bypass ratio up further. Thus, if fuel prices remain high, or rise further, striking reductions in community noise level can be achieved as a fallback in development of a 1980s airplane and engine. Analysis of the above trends are presented, along with the effects on fuel consumption of design field length, powered lift concepts, and turboprop as well as turbofan propulsion. Assessment is made of the most appropriate aircraft developments in the low/medium density short-haul arena as well as the high density short and intermediate range markets. Recommendations are made for further work which will support fuel and fuel conservation, including active controls for high aspect ratio wings, and development of engines which are most suitable for low weight and operating costs at high fuel prices. (6 references) (auth, abstract modified)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096 $2.75

<55> Bees, Allen & Hamilton Inc.
Address: 4733 Bethesda Ave., Bethesda, MD 2014
11 Jan 1977

Sponsor: Energy Research and Development Administrator, Division of Transportation Energy Conservation
Abstract: The objective of Task I of this energy study of ship transportation systems is to analyze the marine transportation industry in terms of equipment, costs, operating profiles, and energy consumption. The operating or service sectors of the marine transportation industry are identified (ocean shipping sector, Great Lakes sector, the coastal shipping sector, the offshore sector, the inland waterway sector, fishing and miscellaneous sector, and recreational boats); the numbers and types of vessels are determined; and their operating characteristics and energy consumption are detailed. The study encompasses all powered waterborne craft except fixed offshore production platforms and ships owned or operated by a government agency. The marine transportation industry consumes 2.94 Quads of energy per year, which represents 15% of the energy used for all transportation services. The ocean shipping sector accounts for 80% of marine transportation energy requirements. At the most 35% of the energy needed by marine transportation is purchased domestically. This report is organized into eight chapters, with the first chapter providing an introduction and summary. Chapters Two through Eight describe each of the industry sectors in terms of population, operating profiles, energy consumption, typical or generic vessels, costs, and cargo movements. The depth of coverage for each sector varies due to availability of data and its importance as an energy consumer. Appendices are included on Marine Fuel Consumption Calculations, Essential Trade Routes, Conversion Factors, and Merchant Vessels of the U.S. (39 references) (BYB

Availability: NTIS (when available)

<55> Brainard, J.; Davitian, H.; Soetlle, R., IV; Palmedo, P.F.
Brookhaven National Laboratory, National Center for Analysis of Energy Systems, Policy Analysis Division
Address: Bethpage, NY 11713
A Perspective on the Energy Future of the Northeast United States
Jun 1976

Sponsor: Energy Research and Development Administrator, Division of Biomedical and Environmental Research
Abstract: The past and present energy supply and demand patterns for the United States and the Northeast region are reviewed. On the basis of detailed analyses of present and possible future supply and demand activities, scenarios for the years 1985 and 2000 are constructed and compared. Economic and environmental consequences are also discussed. The principal findings are: (1) conservation measures can reduce fuel and resource requirements in the northeast by over 30%; (2) oil imports are likely to continue to be a major energy resource for the northeast; (3) a shift to coal and other alternate energy supplies, coupled with increased conservation, could compensate for a curtailment in the use of nuclear power in the region; (4) new resource technologies are capable of supplying up to 20% of the region's energy requirements in 2000; and (5) no single supply technology or single conservation strategy taken alone can reduce the region's increasing dependence on foreign oil. Rather, the creation of an acceptable energy system for the region will require efforts in many directions in terms both of reducing demand and developing reliable, diversified supplies. (44 references) (auth, abstract modified)

Availability: NTIS

<55> Bowden, M.K.; Sweet, H.S.; Waters, M.H.
Lockheed Georgia Co.; National Aeronautics and Space Administration, Ames Research Center
Design of Short-Haul Aircraft for Fuel Conservation
1975

Sponsor: Society of Automotive Engineers

Abstract: The objective of Task 1 of this energy study is to analyze the economic desirability of lower design cruise speeds and higher aspect-ratio wings compared to designs developed in the hypersonic era of low fuel price. Evaluation of potential fuel savings for short-haul aircraft showed that an interaction of airfoil technology and desirable engine characteristics is important: the supercritical airfoil permits higher aspect ratio wings with lower sweep; these, in turn, lower the cruise thrust requirements so that engines with higher bypass ratios are better matched in terms of lapse rate; lower cruise speeds which are also better for fuel and operating cost economy push the desired bypass ratio up further. Thus, if fuel prices remain high, or rise further, striking reductions in community noise level can be achieved as a fallback in development of a 1980s airplane and engine. Analysis of the above trends are presented, along with the effects on fuel consumption of design field length, powered lift concepts, and turboprop as well as turbofan propulsion. Assessment is made of the most appropriate aircraft developments in the low/medium density short-haul arena as well as the high density short and intermediate range markets. Recommendations are made for further work which will support fuel and fuel conservation, including active controls for high aspect ratio wings, and development of engines which are most suitable for low weight and operating costs at high fuel prices. (6 references) (auth, abstract modified)

Availability: NTIS (when available)
Supply of Liquefied Natural Gas to the Northeast

Abstract: The availability, projected costs, and project schedule for the importation of liquefied natural gas (LNG) are defined in this report. The near-term availability of LNG for importation into the Northeast is dependent on: (1) available foreign resources, (2) international competition and economic feasibility of agreements for exporting LNG, and (3) distance from the exporting country to the Northeast. Taking these factors into consideration, source countries are limited to Abu Dhabi, Algeria, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, Venezuela, and western Russia. Imports of LNG to the Northeast are projected to be between zero and 1.1 trillion cubic feet for 1985, and 2.0 trillion cubic feet for the year 2000. The estimated cost of this imported gas is between $1.50 and $4.00 per MMBtu in 1975 dollars. It is expected that a period of eight to ten years will be required to put an LNG receiving terminal into operation. The environmental hazards associated with the construction and operation of an LNG terminal (e.g., accidental fires and explosions) appear to be minimal when compared to those associated with other energy facilities, and the societal risks can be made to be acceptable. LNG terminal sites under consideration in the Northeast include Cove Point (Chesapeake Bay) Maryland, which has been approved by the Federal Power Commission; Staten Island, New York; Providence, Rhode Island; Raccoon Island, New Jersey; West Deptford, New Jersey, on the Delaware River; and Everett, Massachusetts. (SBT)

Availability: NTIS

Energy Conservation

Internal Memorandum No. IM-2046, 50 p. Aug 1976
Sponsor: Energy Research and Development Administration, Division of Transportation

Abstract: To resolve discrepancies in lead-acid battery efficiencies derived in an earlier General Research Corporation Electric Car Impact Study, a detailed simulation of electric vehicles, called ELVEC, was developed. In addition to the Fractional Utilization battery model used in the previous study, two more models were incorporated into ELVEC. One of the new models allows battery recuperation during idle periods of a driving cycle. A detailed battery charging model was also included. Simulations with ELVEC of vehicle/driving cycle combinations previously studied revealed reasonable agreement with overall range and energy efficiencies, although battery charger efficiency was much lower than had been previously assumed (70% versus 97%). Average motor/driveline efficiencies of 72% were calculated by ELVEC for both a two-passenger/residential and a four-passenger/metro passenger vehicle/driving cycle combination. The previous study had assumed fired values of 63% and 72% for comparable measures. ELVEC simulations resulted in battery efficiencies of 76-77% for a 110-kwh charge for Residential, Metropolitan, and Federal driving cycles, compared with 66% for the previous study. (17 references) (auth)

Availability: NTIS (when available)
Abstract: Two cars, one carbureted and the other fuel injected, were modified to burn neat methanol. Exhaust emissions, fuel economy, and driveability were measured and compared to those obtained with gasoline in the unmodified (production) cars. Since acceptable driveability and durability were obtained only with the fuel injected car, it was used to investigate the spark timing and equivalence ratio settings which would give an acceptable compromise among exhaust emissions, fuel economy, and driveability. Average equivalence ratios of 0.96 to 0.62 and spark timings from best power to 15 degrees retarded were studied. With spark timing set for best power and the average equivalence ratio for maximum fuel economy (0.83), driveability was acceptable and CO and NOx emissions met the 1977 standards. However, the unburned fuel (UF) emissions exceeded the 1977 standards for hydrocarbons (HC), even though the car was equipped with a catalytic converter. At 0.83 average equivalence ratio, NOx emissions were reduced below the statutory standard (0.4) by retarding spark timing; however, driveability and fuel economy deteriorated. (11 references) (auth)

Broderick, A.J.
U.S. Dept. of Transportation, Transportation Systems Center
Address: Kendall Square, Cambridge, MA 02142
Fuel Consumption of Tractor-Trailer Trucks and Other Fuel Consumption Affecting Speed Limit and Payload Weight
Nov 1975
Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology
Abstract: The effect of speed limit and payload weight on fuel consumption was determined in tests of tractor-trailer rigs. Two virtually identical vehicles were used, one loaded with a 28,000 lb payload and the other carrying 42,000 lb each was assigned over two different sets of terrain on the Massachusetts Turnpike at simulated speed limits of 50, 55, and 60 mph. Onboard observers recorded data on tank-measured fuel consumption, trip average speed, etc. An analysis of the data led to the following conclusions: (1) increased fuel consumption results from higher speed limits in the range of 50 to 60 mph; (2) terrain is an important factor in determining the effect of speed limit on fuel consumption; and (3) a payload increase from 28,000 lbs to 42,000 lbs is carried at no detectable increase in fuel consumption for the "hilly" route, and less than a 7% increase in fuel consumption for the route excluding a crossing of the Berkshire Mountains. (Summary)
Availability: NTIS

Brogan, J.J.
U.S. Environmental Protection Agency, Advanced Automotive Power Systems Development Division
Alternative Powerplants
Paper 730519, 6 p.
May 1973
Abstract: A review is made of available data on fuel economies of the current internal combustion engine-powered automobiles and of those with alternative powerplants. Comparisons of fuel economies of all these engine systems are made on the basis of the vehicle weight/engine displacement, and the vehicle weight alone. The thermal efficiencies are also compared. It is shown that several versions of the diesel engine which meet the 1975 Clean Air Act Standards and which are on the road today are more efficient than the conventional internal combustion engine of 1973. Moreover, prototypes of other alternative systems using other cycles (Brayton, Rankine, Stirling) under development are also projected to provide higher efficiencies than the conventional internal combustion engine of 1973. All comparisons are made using the federal driving cycle as a common reference. (Auth)
Availability: Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, NY 10001

Stroehl, R.
Brookhaven National Laboratory, National Center for Analysis of Energy Systems, Policy Analysis Division
Address: Upton, NY 11973
Future Oil Supply to the Northeast United States
Jun 1976
Sponsor: Energy Research and Development Administration, Division of Biomedical and Environmental Research
Abstract: The Northeast consumed some 4.5 million barrels/day of petroleum products in 1972. Nearly 63% of that supply was of foreign origin, making the Northeast the single largest oil importing region in the nation. The remainder of its supply originated mainly in states on the Gulf of Mexico. Nationwide oil production reached a peak of 11.3 million barrels/day in 1970 and has been declining yearly ever since. The Northeast in particular has led the movement to foreign imports because of its coastal location, its distance from domestic sources, the competitive pricing of foreign oils, and because of environmental considerations (e.g., sulfur emission regulations). Under various assumptions of total U.S. reserves of oil (discovered and undiscovered) coupled to alternate schedules of national resource development, projections of crude oil production were made for the years 1985 and 2000. The projections indicate that even under optimistic conditions crude oil production will be declining in the post 1985 period, if not earlier. This is primarily because oil recovery is technologically limited and generally unaffected by "moderate" price movements. Of these, the amount of domestically produced oil allocated to the Northeast was based on further assumptions with regard to supplies from historical sources as well as from future frontier areas in Alaska and the Atlantic Outer Continental Shelf. The scenarios consistently indicate that domestic oil production and the Northeast's regional share will be heavily constrained by 1985, and rapidly declining thereafter. On the other hand production of oil worldwide will concentrate further in the hands of the Arab OPEC nations, who are likely to exercise growing control over pricing and the international supply of crude oil. (83 references) (auth, abstract modified)
Availability: NTIS

Brookhaven National Laboratory
Address: Upton, NY 11973
Jul 1975
Sponsor: Energy Research and Development Administration, Division of Biomedical and Environmental Research
Abstract: Energy conservation technologies encompass the entire spectrum of human activities: electrical supply, industry, commercial and residential buildings, transportation and various overlapping combinations of these. This report is concerned with those conservation technologies which appear to be most important in the near and intermediate terms. Many of the specific B & D programs are contained in the preliminary "Conservation Program Plan" of the ERDA Assistant Administrator for Conservation. However, some projects are included which are supported by other Federal agencies and private industry. Section 1 contains a brief description of each conservation technology and an enumeration of health/safety/environmental impacts, both beneficial and adverse, which are expected to accrue from the new technology. Section 2 contains a brief discussion of problems, priorities and programs. Section 3 contains "Problem Definitions" and "Program Units" which are recommended to become a part of the "ERDA Balanced Program Plan." Assessments which will permit a cost/benefit analysis of each ERDA-sponsored B & D project are emphasized. Information concerning the first 20 conservation technologies will have been beneficial environmental impact. Often the decision whether or not to support a particular B & D proposal will depend on a detailed cost/benefit evaluation. (30 references) (GRA)
Availability: NTIS

Brown, B.L.
Systems Consultants Inc.
Address: 3255 Wing St., San Diego, CA
Apr 1976
Sponsor: U.S. Dept. of Transportation, Federal Aviation Administration, Office of Aviation Policy, Aviation Forecast Branch
Abstract: This report provides annual state, regional and national forecasts through 1987 of total (towered plus non-towered airports) general aviation activity in terms of total, local and itinerant aircraft operations. In addition to the forecasts, this report identifies the forecasting model and the rationalization of its development. Also, alternative forecasting techniques, whose results verified the validity of the aggregate forecasts, were developed and are described in this report. (GRA)
Availability: NTIS

Burkin, C.E.; Cavanaugh, E.C.; Dickerson, J.C.; Fernandez, S.R.
Radian Corp.
Address: 8500 Shook Creek Boulevard, P.O. Box 9948, Kansas City, MO 64114
A Study of Vapor Control Methods for Gasoline Marketing Operations: Volume 1 - T-Industry
Survey and Control Techniques. Volume II - Appendix
Apr 1975
Sponsor: U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Air Quality Planning and Standards
Abstract: Background information is given on the size and extent of the gasoline marketing industry and the magnitude of hydrocarbon vapor emissions. The principal sources of emissions, tank truck filling at bulk terminals, service station storage tank filling, and vehicle refueling are characterized. Vapor control techniques for fuel terminals are described: vapor recovery refrigeration, absorption, adsorption, incineration, and combinations of these techniques. The two types of control systems for service stations are evaluated, vapor balance systems and vacuum assist/secondary processing systems. Test data are given. (5 references) (auth)
Availability: NTLS

Burn, K.S.; Walker, G.
Calgary Univ., Dept. of Mechanical Engineering, Alberta, Canada
Exploratory Study of the Rainbow Variated Stirling Cycle Engine
Paper No. 769262 presented in the "Eleventh Intersociety Energy Conversion Engineering Conference Proceedings" (conference held at the Sahara Tahoe Hotel, State Line, Nevada, on September 12-17, 1976), pp. 1519-1524
1976
Abstract: In the early 1970's a British engine designer, Horace Rainbow, devised a Stirling engine with reciprocating elements acting as pistons and displacers in the conventional manner to control volume variations in the compression and expansion spaces of the engine. In his design, Rainbow divided the compression space equally between two smaller cylinders rather than the usual single cylinder. This feature was adopted principally to enhance the mechanical design. Later in was recognized that the thermo-fluid characteristics of the engine might be improved by the novel arrangement. In this paper a thermodynamic analysis is presented for a Stirling engine having the compression space split into two variable volumes. The analysis follows the Schmidt theory for Stirling engines but is modified to accommodate independent variable volume ratio and phase angle for the two compression spaces. The analysis was used to determine the effect of operating the machine with the volumes of the two compression spaces varying out of phase with each other and in unequal proportions relative to the expansion space volume. Typical results are presented in the form of work diagrams with the axes rationalized to a common pressure and volume. Optimum combinations of proportion and phase angle of the two compression spaces are determined. The same approach was extended to analysis of the alternative form of Rainbow engines in which a double expansion space is used in conjunction with a single compression space. The arrangement investigated the split expansion spaces are arranged in parallel rather than the tandem arrangement sometimes used for cryogenic cooling engines. As before the relative advantages of the split expansion space are explored and optimum combinations are determined for both prime movers and cooling engine combinations. (5 references) (auth)
Availability: American Institute of Chemical
Abstract: While much previous transportation research has been devoted to estimating the change in the vehicle miles traveled, while caused by changes in driving habits; (4) percentage decline in highway motor fuel use. (35 references) (BYB)

Cost of Fuels for Fuel Cell Automobiles

Bush, W.V.
Shell Development Co.

Abstract: The cost of operation projected for a fuel cell automobile could be as much as 1.2-2/`mi less than for a comparable internal combustion engine car or an all-battery car, assuming energy raw material cost equilibrated at $10/bbl crude oil equivalent. Fuel cost is a small but significant element in the total operating cost. Therefore, the projected cost advantage of the fuel cell automobile increases with increasing cost of fossil fuel, because of the higher energy efficiency projected for the fuel cell automobile. (14 references) (auth)

Availability: SPRI for 1973 data; GPU $0.95, Stock No. 5800-00001 for 1972 data

Cost of Fuels for Fuel Cell Automobiles

Bush, W.V.
Shell Development Co.

Abstract: The cost of operation projected for a fuel cell automobile could be as much as 1.2-2/`mi less than for a comparable internal combustion engine car or an all-battery car, assuming energy raw material cost equilibrated at $10/bbl crude oil equivalent. Fuel cost is a small but significant element in the total operating cost. Therefore, the projected cost advantage of the fuel cell automobile increases with increasing cost of fossil fuel, because of the higher energy efficiency projected for the fuel cell automobile. (14 references) (auth)

Availability: SPRI for 1973 data; GPU $0.95, Stock No. 5800-00001 for 1972 data

Cost of Fuels for Fuel Cell Automobiles

Bush, W.V.
Shell Development Co.

Abstract: The cost of operation projected for a fuel cell automobile could be as much as 1.2-2/`mi less than for a comparable internal combustion engine car or an all-battery car, assuming energy raw material cost equilibrated at $10/bbl crude oil equivalent. Fuel cost is a small but significant element in the total operating cost. Therefore, the projected cost advantage of the fuel cell automobile increases with increasing cost of fossil fuel, because of the higher energy efficiency projected for the fuel cell automobile. (14 references) (auth)

Availability: SPRI for 1973 data; GPU $0.95, Stock No. 5800-00001 for 1972 data
Long-Distance Coal Transport: Unit Trains or Slurry Pipelines

Campbell, T.C.; Katell, S.

Address: Washington, DC 0.s. Dept. of Interior, Bureau of Mines

Abstract: This Bureau of Mines publication presents an analysis of information related to the transportation of bituminous coal by unit trains and slurry pipelines. Even for short hauls from mines to markets, transport costs frequently account for between one-third and one-half of the delivered price of coal. Minimizing these costs has become an even more critical objective for hauls from the western mines than for hauls from farther east. Factors related to minimizing costs and selecting the optimal coal to be transported receive special attention. Although no general rule of preference is likely to be developed that can be applied to all shipments, both rail and pipeline service will be needed on an increasing scale. The study should provide useful background information and assistance in approaching investment decisions in the mining and transportation industries.

(79 references) (auth)

Availability: GPO $0.85, Stock No. 024-004-01789-9

Executive Office of the President, Office of the President's Energy Program

Carter, J.E.

Executive Office of the President, Office of the President's Energy Program

Address: Washington, DC 20500

Abstract: The President addressed a Joint Session of Congress and outlined a national energy program with the following objectives: in the short term, to reduce and control the nation's dependence on foreign oil; in the medium term, to weather the eventual decline in the availability of world oil supplies; and in the long term, to develop renewable energy sources. The major strategies for achieving these objectives are: implementation of an effective conservation program for all sectors; the conversion of industries and utilities using oil and natural gas to coal and other more abundant fuels; an S & O program on renewable energy resources. It is projected that the President's energy plan could save approximately 4.6 million barrels of oil per day over the amount of oil otherwise consumed by 1985. The energy program is forecasted to have small but basically positive economic impacts. The elements of the program are described, including those dealing with conservation, programs on transportation, buildings, appliances, industrial conservation, cogeneration of electricity and process steam, district heating, utility rate reform, and taxes on oil and natural gas; management information systems; industry competition; state and local government participation; assistance for low income persons; oil and natural gas, coal, nuclear power, hydroelectric power, and non-conventional energy sources; BDBP of decentralized systems; and a transportation study to reassess the nation's energy transportation system. Conservation measures proposed for the transportation sector include: a gas guzzler tax and rebate, auto efficiency standards, a 55 mph speed limit, a standby gasoline tax, expanded use of Highway Trust Fund, efficiency standards for light duty trucks, removal of the 10% excise tax on intercity buses, a tax on aviation and marine fuel, and a Federal Energy Management Program. In the buildings sector, the plan provides for: a national residential energy conservation program for existing buildings, mandatory efficiency standards for new buildings, and programs for Federal buildings.

Availability: White House Press Release Office, Washington, DC 20500
<78>
Carter, J. E.
Executive Office of the President, Office of the
White House Press Secretary
Address: Washington, DC 20500
* Text of an Address by the President to a Joint Session of Congress on Energy


**Abstract:** In his message to a Joint Session of Congress, the President outlined a national energy plan. Energy conservation goals to be reached by 1985 are presented. The first goal of the plan is conservation, the cheapest, most practical means to meet energy needs while reducing dependence on foreign oil. The U.S. wastes most of its energy in transportation and in its heating and cooling systems. For the transportation sector, the President proposes: a graduated excise tax on new gas guzzlers; rebates on cars that are efficient; and a standby tax on gasoline. His proposed conservation plan for buildings includes: strict conservation goals for both new and old Federal buildings; a tax credit for those who weatherize buildings; a weatherization service offered by all regulated utility companies; direct Federal help for low-income residents; an additional 10% tax credit for business investments; Federal matching grants to non-profit schools and hospitals; and public funds money for weatherizing state and local government buildings. Other conservation measures are outlined, including: legislation that would impose strict efficiency standards for household appliances by 1980; changes in utility rate structure; and cogeneration projects by industries and utilities. The second major strategy of the plan involves production and rational energy pricing. The price of newly found oil will be allowed to rise, over a three-year period, to the 1977 world market price. In order to eliminate artificial distortions in gas prices in different regions of the country, the President proposes that the price limit for all new gas sold anywhere in the U.S. be set at the price of the equivalent energy value of domestic crude oil, beginning in 1978. The third strategy is conversion from scarce fuels to coal. This strategy will be implemented through a sliding scale tax on large industrial users of oil and gas. Nuclear energy will be needed to close the gap between energy needs and the energy that can be produced and imported. The President discusses reorienting the nuclear licensing procedures. The fourth strategy is to develop permanent and reliable new energy sources, particularly solar energy. A gradually decreasing tax credit is proposed for people purchasing solar heating equipment. An independent information system is called for to provide reliable data about energy reserves and production, emergency capabilities, and financial data from the energy producers. It is emphasized that the guiding principle in developing this national energy plan was that it must be fair. (88) Availability: White House, Press Release Office, Washington, DC 20500

<79>
Carter, J. E.
Executive Office of the President, Office of the
White House Press Secretary
Address: Washington, DC 20500
*Message to Congress from the President: Fact Sheet on Energy Reorganization Legislation


**Abstract:** The President sent to Congress proposed legislation to reorganize the Federal government's energy agencies and programs.

This bill would establish a new Cabinet-level Department of Energy by combining the functions of the three major Federal energy agencies along with energy-related functions of six other executive and independent regulatory agencies. The new Department would provide the organizational base and the administrative authorities needed to develop and implement overall Federal energy policies. Among the major responsibilities of the Department will be: conservation, regulation, research and development, resource development and production, and data and information. All of these functions are critical to establishing and implementing a national energy policy which serves both the near and long term needs of the country. The proposal was advanced in the President's Message on Energy Reorganization of the Executive Branch. Legislation to establish the Department of Energy accompanies the Message to Congress. (from Fact Sheet)

Availability: GPO $1.45, Stock No. 041-001-00141-1

<88>
Carter, J. E.
Executive Office of the President
Address: Washington, DC 20500
*The Organization of Federal Energy Functions: A Report from the President to the Congress

Jan 1977

**Abstract:** A Department of Energy is proposed to provide an effective, efficient management structure for conducting national energy affairs. This report details the study background and methodology; Energy Background, Part B, discusses the national and international energy outlook. The present organizational structure is reviewed in Part C. Federal energy functions are now divided among several agencies, including the Federal Energy Administration, ERDA, the Department of the Interior, the Federal Power Commission, and the Nuclear Regulatory Commission. Seven alternative organizational structures are identified and evaluated in Part D, and the three most promising are selected for further evaluation: (1) a multi-agency Federal Department of Energy and Natural Resources; (2) a special-purpose Department of Energy (DOE); and (3) the current structure for energy functions, with some effort to improve coordination and resolve unclear jurisdictions. To facilitate the selection of an alternative, a series of special analyses was performed (Part E), including studies on: energy policy formulation and coordination; data collection and analysis; energy resource development; energy conservation; research, development and demonstration; energy use of Federally managed natural resources; energy regulation; and nuclear weapons development and production. The DOE (which would include functions of TEA, ERDA, FCC, Bureau of Mines, the power marketing functions of the Department of the Interior, and the Rural Electrification Administration) is proposed as the best organization plan (Part F). The proposed DOE would have approximately 22,860 employees and a budget of $7189 million. Part G describes a proposed internal management structure of DOE and proposes the Executive Level positions and basic staff units needed. A bill to establish the DOE is provided in Part H. (BYM) Availability: GPO $1.45, Stock No. 041-001-00141-1
Abstract: World petroleum demand is projected to approach productive capacity by early 1980s and to exceed capacity by 1985. This projection of petroleum supply and demand is similar to other forecasts, but this study is more pessimistic about the implications of this projection than many others. (1) an estimate that the US 55 will become a substantial importer rather than an exporter; and (2) an examination of the supply capabilities of the Organization of Petroleum Exporting Countries (OPEC) and non-OPEC nations will determine demand for major consuming countries is estimated in this study from two factors: (a) world energy situation (price, supply, and demand for OPEC oil to increase to about 47 to 51 million b/d by 1983, along with its ability to act as a price moderator in OPEC. Saudi Arabia does have the reserve potential to meet increased OPEC oil to increase to about 47 to 51 million b/d by 1983, along with its ability to act as a price moderator in OPEC. Saudi Arabia does have the reserve potential to meet increased demand through 1985, but it is expected that the Saudis will not be able or willing to meet the demand. Oil supplies from other regions will not alter the situation. By 1980, growth in North Sea production will be slowing, and Alaskan supplies will have stabilized. By 1985, the US 55 will change from a net oil exporter to the West to a net importer. Other energy supplies can not be relied on to substantially alleviate the shortages from now until 1985. With long lead times and delays in nuclear plant construction, nuclear power plants may contribute only about 1.5 million b/d of oil equivalent by 1985. Natural gas production outside OPEC will increase little. Coal production will escalate in the U.S. but not in most other free world countries.

Cost and Performance of Automotive Emission Control Technologies
EOI Memorandum No. 7, 29 p., 8 references

Sponsor: National Science Foundation, ERI Program
Abstract: Near-term commercially feasible automotive emission control technologies are discussed. The technologies design that are discussed are: the conventional spark-ignition piston engine with engine modifications and a variety of add-on control devices, such as exhaust-gas recirculators and catalytic converters; the diesel engine equipped with exhaust-gas recirculator; the Wankel engine, potentially equipped with exhaust-gas recirculator and thermal reactors; and the three-valve stratified charge engine, possibly equipped with exhaust-gas recirculator. Data are tabulated for different emission control systems on various automobiles; however, data for larger American-sized vehicles equipped with unusual engines are scarce. The second part of this paper discusses the impact of pollution control technology on the economic decisions facing a new car buyer.

Availability: Emission Laboratory
$1.00

Cayce, B.V.
U.S. Dept. of Transportation, Federal Aviation Administration, Office of Management Systems
Address: 800 Independence Ave. SW, Washington, DC

FAA Statistical Handbook of Aviation: Calendar Year 1975
Annual report, 162 p.
31 Dec 1975
Abstract: Statistical data on air transportation in 1974 is presented in 155 tables, which cover personnel, airport traffic and control, domestic and international flight service stations, civil and joint-use airports, various types of air carriers, operations, and financial information. The mission and activities of the Federal Aviation Administration and the National Airspace System are outlined. Information on airmen covers pilot and non-pilot personnel for all types of aircraft. Safety data reports 47 aircraft accidents, nine of which resulted in a total of 467 fatalities. (DCX)

Availability: GP 70 2.80; NTIS

Central Intelligence Agency

The International Energy Situation: Outlook to 1985
Apr 1977
Abstract: World petroleum demand is projected to approach productive capacity by early 1980s and to exceed capacity by 1985. This projection of petroleum supply and demand is similar to other forecasts, but this study is more pessimistic about the implications of this projection due to: (1) an estimate that the US 55 will become a substantial importer of oil rather than an exporter; and (2) an examination of the supply capabilities of the Organization of Petroleum Exporting Countries (OPEC) and non-OPEC nations. Total energy demand for major consuming countries is estimated in this study from two factors: rates of economic growth and the effect of conservation measures now in use. Large increases in oil production from the North Sea and Alaska will stabilize demand for OPEC oil through 1979. From 1979 to 1985, rising world demand and slowing oil production in major consuming nations will cause demand for OPEC oil to increase to about 47 to 51 million b/d. Considering Saudi Arabia's current expansion plans, its excessive productive capacity will be exhausted by 1983, along with its ability to act as a price moderator in OPEC. Saudi Arabia does have the reserve potential to meet increased demand through 1985, but it is expected that the Saudis will not be able or willing to meet the demand. Oil supplies from other regions will not alter the situation. By 1980, growth in North Sea production will be slowing, and Alaskan supplies will have stabilized. By 1985, the US 55 will change from a net oil exporter to the West to a net importer. Other energy supplies can not be relied on to substantially alleviate the shortages from now until 1985. With long lead times and delays in nuclear plant construction, nuclear power plants may contribute only about 1.5 million b/d of oil equivalent by 1985. Natural gas production outside OPEC will increase little. Coal production will escalate in the U.S. but not in most other free world countries.

Availability: NTIS

Champion Spark Plug Co.
Address: Toledo, Ohio 43661
Tune Up: Its Effect on Fuel Economy, Emissions and Performance

Abstract: This report presents results of a test project which examines engine condition and maintenance habits of existing vehicles and the effects of tune-up and spark plug replacement on fuel economy, emissions, and performance. Assuming that the 5,666 vehicles tested are typical of those operating in the 0.5% most cars are not receiving proper maintenance. When cars needing a tune-up were tuned properly, they averaged an 11.36% improvement in fuel economy. New spark plugs alone accounted for an average 3.42% fuel economy improvement. Carbon monoxide emissions declined an average of 45.37% after a complete tune-up, and hydrocarbon emissions fell 55.5%. After changing plugs only, HC emissions were reduced by 24.33%. Of all the cars tested, 6% exceeded the CO and HC emissions limits set by New Jersey, and almost 1 car in 20 was a gross emitter. The 1975 and 1976 models were much cleaner than older cars. Car owners' responses to a questionnaire indicated that poor car maintenance also results in substandard performance that affects safety, starting dependability, and general operation. A periodic mandatory emissions inspection program such as the one proposed by the Environmental Protection Agency is recommended. (BYB)

Chase Econometric Associates Inc.
Address: One Chase Manhattan Plaza, New York, NY 10017

The Effect of Tax and Regulatory Alternatives on Car Sales and Gasoline Consumption

May 1976

Sponsor: Executive Office of the President, Council on Environmental Quality

Abstract: The primary purpose of the study was to predict gasoline consumed by passenger vehicles for 1974-1976 with existing assumptions about technology and fuel efficiency and incorporating assumptions about six tax and regulatory alternatives.

Availability: NTIS

Choucri, N.; Ferraro, V.
Massachusetts Institute of Technology
Address: Cambridge, MA

International Politics of Energy Interdependence: The Case of Petroleum

1976

Abstract: The energy problem is more political than economic in nature, and underlying political differences must be understood in order to appreciate the effects on world-wide interdependence of petroleum supplies and prices. This book seeks to explore those political implications which have evolved the evolving crisis. Part I analyzes the last 25 years of petroleum politics and describes the changing relationships involved in petroleum transactions. Part II analyzes the political features of the Organization of Petroleum Exporting Countries and its effect on post 1973 prices. Part III explores the implications of alternative sources of energy and concludes that political adjustments will take place and have precedence over technological and economic features, whatever the energy source. A global imperative is needed to avoid piecemeal approaches and solutions which only generate new problems. (482 references) (DCX)

Availability: Lexington Books, D.C. Heath and Co., Lexington, MA $18.00

Civil Aeronautics Board, Bureau of Accounts and Statistics, Financial and Traffic Data Section
Address: Washington, DC 20428

Air Carrier Traffic Statistics

Monthly report, approximately 95 p.

Abstract: In this monthly report, monthly and twelve-month traffic data of 35 air carriers are presented, including information on revenue passenger-miles, available seat-miles, revenue passenger load factor, revenue passenger enplanements, revenue ton-miles, overall capacity, overall load factor, aircraft revenue miles and hours, overall performance factor and departures, and arrivals. Data are grouped into two broad operational categories: domestic and international. Domestic includes operations of the trunk and all-cargo carriers, the local service, helicopter, Alaskan, Hawaiian, and other carriers; the international category comprises operations for both the intercontinental and transcontinental carriers. The data include both basic figures from the carriers' reports and derived figures computed from the basic data. Statistics are
The entries in this table may be used to compute the average statewide fuel consumption rate for any state given reasonably accurate estimates of the distribution of travel within the state by vehicle type and highway system. The computations for evaluating average statewide fuel consumption rates are demonstrated using data from one state, New Mexico. Annual travel estimates for 1970 were computed for eight sample states: New Mexico, Colorado, Utah, Delaware, New York, Pennsylvania, Vermont, and Arizona. Four of these states, New Mexico, Colorado, Utah, and Delaware, prepare annual estimates of travel on the basis of traffic counting programs that include counts on low volume roads. For these states travel reported by the states for 1970 differed from the corresponding fuel consumption-based travel estimates by less than 3 percent. (11 references) (GHA)

Cochran, W. P.
Oil and Gas from Coal

Scientific American, 234(5), pp. 24-29 (May 1976)

Abstract: In order to use the large domestic resources of coal, technology must be developed to convert coal into oil and gas on a large scale. The pit limits of the technology exist, but financial and industrial resources are needed to commercialize the technology. Much research in the U.S. has been done by the Bureau of Mines and the Office of Coal Research in the Department of the Interior; coal conversion research is now being conducted by ERDA. The conversion of coal into oil or gas is accomplished by adding hydrogen to the coal through one of four basic processes: carbonization, heating coal in the absence of air; hydrogenation, reacting coal with hydrogen at high pressures, usually in the presence of a catalyst; extraction, in which coal is partly or completely dissolved; and Fischer-Tropsch synthesis, a liquidfication method in which coal is burned in the presence of oxygen and steam. The four processes are compared by examining the yield per ton of coal and the pressure at which each process operates. This article suggests that the most successful commercial operation will be a "coal refinery," involving a combination of these processes (e.g., a combination of hydrogen-donor extraction and Fischer-Tropsch synthesis). A coal refinery is described which combines extraction, hydrogenation, and Fischer-Tropsch synthesis. This coal refinery is adapted to fit the characteristics of any coal, and the mixture of products can be adjusted to any market. Production of synthetic fuels from coal would assure the U.S. of sufficient oil and gas supplies, would place a ceiling on the international price of crude oil, and would allow the U.S. to be independent of foreign supplies of oil. (BYB)
Compton, R. H. (Chairman)

**Abstract**

Previous electric car impact studies have focused on regional impacts. Some attention has been given to national impacts of regional use but little has been done to evaluate the national impacts of national use. The purpose of this task is to set forth methods for deriving national impacts from the regional data and methodologies developed to date. Two models are proposed for estimating the national impact of electric cars on energy consumption and air pollution. The models use computerized data bases available from the Federal Power Commission (FPC), the Environmental Protection Agency (EPA), and the Edison Electric Institute to generate electric power load profiles, estimates of future emissions, and electric car power capacity and fuel consumption. The usefulness of regional data developed to date for Los Angeles, Philadelphia and St. Louis urban areas as a base for national projections is also investigated. It is found that only 17.6% of all electric power utilities in 1980 will have a fuel mix similar to the utilities serving Los Angeles, Philadelphia, or St. Louis. Therefore, national projections of fuel consumption for generating recharge electricity cannot be based solely on the fuel mixes of the utilities serving the three regions previously investigated. A preliminary analysis of utility estimates of the mix of fuels available to recharge electric vehicles during off-peak hours indicates that electric vehicles will have a significant impact on crude oil consumption.

The relationship of urban area characteristics to pollution emissions and air quality is found to be too complex to permit clustering cities in terms of air pollution impact. Data from the 1974 National Transportation Study depicting existing 1972 and planned 1990 transportation environments in a sample of urbanized areas is presented and reviewed. (24 references) (auth, abstract modified)

**Availability:** NTIS (when available)

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Compton, W. D.

Ford Motor Co., Scientific Research Staff

Address: Dearborn, MI

Energy Conversion and Storage Technology - The Sodium-Sulfur Battery


**Abstract**

Abstract: Data are presented for comparison of electric-powered and gasoline-powered automobiles and for selection of the sodium-sulfur battery as the most promising system for an electric-powered automobile. The basic principles of construction and operation of the sodium-sulfur battery, and the research efforts of the Ford Motor Co. toward using this battery system are described. (BLM)

**Availability:** GPO, Stock No. 3800-00177 ($3.40 for entire proceedings)

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Condell, H.; Polan, R.

U.S. Dept. of Transportation, Transportation Systems Center, Information Division

Address: Kendall Square, Cambridge, MA 02142

Review and Analysis of Gasoline Consumption in the United States from 1960 to the Present


Sep 1975

Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Policy, Plans and International Affairs

Abstract: A presentation and analysis are made of the monthly gas consumption data for each of the 50 states and the District of Columbia. The data, obtained from the Federal Highway Administration, cover the period from January 1960 through April 1974. Included is a series of charts containing a regression analysis performed on the selected data for each state, growth rates for each state, and a ranking of the states with respect to different parameters. Also included is a series of graphs depicting monthly gas consumption for each state. (GRA)

**Availability:** NTIS

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Southwest Research Institute, Energy Conversion Systems Section, Dept. of Automotive Research

Address: San Antonio, TX 78284

Technological Improvements to Automobile Fuel Consumption. Volume I: Executive Summary. Volume II A: Sections 1 Through 23. Volume II B: Sections 24 and 25, and
**The Effect of Speed on Automobile Gasoline Consumption Rates**

Cope, E.M.

Abstract: The purpose of this study was to obtain information on the effect of speed on the rates of fuel consumption of heavy-duty highway trucks. The tests were not designed to elicit the maximum fuel economy from the trucks used; and the trucks were not necessarily representative of optimized combinations of engines, power train, and load. No effort was made to compare the advantages or disadvantages of one vehicle versus another. Differences in engine horsepower, transmissions, and other optional equipment offered to the purchaser by the manufacturer and in fact used on the test vehicles would make such comparison unwarranted. For this reason and because of other factors, such as original cost, longevity, frequency and type of maintenance and repairs, resale value, dependability, employee relations (driver satisfaction), suitability for particular performance (trip travel time), type of service, or other factors, the information in this report should not be interpreted as implying an advantage or disadvantage of one vehicle over another. (auth)

Cope, E.N.

**Consumption Rates**

Sponsor: U.S. Dept. of Transportation, Office of the Assistant Secretary for Systems Development and Technology; U.S. Environmental Protection Agency

Abstract: This report is a preliminary survey of the technological feasibility of reducing the fuel consumption of automobiles. The study uses as a reference information derived from literature, automobile industry contacts, and testing conducted as part of the program requirements. The design changes, which are recommended for the purpose of maximizing fuel economy, have been derived after lengthy review against a series of constraints including regulatory requirements, technical feasibility, and cost effectiveness. Several possible technological improvements are identified, documented, and evaluated with respect to fuel economy. Results are reported as percentage improvement in fuel economy in comparison with 1973 model year vehicles. The effect of vehicle emission control systems is considered in the evaluation procedure. The most promising individual improvements are incorporated into three synthesized vehicle designs, and the projected fuel economy improvement for these vehicles is reported. The status of the technology reported is that available in the time period of July 1973 to January 1974. (172 references) (GPA)

Availability: Stock No. 050-000-0094

8 p. report
Oct 1973

Abstract: The purpose of this study was to measure, under practical operating conditions, the effect of automobile speed on gasoline consumption. Twelve cars with weights varying from 2050 lbs. to 5250 lbs. were used for the tests. The testing methods and equipment are described, and data are presented for each car on miles per gallon at 30, 40, 50, 60, and 70 miles per hour, and the percent increase in gasoline consumption caused by increases in speed from 30 to 40, 40 to 50, 50 to 60, 60 to 70, and 70 to 70 miles per hour. Measurements were made with and without the use of air conditioning, and the fuel consumption of one car was measured before and after tuning. When the results from the 12 cars were averaged, it was found that fuel economy decreased for 21.05 miles per gallon at 30 mph to 14.03 at 70 mph without the use of air conditioning, and from 18.14 to 13.17 with air conditioning. The use of air conditioning reduced the average car's mileage by as much as 2 miles per gallon, and a tune-up improved one car by better than 2 miles per gallon. (NPG)

Availability: U.S. Dept. of Transportation (no charge)

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**The Effect of Speed on Track Fuel Consumption Rates**

Cope, E.M.

Abstract: The purpose of this study was to report a preliminary survey of the technological feasibility of reducing the fuel consumption of automobiles. The study uses as a reference information derived from literature, automobile industry contacts, and testing conducted as part of the program requirements. The design changes, which are recommended for the purpose of maximizing fuel economy, have been derived after lengthy review against a series of constraints including regulatory requirements, technical feasibility, and cost effectiveness. Several possible technological improvements are identified, documented, and evaluated with respect to fuel economy. Results are reported as percentage improvement in fuel economy in comparison with 1973 model year vehicles. The effect of vehicle emission control systems is considered in the evaluation procedure. The most promising individual improvements are incorporated into three synthesized vehicle designs, and the projected fuel economy improvement for these vehicles is reported. The status of the technology reported is that available in the time period of July 1973 to January 1974. (172 references) (GPA)

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Availability: U.S. Dept. of Transportation (no charge)

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Availability: U.S. Dept. of Transportation (no charge)

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**A Technology Assessment of Future Automobile Engines**

Cope, E.N.

Draft Summary of Hittman Associates Report

Abstract: A technology assessment of the impact of advanced automobile engines was conducted by Hittman Associates, Inc., for the National Science Foundation. The technique employed involved generating seven scenarios of future sizes of automobile production between 1976 and 2000. Five algorithms (calculational methods) were programmed on a computer to forecast: (1) the air of the cars on the road; (2) the impact on materials resources; (3) the impact on energy resources; (4) the impact on emissions levels; and (5) the socioeconomic impact. Impacts were measured against a baseline provided by the internal combustion engine (ICE) now common throughout the world. (auth)

Cope, E.N.

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Cope, E.N.

**The Effect of Speed on Track Fuel Consumption Rates**

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Abstract: The basic objective of the study was to obtain information on the effect of speed on the rates of fuel consumption of heavy-duty highway trucks. The tests were not designed to elicit the maximum fuel economy from the trucks used; and the trucks were not necessarily representative of optimized combinations of engines, power train, and load. No effort was made to compare the advantages or disadvantages of one vehicle versus another. Differences in engine horsepower, transmissions, and other optional equipment offered to the purchaser by the manufacturer and in fact used on the test vehicles would make such comparison unwarranted. For this reason and because of other factors, such as original cost, longevity, frequency and type of maintenance and repairs, resale value, dependability, employee relations (driver satisfaction), suitability for particular performance (trip travel time), type of service, or other factors, the information in this report should not be interpreted as implying an advantage or disadvantage of one vehicle over another. (auth)
The technique of forecasting the demand of comfort and luxury. Results indicate that the main determinants are purchase price, "brand name identification," acceleration time, and length and width although the latter was not confirmed in the sub-compact sample. In spite of recent advertising efforts, gasoline mileage appears to have only minor influence on consumer choice. Potential electric car sales are greater for an established manufacturer than for a new maker. (20 references) (OCR)
Applicability of Safety Standards to Urban Electric Cars

Internal Memorandum No. 18-2038, 46 p.
May 1976
Sponsor: Energy Research and Development Administration, Division of Transportation

Abstract: The effects of Federal Motor Vehicle Safety Standards (FMVSS) were investigated for typical two- and four-passenger subcompact electric cars with advanced lead-acid batteries. The direct weight of safety equipment added to these electric cars is pyramided not only by the passive components required for support, braking, etc.—which would be required by any car—but also by the additional propulsion and batteries required to maintain an acceptable marginal performance. With safety equipment weighing what it now does, the current FMVSS will account for 27% of the two-passenger electric car's curb weight and 37% of the four-passenger car's weight. Future FMVSS will increase these fractions to 47% and 66%. The operating costs will be increased by 2.3 cents per mile for the two-passenger car and by 4.4 cents per mile for the four-passenger car. Future standards will increase these costs to 3.9 and 7.7 cents per mile. Strict enforcement of the FMVSS with the current safety equipment weights will thus seriously jeopardize the feasibility of electric cars until breakthroughs in battery and safety equipment light occur. However, it may be inappropiate to apply the same safety standards to all vehicles. ... The accident environment of the electric car operated in urban areas only is shown to be different from that of the general vehicle population. The total benefit to society for the elimination of all urban-area accidents would be only 2.8 cents per vehicle mile. Thus, both the economics and the accident environment can justify relaxation of the FMVSS as an expedient in the near-term development of the electric car. (15 references) (auth)

Availability: NTIS (when available)

Applicability of Safety Standards to Urban Electric Cars

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Abstract: The effects of Federal Motor Vehicle Safety Standards (FMVSS) were investigated for typical two- and four-passenger subcompact electric cars with advanced lead-acid batteries. The direct weight of safety equipment added to these electric cars is pyramided not only by the passive components required for support, braking, etc.—which would be required by any car—but also by the additional propulsion and batteries required to maintain an acceptable marginal performance. With safety equipment weighing what it now does, the current FMVSS will account for 27% of the two-passenger electric car's curb weight and 37% of the four-passenger car's weight. Future FMVSS will increase these fractions to 47% and 66%. The operating costs will be increased by 2.3 cents per mile for the two-passenger car and by 4.4 cents per mile for the four-passenger car. Future standards will increase these costs to 3.9 and 7.7 cents per mile. Strict enforcement of the FMVSS with the current safety equipment weights will thus seriously jeopardize the feasibility of electric cars until breakthroughs in battery and safety equipment light occur. However, it may be inappropiate to apply the same safety standards to all vehicles. ... The accident environment of the electric car operated in urban areas only is shown to be different from that of the general vehicle population. The total benefit to society for the elimination of all urban-area accidents would be only 2.8 cents per vehicle mile. Thus, both the economics and the accident environment can justify relaxation of the FMVSS as an expedient in the near-term development of the electric car. (15 references) (auth)

Availability: NTIS (when available)
Desai, S.A.

Abstract: This report defines the concept of Parking Management Strategies for Reducing Damage, support mass transit, reduce energy consumption and improve the amenities of life in urban areas. Specific aspects of this analysis were development of a prototype parking management plan for the Washington, D.C. metropolitan area illustrating types of measures which can be used for parking management; evaluation of the socioeconomic impacts of parking measures in the plan and their effectiveness in reducing vehicle miles traveled (VMT) and improving air quality; and development of a parking management planning process which integrates local and regionwide planning through the use of regional guidelines. Four target areas in the D.C. region were studied in detail: the D.C. Core, Rosslyn, Va., Silver Spring, Md., and Centreville, Va. A regional plan was then developed from information gathered in the target area studies, including an analysis of regionwide parking related goals and problems. (105 references) (auth)

Availability: NTIS

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Availability: NTIS

Dickson, E.M.; Yarbroff, I.H.; Kroll, C.A.; Fullen, R.E.; Weissbecker, L.W.; Hays, R.L.


Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The computerized Coal Resource Depletion model is used to evaluate two problems of coal resource depletion and regional boom-bust cycles associated with intensified coal production and conversion. The model inventoried coal resources for eight major coal regions in the West and derived the quantities of coal extractable at different costs by three technologies: stripping, underground mining, and in-situ combustion. The basis for the computer model calculations is a realistic coal demand scenario from 1975 to 2050 in which 75% of the U.S. energy demand is supplied by coal in the year 2050. The COAL model scenario is examined in three variations that differ mainly in the location of the synthetic fuel plants: the Minemonth Scenario, in which coal conversion plants are located near the mine-mouth in the region that can yield the lowest cost final energy product, without concern for social or environmental impacts; the Dispersed Scenario, in which synthetic plants are located in towns and counties with an ample social and economic capacity sufficient to accept the plants without disruption; and the Limited Minemonth Scenario, in which synthetic plants are selectively allowed to locate at the mine-mouth. All of these scenarios indicate that, with the assumed high level of technology use, half of the U.S. coal could be depleted or obligated by 2050. Although the Dispersed Scenario avoids excessive environmental and social damage, the costs of synfuels would be
Abstract: Numerous studies of transportation energy use have been conducted in an effort to estimate the extent to which future demand might be reduced through conservation initiatives and behavioral and institutional changes. Resources for the Future, Inc. (RFF), through a contract with the National Institute of Health, adapted EFA's Strategic Environmental Assessment System (SEAS) to project energy demand out to the year 2025. The purpose of this paper is to compare and contrast two RFF projections with ten other projections; three by the Federal Energy Administration's Project Independence effort, three by the Energy Research and Development Administration's Energy Policy Project (EPP), and a preliminary projection by the recently developed SEAS transportation energy demand module. Particular attention will be given to the basic methodology and underlying assumptions used in making each projection. (Introduction)

Available: Society of Automotive Engineers

Abstract: A postal jeep and a commercial delivery van were evaluated. Energy data from operation over a test loop and various grades are presented for zero to 15 mph start/stop and 30 mph range runs. Test results are summarized in a graph for prediction of remaining miles based on route terrain. Jeep regenerative braking is discussed. A high power electrical simulator was used to reproduce a mountainous terrain local profile. The simulator was programmed with magnetic tapes made up from actual field recordings. This verified calculations, gave additional battery information and eliminated the need for a mountainous terrain test track. (7 references) (auth)

Available: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75
Abstract: As a systematic discussion of energy conservation strategies, this book presents an area-by-area analysis of approaches to the design and operation of more energy-efficient systems. Chapter One—Energy Conservation: The Possibilities—the limits, the benefits—concludes that energy conservation is not only technically possible but also extremely beneficial economically and environmentally. Conservation methods in buildings are covered in these three chapters: Building Design and Energy Consumption; Heating, Cooling, and Ventilation; and Lighting. Chapters Five through Eight discuss energy conservation in different transportation systems, e.g., automobiles, trucks, railroads, bicycles, buses, urban systems, water transportation, and air transportation. Two chapters are also included on conservation in industry and the food system. (336 references) (BTB)

Availability: $16.50

<120>
Dawood, J.L.; Puleo, F.; Hanson, B.
Illinois Univ., Center for Advanced Computation, Energy Research Group
Address: Urbana, IL 61801
Urban Bus-Car Substitution: Dollar, Energy and Labor Impact
161 p.
Sep 1973
Abstract: The direct and indirect dollar, energy, and labor costs of bus and car urban transportation systems are evaluated and compared in this paper. Changes in these costs that would result if urban passengers transfer from cars to buses are determined. The costs are calculated in units of dollar, Btu, and man-years of labor needed both directly and indirectly to provide each unit of travel. Significant amounts of direct energy could be saved if passengers travel by buses rather than cars. An increase in the occupancy level of both modes of travel would result in substantial energy savings, but buses offer the greatest chance for savings. It is concluded that the car costs less dollars per passenger mile but demands far more energy and in less labor-intensive. If the nation were persuaded to change some of its car transportation to urban buses, energy consumption would decrease and employment would increase. If an individual transfers only a portion of his urban travel to buses and retains his car, he experiences an increase in dollar cost per mile for every trip purpose, although such action would still decrease energy consumption and increase employment. Therefore, government actions are needed to induce the family to get rid of one or more of its cars more quickly in order to reduce costs of operating in both systems. Such incentives for decreasing car ownership include control of automobile depreciation cost by regulating style changes, improving bus systems, and restricting car use on urban freeways and streets. (89 references) (BTB)

Availability: $10.00

<122>
Dupree, W.; Ezzer, H.; Miller, S.; Hillier, D.
U.S. Dept. of Interior, Office of the Secretary, Office of the Assistant Secretary for Energy and Minerals
Energy Perspectives 2
230 p.
Jan 1976

Abstract: "Energy Perspectives" was first published in February 1975. With new and revised energy data available, this revised study was prepared to describe the basic parameters influencing the U.S. energy situation and to present additional data for statistical, econometric, and other analysis. Material presented in the first Energy Perspectives study (e.g., capital requirements, U.S. energy and R&D funding, and energy and environmental data) have been omitted from this revised publication. This second edition includes additional projections and data on the world energy situation, on prices and costs, U.S. regional data, and energy related relationships expressed in both physical terms and in Btu. The document includes a section on world energy resources, consumption, production, trade, and projections as well as a section on the U.S. energy situation. (BTB)
Availability: 620 $5.40, Stock No. 034-000-00826-6

<123>
Eccleston, R.H.; Colcortino, J.S.
United States Energy Through the Year 2000 (Revised)
72 p.
1975

Abstract: Earlier energy consumption and supply forecasts of the Bureau of Mines are updated in this report, which is based mainly on evaluation of Bureau of Mines fuels data. Net energy consumption is expected to increase from 59,855 trillion Btu in 1974 to 110,230 trillion Btu in 2000. The present trend toward increased use of secondary energy sources will continue. Conversion losses in the electrical, synthetic gas, and synthetic liquids sectors will increase as will the total gross energy inputs. Both net and gross energy inputs per capita are forecast to rise. The difference between net and gross energy inputs will increase over time due to increased dependence on secondary energy sources. In 1974 the energy consumed by the electrical sector comprised 26.7% of total gross consumption of energy. By 2000 this sector is expected to consume 48.1% of total gross energy inputs. It is anticipated that coal, petroleum, and natural gas will have to be supplemented with synthetic fuels and imports. (BTB)
Availability: Bureau of Mines, Publications Distribution Branch, 4800 Forbes Ave., Pittsburgh, PA 15213

<124>
Energy Research and Development Administration, Battelleville Energy Research Center
Physical Properties of Gasoline/Methanol Mixtures
Report No. BREC/83-76/12, 81 p.
Jan 1977
Abstract: Experimental work was done to relate selected physical properties of gasoline/methanol solutions, containing contaminant levels of water, to compositional and physical properties of the blending gasoline. Water tolerance, octane number, vapor pressure, and distillation data are presented for eight gasolines and for their methanol solutions at methanol levels up to 20 wt-pct. The water tolerances of these
fuels were strongly dependent upon temperature, methanol concentration, and gasoline concentration. Testing their range of compositional effects, water tolerance measurements were made at selected methanol levels on individual hydrocarbons, refinery stocks, and gasolines selected for specific compositional characteristics. These selections provided a sufficient range of property variation for the data to permit useful water-tolerance/gasoline composition correlations. The results presented in this report supplement and expand published data on water tolerances of gasoline/methanol mixtures. It is shown that a gasoline can be made of the water tolerance of a gasoline/methanol mixture when the composition of the gasoline is known in sufficient detail. Portions of the D-86 distillation curves of gasoline/methanol mixtures can be estimated from a knowledge of the base gasoline distillation curves. In the region of 5 to 20 pct methanol content, vapor emissions can be estimated from those of the gasolines. The blending octane numbers resulting from the study agree well with previously published values. The references included and their associated bibliographies are intended to serve as a source of information regarding previous work on methanol and gasoline/gasoline solutions for use as automotive fuel. (10 references) (auth)

Availability: NTIS

Energy Research and Development Administration
Jun 1975

Abstract: Five rational policy goals are recognized as a focus for energy policy: maintain the security and policy independence of the U.S.; maintain a strong and healthy economy; provide for future needs so that life styles are not limited by the unavailability of energy; contribute to world stability through cooperative international efforts in energy; and protect and improve the Nation's environmental quality. The present energy problem is one of limited choices. This plan is designed to create options for the future and delineates innovations in technologies required to overcome energy problems. Individual chapters are devoted to: The Problem: Limited Choice; National Energy Technology Goals; Establishing a Strategic Framework for the Plan: Technology Priorities; Roles of Key Participants in Achieving National Goals; Summary of Federal Program Implementation; Potential Constraints of Implementation; and Future Evolution of the Plan. Eight national energy technology goals are outlined, all of which must be pursued together. Priorities are set for research, development, and demonstration technologies, and broad and specific supporting technologies are also outlined. Five major changes are needed in the nature and scope of the Nation's energy R&D&D program: emphasis on overcoming the technical problems inhibiting expansion of high leverage existing systems—nuclear, coal and light water reactors; immediate focus on conservation efforts; acceleration of commercial capability to extract gaseous and liquid fuels from coal and shale; high priority to the solar electric approach; and increased attention to under-studied new technologies that can be rapidly developed, e.g. solar heating and cooling and use of nuclear thermal power. (45 pages) (RFG)

Availability: GFO $1.70

Energy Research and Development Administration

Address: Washington, DC

The introductory chapter to Volume III explains how to interpret the data base output and provides a glossary of terms used in energy analysis. The remaining chapters of Volume III describe these sectoral studies: Agriculture; Mining, Manufacturing, Transportation, Commercial, Household, and Electric Utilities. Each of these documents describes the major energy consumption characteristics of the economic sector, details state-by-state excerpts of data installed in ECDB, and documents this data. Documentation consists of a general methodology as well as a detailed step-by-step methodology, including computer programs and data files used. Net U.S. energy consumption during 1974 was approximately 70 quadrillion Btu's (quads). Petroleum products provided about 46% of the total amount of energy used; natural gas contributed about 29%; coal accounted for about 18%; and hydro and nuclear sources provided about 3%. The industrial sector used 36% of all the energy consumed in 1974; the agriculture sector consumed 2%; mining sector used 3%; construction used 2 1/2%; manufacturing accounted for 28%; transportation used almost 25%; the commercial sector used about 16%; and the electric utilities sector used 16%. (NTA)
Understanding Conservation, it is pointed out that three kinds of action are needed to reach conservation goals: promotion of energy conservation ethic; conversion of existing facilities and equipment; and development of new, energy-efficient methodologies and technologies that conserve energy. The conservation technology base is reviewed for three end-use sectors (transportation, residential/commercial, and industrial) in Chapter Two. In the near future, alterations in existing types of vehicles, engines, and components will be the major means to achieve conservation. For alternative engines, the turbine and the Stirling, may play a significant role in meeting fuel economy and emission objectives. Efforts are also being made to develop and introduce electric and hybrid vehicles. Considering the residential/commercial sector, retrofitting buildings can have substantial near-term impacts. Because industries developed during a period of plenty use much energy, many industrial processes are inefficient and can be improved. Chapter Three examines technologies that would expand existing fuel sources. Through the early 1980's the U.S. should work on technologies that: produce additional petroleum and natural gas through enhanced recovery techniques; expand the direct use of coal in the utility and industry sectors; and expand the use of light water reactors in a once-through fuel cycle for electric power production. In Chapter Four, technologies that use new fuels (shale oil, synthetic fuels from waste and biomass, geothermal heat, and solar energy) are considered. Chapter Five looks at the broad-based support programs and activities needed, (e.g., basic research, data collection and dissemination, education, and training). Two major ERDA studies, now in progress, are described in Chapter Six: the Market-Oriented Program Planning Study and the Lemont-Racine Energy Efficiency Study. The final chapter provides an overview of ERDA's budget, which totals $7.3 billion.

Available: GPO, Stock No. 060-000-00676-1

Energy Research and Development Administration
Division of Transportation Energy Conservation
Address: Washington, DC

Highway Vehicle Systems Contractors Coordination Meeting. Ninth Summary Report
Report No. ERDA 76-61, TEC-76/002, meeting held in Ann Arbor, Michigan, Nov. 17 and 18, 1975, 256 p.

Abstract: Status reports on ERDA programs for heat engine systems (including gas turbine engines and components, diesel, Stirling, and Rankine engines) and vehicle systems for improving fuel economy were discussed at this conference. The Rankine engine program is being completed and some parts of the gas turbine program should be fully implemented in 1977. Diesel engines, on the other hand, have been delayed as a result of changes in procurement policies. An additional demonstration phase has been added to satisfy nitrous oxide emission standards. Stirling engines are still in the program formulation stage. Powertrain and vehicle system programs that are in procurement, working on advanced transmissions, recovering exhaust heat, and reducing vehicle drag and weight are discussed. ERDA is cooperating with the Department of Transportation on these projects. Three electric cars are being tried and legislation is under consideration for the future. 1977 is called the demonstration year. Work is continuing on methanol, methanol-gasoline blends, and hydrogen as alternative vehicle fuels. Details of each...
<129> CONT.
program are provided. (46 references) (25X)
Availability: GPO $3.25; NTIS

130>
Energy Research and Development Administration,
Division of Transportation Energy Conservation
Address: Washington, DC
Highway Vehicle Systems Contractors Coordination Meeting. Tenth Summary Report
Report No. ERDA-76-136, TEC-76/003, summary of a meeting held in Ann Arbor, Michigan, Sept 4-6, 1976, 385 p.
1976
Abstract: These meetings are held periodically to provide a focus for government, industry, and technical experts on technical aspects of energy conservation in transportation. Over 525 people, representing 175 contractors and organizations, attended this meeting. The Tenth Summry is organized under these subject areas: introductory and keynote remarks by the Energy Research and Development Administration, the Federal Energy Policy and Programs, the Environmental Protection Agency; heat engines, including gas turbine engine and components, diesel engines, Stirling engines, and Rankine engines; powertains, accessory, and vehicle systems aimed at near-term improvements in fuel economy; electric and hybrid vehicle systems; and alternative fuels utilization. (BTB)
Availability: NTIS

131>
Energy Research and Development Administration,
Division of Transportation Energy Conservation
Address: Washington, DC
Highway Vehicle Systems Contractors Coordination Meeting. Eleventh Summary Report
Report No. CMF-761028, TEC-77/001, meeting held in Ann Arbor, Michigan, Sep 18-20, 1976, 382 p.
1977
Abstract: The purpose of these meetings is to promote technical progress in designing highway vehicles that consume less energy. Contractors, staff, consultants, prospective contractors, and other experts discussed trends in requirements, the status of current programs, and plans for future progress. Summaries of the presentations are organized into these main categories: preliminary and keynote presentations by ERDA, the National Aeronautics and Space Administration, and the Department of Transportation; vehicle systems programs, including transmissions, accessories, drive, variable displacement engines, and combustion programs; heat: engine developments, including diesel engines, gas turbines, and Stirling engines; heat engine and materials technology programs; and alternative fuels utilization programs. Appendix A provides a list of the over 425 attendees and the 169 organizations represented. Appendix B lists the advanced vehicle displays exhibited at the Meeting. (BTB)
Availability: GPO $4.40

132>
Energy Research and Development Administration,
Division of Transportation Energy Conservation
Address: Washington, DC
Introduction to the ERDA Electric and Hybrid Vehicle Demonstration Project
Report No. ESHQ-0006, meeting held in Ann Arbor, Michigan, Oct 6-8, 1975, 54 p.
1975
Abstract: In an effort to evaluate and promote ERDA's Electric and Hybrid Vehicle Demonstration Project, described in this report, was authorized in Public Law 94-443 to promote electric and hybrid vehicle technology and to demonstrate the commercial feasibility of these vehicles. The law requires that: (1) the project be established within ERDA; (2) R & D be conducted on electric and hybrid vehicles; (3) a two-part demonstration involving up to 7,500 vehicles be conducted; and (4) a program of financial incentives be established. The legislative history of the Act is summarized, and ERDA's position on the Bill is reviewed. The domestic electric vehicle industry consists of small businesses. In Europe and Japan major vehicle manufacturers are involved in electric vehicle development programs, are emphasizing integrated research and engineering development of electric propulsion systems, and are planning for the infrastructure needed to support commercial applications of these systems. With significant advances in electric and hybrid vehicle technology, (e.g., battery, propulsion systems, and manufacturing processes), the introduction of these vehicles could result in substantial petroleum savings, improvement in vehicle efficiency, and the ability to limit or control pollution from the transportation sector. The ERDA energy storage system F & D program covers electrochemical (battery), mechanical (flywheels), chemical (hydrogen fuel), and thermal storage systems. The basic plan to transfer electric vehicle technology to private enterprise and potential vehicle users is outlined. The information base to be disseminated includes design, marketing, economic operation, environmental, and other data. In addition to the demonstration buys of 7,500 vehicles, other financial incentives are planned (i.e., encouragement and protection of small businesses and loan guarantees). The vehicle demonstration program calls for an early demonstration of up to 2,500 vehicles plus a second phase with 5,000 additional vehicles. The demonstration plan covers the number and selection of demonstration sites, data requirements, vehicle user mix, financial arrangements, etc. Servicing and maintenance centers and adequate information requirements need to be planned. Safety considerations and requirements, another concern of electric vehicle suppliers, are under study, specifically for crashworthiness, fire and explosion protection, electric shock protection, crash avoidance subsystems, placement of batteries, and containment of dangerous materials. Following the completion of the F & D Program, the major factors that will affect the development of a commercial electric vehicle industry include: the market demand, investment in manufacturing facilities, development of a sales/service infrastructure, availability of raw materials, impacts on the petroleum industry, and modification of existing tax structure to facilitate introduction of electric hybrid vehicles on public roads. (BTB)
Availability: NTIS
the maximum rate of technical progress toward the country's clean air objectives, the Advanced Automotive Power Systems (APPS) Division, which has now been transferred from the Environmental Protection Agency to ERDA, has been holding periodic coordination meetings with all of its contractors, staff consultants, prospective contractors, and selected guests. The meetings focus on the trends in requirements and the status of the program; they provide an opportunity for interaction between the participants on problem areas of mutual interest. This report summarizes the presentations and discussions at the Eighth Contractors Coordination Meeting. Documentation such as this is believed to be an effective and timely means of broadly disseminating a full and up-to-date review of APPS program objectives and progress. Included in this document are presentation summaries grouped under the following broad subject areas:

- Energy Conservation, Goals and Plans
- Transportation Efficiency - Near-Term Impact Programs: Gas Turbine and Related Programs
- Rankine Systems: Stirling Engine Program
- Alternative Fuels Program: and Impact Studies

In conjunction with the technical program, a number of static and dynamic exhibits were on display. Appendix B is a list of the exhibitors and photographs of some of the exhibits. A bibliography of APPS publications (annual, final, and summary reports) released through April 1975 is contained in Appendix C. (from Foreword)

Availability: NTIS

Energy Research and Development Administration, Division of Transportation Energy, Washington, DC 20545; MA, 1900 Sulphur Spring Ft., Baltimore, MD 21227

Alternative Fuels Utilization Report

Periodic publication, approximately 8 p.

Abstract: This publication serves as a media for information exchange among researchers in alternative fuels utilization and provides a stimulus for further research on the use of these fuels for transportation. The first edition, published April 1977, contains a feature article describing the alternative fuels program of the Division of Transportation Energy Conservation of ERDA and its sponsored activities on alcohol fuels. Also included in this publication are current news notes on industry, government actions, and international happenings related to alternative fuels. Recent publications and upcoming conferences that may be of interest to researchers and others in the field are announced. (89Y)

Availability: Energy Research and Development Administration, Division of Transportation Energy Conservation, Alternate Fuels Branch, Washington, DC

Escher Technology Associates

Address: P.O. Box 189, St. Johns, MI 48879

Moving the Railroads Off of Oil: The Hydrogen Alternative

Jan 1977
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: Although there seem to be only two recognized alternative railroad fuels (syngas from coal and shale and rail electrification), this report suggests a third option--hydrogen energy. The technical and economic feasibility of this option is discussed, and a demonstration program is outlined. The hydrogen-energy systems concept is described. A feasibility study indicates that: (1) the hydrogen rail alternative appears to be sufficiently promising; (2) conversion of current diesel-powered active electric power systems is thought to be technologically feasible; and (3) the concept must be carried to the hardware demonstration level to warrant serious consideration by the railroad industry. A major purpose of this report is to communicate the results of this feasibility study. In the railroad industry. In addition, this report evaluates the possibility of converting locomotive engines to hydrogen, defines an overall project technical plan, and assesses the relative economics of the hydrogen alternative as compared to hydrocarbon synfuels and electricity alternatives. A tentative program approach is recommended to ERDA, including a demonstration program, limited development to support the demonstration, industry lead in the demonstration, with government support, and the inclusion of both freight and passenger service in the demonstration. Also, although the technical data base is currently inadequate, it is estimated that hydrogen-generated locomotive diesel engines are feasible and technically attractive. (5 references) (HB)

Availability: NTIS

Hydrogen-Via-Electricity: A Candidate Transitional Transportation Energy System Concept

Sep 1976

Abstract: There is an expressed need to move transportation off oil. However, the strategic alternatives for creating a non-petroleum energy base for transportation are all long-term, extremely costly systems (hydrocarbon synfuels, electricity, hydropower energy), each having technical and socio-economic limitations and constraints which will govern their contributions. To "preserve the options" while conducting positive steps to obviate the possibility of energy shortfalls affecting transportation in the meanwhile, a "transitional transportation energy" systems approach may be needed. A candidate concept, "Hydrogen-Via-Electricity" (HVE) is described in terms of criteria for such a system, and also related to each of the strategic alternatives to establish compatibility. If implemented, the HVE Concept has the near-term potential for supporting a certain fraction of the energy needs in the following transportation subsectors: railroads, intercity trucking, urban and intercity buses, and selected fixed vehicle systems. (43 references) (auth)

Availability: NTIS

Recent Progress in the Hydrogen Engine

Executive Office of the President, Office of Management and Budget
Address: Washington, DC
Special Analyses, Budget of the United States Government, Fiscal Year 1977
313 p.
1976
Abstract: The Federal budget is analyzed first as a whole to illustrate the effect of government finances on the economy, then by a series of special analyses in terms of national income accounts, groups of funds, borrowing and debt, and the distribution and nature of benefits, credit programs, revenue losses from income tax deductions and exemptions, obligation levels for programs, and civilian employment in the Executive Branch. Social programs covering education, training and employment, health, income security, civil rights, and crime reduction are examined. Trends and developments of programs providing aid to State and local governments, research and development, and environmental programs are analyzed to identify funding for selected activities.

Availability: GPO $2.70, Stock No. 041-001-00168-5

Executive Office of the President, Energy Policy and Planning
Address: Washington, DC
* The National Energy Plan
126 p.
29 Apr 1977
Abstract: The President's proposed National Energy Plan is described in this document, which includes chapters on: the Origins of the U.S. Energy Problem; the Continuing Crisis; Principles and Strategy of the National Energy Plan; Conservation and Energy Efficiency; Oil and Natural Gas; Coal, Nuclear, and Hydroelectric Power; Nonconventional Sources and Energy Research; the Role of Government and the American Public; and the National Energy Plan and the Future. In the transportation sector, the plan suggests incentives to reduce consumption (e.g., an excise tax on new automobiles with low fuel efficiencies, a standby gas tax, fuel efficiency standards, and an excise tax and rebate system for light-duty trucks, and renewal of Federal excise tax on intercity buses). To enable more efficient energy use in buildings, the plan calls for a tax credit to approved residential conservation measures, a utility program to insulate homes with payment made through monthly bills, expansion of the weatherization program for low-income households, etc. Government policies for oil and gas are aimed at providing for prices that stimulate development of new fields and a more rational pattern of distribution, while preventing windfall profits. Industries and utilities are encouraged to convert from oil and gas to coal and other fuels. Along with promoting increased coal use, the administration will try to achieve continued improvement in environmental quality. The President's policy on nuclear power will be to defer any U.S. commitment to advanced nuclear technologies that are based on the use of plutonium. The country has the option of relying on light-water reactors to provide nuclear power. EPA's nuclear waste management program has been enlarged to encompass development of technologies for long-term storage of spent fuel. The administration is strongly in support of developing technologies to use nonconventional energy resources.

Availability: GPO, Stock No. 040-000-00380-1
Abstract: This report provides an in-depth analysis of the base year data development and projections of trucking activity and fuel consumption. Descriptions of existing sources of information, data reliability, methodological procedures and assumptions, historical trends, and comparisons with other estimates are presented in great detail.

Both the data base and forecasts are estimated in a highly disaggregated fashion. Trucking activity measures include the number of trucks, vehicle miles travelled, average load carried, and total ton-miles, each classified by truck size class, area of operation and fuel type. In addition, the historical measures for 1973 are detailed by major use—personal transportation, for-hire and other private. Base year fuel consumption rates on a miles per gallon basis are also developed according to the same vehicle size, area of operation and fuel type classification and are consistent in the aggregate, with the most reliable information available on truck fuel consumption. A baseline forecast of fuel consumption is made by applying the detailed base year fuel economy estimates to the detailed projections of vehicle miles travelled. This forecast provides a framework whereby success of the voluntary industry/government fuel economy improvement program can be measured. This information is organized into three sections of the report. Section I presents the estimation methodology and statistical tables of the detailed trucking activity measures for 1973. Section II covers the forecast of trucking activities for 1980, 1985, and 1990 and includes an extensive explanation of the procedures employed in the derivation. Section III develops the detailed truck fuel economy estimates and presents the baseline forecast of fuel consumption. (13 references) (from Overview)

<145>

316 p.
Nov 1974

Abstract: Energy conservation data in the transportation sector were compiled for a scenario with petroleum prices under $8 per barrel and for scenarios with petroleum prices under $7 and under $11 per barrel. Projections are made of passenger and freight and trucking modes. Fuel transportation demands and impacts on demands for transportation of products sensitive to petroleum prices are discussed in an overview. Information presented in five appendices includes summary tables of passenger travel projections by purpose and distance interval; summary tables of total passenger travel trip costs by mode; fuel consumption by type of fuel and mode of passenger travel; auto fuel efficiencies considering vehicle sales and alternative energy; and gasoline consumption for military transportation. (TIC)

Availability: GPO 34.26, Stock No. 4118-00639

<146>
Faucett, J.G.; Scheppach, B.G.; Terymaltsev, T.
Address: 5454 Wisconsin Ave., Chevy Chase, MD 20015


Dec 1974

Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Analysis and Information, Office of Transportation Systems

Abstract: the five volumes of this study present measures of the value of plant and equipment in transportation, projections of investment needs and measures of capacity. The first volume describes the methodology and procedures used in deriving measures of investment and stocks of plant and equipment in some 20 transportation modes, commercial and private. The data are presented in both historical and constant dollar values in the second volume. Investment needed for replacement and expansion are projected to 1980 for the same detailed modes in the third volume. Economic depreciation is calculated in the fourth volume with an explanation of the concepts involved in the measurement of capital costs. The final volume examines the concepts and problems of capacity measurement and presents alternative measures for the principal modes of air, motor freight, rail and water. (123 references - GBA)
Federal Energy Administration
Address: Washington, DC 20461
Initial Report on Oil and Natural Gas Resources, Reserves, and Productive Capacities.
Submitted in Compliance with Public Law 93-275, Section 15(b). Executive Summary

Abstract: U.S. proved reserves of crude oil and natural gas are estimated to be 38.2 billion barrels of oil and 237 trillion cubic feet of natural gas. These estimates are compared with reserves from the American Gas Association, the U.S. Geological Survey, the American Association of Petroleum Geologists, the National Petroleum Council, and the Potential Gas Committee. Proved reserves are defined as those oil and natural gas resources that have been discovered and can be produced under current economic and technological conditions. Four conclusions are reached: 1) annual additions to reserves must be greater than in recent years if domestic producing rates are to be sustained; 2) remaining volumes of recoverable oil and gas are large enough to justify increasing efforts to explore and produce them; 3) the limits of recoverable oil and gas resources may be approached in the next fifty years; and 4) there is a need for a) intensified exploration to define those limits, b) advancement of recovery technology, c) development of alternative energy sources, d) energy conservation, and e) economic incentives to facilitate exploration, recovery, development, and conservation.

Federal Energy Administration
Address: Washington, DC 20461
National Energy Outlook
Report No. EFA/N-75/713, 593 p., also Executive Summary EFA/N-76/100, 14 p.

Abstract: This report is an update of last year's Project Independence Report. It concludes that the U.S. can achieve energy independence by 1985 without sacrificing its economic objectives. The study states that the U.S. oil imports, which are currently 6.1 million barrels per day (MB/D), will continue to increase in the next two years, until Alaskan production begins. However, with gradual deregulation of oil and natural gas prices, intensive efforts to increase domestic production, and continuation of current world oil prices, 1985 imports could drop to 5.9 MB/D, slightly below today's level. With accelerated production and increased conservation efforts, imports could decline to 1 to 2 MB/D in 1985. If domestic oil and gas prices are regulated at low levels, however, imports could reach 13.5 MB/D that year. The report points out that even if imports decline by 1985, they could increase again by 1990 as production from older fields declines. This decline will need to be offset by the use of nuclear power, coal, synthetic fuels, and emerging energy sources such as solar power.

Availability: GPO $7.30, Stock No. 041-018-00097-6, Executive Summary $0.60, Stock No. 041-018-00102-6

Federal Energy Administration
Address: Washington, DC 20461
Findings and Views Concerning the Exemption of Middle Distillates from the Mandatory Petroleum Allocation and Price Regulations

Abstract: The Federal Energy Administration has concluded that mandatory allocation and price regulations on middle distillates are no longer necessary and is therefore transmitting such an amendment to the Congress as specified by Section 12 of the Emergency Petroleum Allocation Act (EPAA). Middle distillates are not in short supply, and adequate supplies are expected for the near term. Applicable unused refinery capacity guarantees that excluding middle distillates from controls will not adversely affect the supply of any other petroleum product. Exemptions of middle distillates from price and allocation regulations is not likely to result in any significant price increases. Competition and market forces are sufficient to protect consumers. Deregulation of middle distillates will not cause inequitable prices for any class of end users or other product users, nor will such action have significant impact on the rate of unemployment, the Consumer Price Index, or the Gross National Product. Continued regulation of middle distillates is no longer necessary to accomplish the goals of the EPAA and is now operating to impede the achievement of those goals.

Federal Energy Administration
Address: Washington, DC 20461
Findings and Views Concerning the Exemption of Residual Fuel Oil from the Mandatory Petroleum Allocation and Price Regulations

Abstract: An amendment to the Federal Energy Administration's regulations has been prepared that would exempt residual fuel oil from mandatory allocations and price controls. This report has been written to fulfill requirements of Section 12 of the Emergency Petroleum Allocation Act, which calls for findings and FEA's views to support such amendments. Provided in this document is an analysis of (1) the supply of and demand for residual fuel oil, (2) the pricing of the product, and (3) the potential economic impact of exempting residual fuel oil from regulation. The following conclusions are reached: residual fuel oil is not in short supply; exemption of residual fuel oil from regulations will not adversely affect the supply of any other oil or refined product subject to the EPAA; competition and market forces are adequate to protect consumers; and exemption of residual fuel oil from regulation will not result in inequitable prices for any class of residual fuel oil or other product user.

Federal Energy Administration
Address: Washington, DC
The Strategic Petroleum Reserve Plan in Brief

Abstract: As a summary of "The Strategic Petroleum Reserve Plan," this document describes the Reserve plan, which is designed to help stabilize the petroleum situation. Major features of the proposed plan are reviewed, including size, daily drawdown capability, types of crude, oil acquisition, types and location of storage facilities.
Abstract: This publication provides basic data on energy resources and consumption from 1950 to 1976 in the following tables: Domestic Consumption Per Capita by Source (5-year increments); Historical Energy Consumption Patterns—1960-1976; Domestic Energy Consumption by Type of Fuel; Domestic Energy Consumption by Economic Sector (commercial/residential, industrial, transportation, and electricity generation); Domestic Energy Consumption Per Capita by Source; Total Domestic Energy Production; Domestic Crude Oil Production and Proved Reserves; Domestic Demand for Refined Petroleum Products; U.S. Oil Imports; U.S. Crude Oil Refining Capacity; U.S. Natural Gas Production, Consumption, and Reserves; Number of Wells Drilled in the U.S.—Oil, Gas, and Dry; Bituminous and Lignite Production and Consumption; Bituminous and Lignite Production by Geographical Location; Nuclear Power Capacity and Production; Electricity Generation by Source; Crude Oil Prices; Motor Gasoline Prices; Natural Gas Prices; and Coal Prices. This report is to be updated periodically and expanded to furnish more comprehensive data. (EYB)

Federal Energy Administration
Address: Washington, DC 20461

A Compliance Guide for Domestic Crude Oil Pricing for Producers and First Purchasers

Abstract: The basic approach to saving truck fuel is to assist producers and first purchasers in both understanding and complying with Federal Energy Administration regulations regarding the pricing of domestic crude oil. The guide presents the changes in regulations resulting from the Energy Policy and Conservation Act as well as clarifications of definitions of property, posted prices, et al., that have been issued since that time. (From Preface)
Federal Energy Administration, National Energy Information Center

Energy Information: Report to Congress. Quarterly Report

Quarterly publication, approximately 130 p.

Abstract: Since third quarter 1974 these reports have been prepared periodically as required by provisions of the Energy Supply and Environmental Coordination Act of 1974 (P.L. 93-319, as amended by P.L. 94-163). Each issue presents summaries and statistical tables for the quarter on resource development and production, consumption, storage, distribution, imports, and exports of coal, natural gas, crude oil, and refined petroleum products. Sections are included on the development and operation of nuclear power and on electric power consumption, trade, production, and plant operation. One issue per year contains an historical appendix of summaries and data tables on fuels, nuclear energy, and electric power. (RTS)

Availability: NTIS $10.00 for individual quarterly reports. $35.00 for annual subscription

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Federal Energy Administration, National Energy Information Center

Petroleum Market Shares: A Report on Retail Marketing by Brand

Monthly report, approximately 7 p.

Abstract: This is one in a monthly series of reports that monitors changes in the aggregate market shares of motor gasoline retailers. It is based on a continuing survey of gasoline service stations conducted by the Bureau of the Census as collecting agent for FEA. The survey obtains data on the number of gallons sold by approximately 10,000 sample stations each month. This information is used to develop universe estimates of market shares as required by Section 4(c)(2)(A) of the Emergency Petroleum Allocation Act of 1973 for nonbranded independent marketers, branded independent marketers, and other persons engaged in the marketing or distribution of refined petroleum products. Tables present data on: Market Share and Average Price by Brand Category, Gallonage Sales Through Service Stations by Marketer Type, U.S. Market Shares of Gasoline Service Stations, Number of Gasoline Service Stations and Average Sales by Marketer Type, and Relative Standard Errors for Selected Estimates. (from Introduction)

Availability: GPO $2.40, Stock No. 041-019-00122-1

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Federal Energy Administration, National Energy Information Center

Directory of Federal Energy Data Sources: Computer Products and Recurring Publications

Report No. PB-254163, FEA/B-76/219, 84 p.

May 1976

Abstract: The purpose of this directory is to announce two major categories of Federally-sponsored energy-related information: energy information on magnetic tape and recurring publications which contain energy-related numerical data. The information on magnetic tape is primarily in the form of data files. However, there are also computer programs, data base reference services, and mathematical models. The items are listed under broad subject categories. The citations include title, responsible agency, dates of coverage, accession number, availability information, and abstract. Each entry is indexed by subject, originating agency, and accession number. (from Foreword)

Availability: NTIS
Federal Energy Administration, Office of Energy Conservation and Environment, Office of Transportation Programs
Address: Washington, DC 20461

Energy Conservation Potential of Urban Mass Transit


Abstract: Trends in urban travel and energy uses during the period 1950-73 are examined. The energy intensiveness of various automobile and transit services is compared. The effect of expanded and improved transit is forecast. In the short term very little energy can be conserved by increasing transit service. Both automobile disincentives and transit incentives will probably be needed to convince people to switch their transportation mode. For the long term, improved mass transit could significantly decrease energy consumption, while adding benefits of improved mobility, reduced urban congestion, and less urban air pollution. (17 references) (BYB)

Availability: NTIS

Federal Energy Administration, Office of Energy Conservation and Environment, Policy, Program Development, and Environment
Address: Washington, DC 20461
Carpool Incentives: Analysis of Transportation and Energy Impacts

Abstract: The purpose of this study was to evaluate the potential and the direct and indirect effects of carpooling strategies and classified into four categories: employer-based actions, parking availability and costs, traffic regulation and control, and travel cost. Coordinated implementation of several strategies could achieve a higher level of fuel conservation than implementation of single strategies. Disincentives to using private cars and restrictions on travel are much more effective than carpool incentives. Carpool strategies designed to include more than work trips alone would be more beneficial. The implementation of carpooling policies can cause long-term changes such as a reduction in car ownership and a shift to more fuel-efficient cars. Promotional efforts are encouraged to inform people of economic and other benefits of ride-sharing. These five strategies are considered desirable and practicable for expanded immediate use: car pools and bus pools, employer-based carpool matching and promotion, preferential traffic control, preferential carpool parking, and carpool parking subsidies. The Federal Energy Administration is advised to work with state governments in developing comprehensive, energy-conserving transportation plans for each of the major urban areas. (BYB)

Availability: GPO $2.70, Stock No. 081-010-00124-7

Federal Energy Administration, Office of Energy Conservation and Environment, Office of Transportation Programs
Address: Washington, DC 20461

Fuel Economy News

Quarterly publication, approximately 6 p.

Abstract: This quarterly newsletter of the Voluntary Truck and Bus Fuel Economy Program reports on the Voluntary Truck and Bus Fuel Economy Program, Federal Energy Administration, Office of Energy Information and Analysis, Competition Task Force

Address: Washington, DC 20461
Report No. PB-260565, FEA/F-76/352, 57 p.

Abstract: This report presents the results of the Federal Energy Administration (FEA) survey of firms that sell distillate and residual fuel oil to ultimate consumers during the period January 1, 1975, through December 31, 1975. Nationally, refiner-marketers sold approximately 42 percent of their distillate fuel oil in 1975 to ultimate consumers (i.e., end-users and wholesale purchasers). Approximately 58 percent of their volume to independent marketers as either branded or nonbranded product. Refiner-marketers sold nationally approximately 80 percent of their 1975 residual fuel to ultimate consumers and 20 percent of their volume to independent marketers as branded or nonbranded product. (2 references) (GBA)

Availability: NTIS

Federal Energy Administration, Office of Energy Information and Analysis, Competition Task Force
Address: Washington, DC 20461
Petroleum Market Shares - Regional Sales of No. 2 Distillate Fuel Oil to Ultimate Consumers, 1972 through 1975

Abstract: This report presents regional results of the Federal Energy Administration (FEA) survey of firms that sell distillate and residual fuel oil to ultimate consumers during the period January 1, 1972, through December 31, 1975. The survey covers the sales of No. 2 distillate fuel oil for home heating and commercial and miscellaneous industrial fuel applications. Sales of No. 1 diesel fuel for highway use by refiner-marketers are included. Since the survey was designed primarily to monitor market shares in the critical heating oil market, independent truckstop operators are not surveyed; their diesel sales, therefore, are not represented in the survey results. The survey results, however, establish a consistent time series for measuring trends in the market share position of refiner-marketers versus independent fuel oil distributors in the No. 2 distillate market. (2 references) (GBA)

Availability: NTIS
Abstract: A national energy policy is the development of a reliable estimate of domestic crude oil and natural gas resources, reserves, and productive capacities. The Federal Energy Administration (FEA) Act directs the FEA to prepare an "complete and independent analysis of actual oil and gas reserves and resources in the United States and its Outer Continental Shelf, as well as of the existing productive capacity and the extent to which such capacity could be increased for crude oil and each major petroleum product each year for the next ten years through full utilization of available technology and capacity." Volume I of the final report provides final reserve and productive capacity estimates, compares these estimates with estimates from other sources, projects U.S. crude oil productivity estimate, evaluates the procedures used to develop these estimates, and recommends procedures to be used for future estimates. Volume II of the final report provides summaries of engineering analyses of major domestic oil and gas fields. (From Summary)
Address: Washington, D.C.

Abstract: These pamphlets are a series of technical hints for conserving fuel used by trucks. Included are tips on unnecessary idling, fuel economy, etc. (BYB)

Availability: FEA, Washington, DC 20461

Federal Energy Administration, Voluntary Truck and Bus Fuel Economy Improvement Program
U.S. Dept. of Transportation; U.S. Environmental Protection Agency
Address: Washington, DC

Periodic publication, approximately 2 p.

Abstract: These pamphlets are a series of technical hints for conserving fuel used by trucks. Included are tips on unnecessary idling, fuel economy, etc. (BYB)

Availability: FEA, Washington, DC 20461

Federal Task Force on Motor Vehicle Goals Beyond 1980
Address: Washington, D.C.


Draft report, 30 p. in Volume 1; 279 p. in Volume 2

2 Sep 1976

Sponsor: Executive Office of the President, Energy Resources Council

Abstract: Written by a task force with representatives from several Federal departments and agencies, this draft report examines motor vehicle fuel economy goals beyond 1980 and is compatible with environmental, safety, and economic objectives. Decisions on the automobile beyond 1980 involve balancing such factors as consumer preferences, government regulations, and manufacturing and finance requirements. It is concluded that, with adequate industry involvement in government regulations, the U.S. can save four million barrels of oil per day by 1995. This fuel savings would represent a 40 to 50% reduction in projected automobile fuel consumption, a 25 to 40% reduction in projected commercial vehicle fuel consumption, and a 30% reduction in projected commercial vehicle fuel consumption. The actual fuel savings are dependent on the rate of introduction of new fuel-economical cars. A move toward more compact, properly-engineered, light-weight automobiles is not expected to increase automobile occupant fatalities and injuries. However, implementation of a higher safety level would increase car weight and cost. The impact of emissions controls on fuel economy is estimated. The estimated emission costs per mile of automobile transportation will decrease with the transition to lighter, more fuel-economical cars. An early draft report was published in July 1976. (BYB)

Pels, M.F.
Princeton Univ., School of Engineering and Applied Science, Center for Environmental Studies
Address: Princeton, N.J.

* Comparative Energy Costs of Urban Transportation Systems

Transportation Report No. 74-T-2, 41 p.

1974

Sponsor: Ford Foundation, Energy Policy Project

Abstract: Several urban transportation systems are compared on the basis of the energy resources consumed for their operation and for the manufacture of their components (vehicle and pathway systems). Four systems are extensively analyzed: the auto, bus, rail, and personal rapid transit. From the auto results, the energy characteristics of two additional modes: Dial-a-ride and the motorcycle, are estimated. Finally, the bicycle and walking are included to provide a comparison of the motorized modes with human propulsion systems. For each system, the operation energy is estimated as the average energy consumed per vehicle-mile. The manufacture processes are traced back to the primary resources required for the materials comprising the components, to yield the energy required to manufacture a vehicle, and the average energy consumed to construct a lane-mile of guideway. By summing the manufacture contributions over the lifetimes of the components, the operation and manufacture energy results are added together to yield a total energy consumed per vehicle-mile. To provide a measure of the potential energy efficiency of the system, the average energy consumed per available seat-mile is calculated to compare the systems when they are operating at capacity. An example containing assumed average occupancy levels gives a more realistic comparison on the basis of energy consumed per passenger-mile. (24 references) (auth)

Availability: Updated article appears in Transportation Research, Vol. 9, pp. 297-306 (1975)

Pels, M.F.
Princeton Univ., Dept. of Civil Engineering, Center for Environmental Studies and Transportation Program
Address: Princeton, N.J.

* Suburban-Suburb Intercity Travel: Energy, Time and Dollar Expenditures


Jun 1976

Sponsor: National Aeronautics and Space Administration, Ames Research Center
Abstract: This paper is an attempt to evaluate the energy, time, and dollar costs of suburb-to-suburb intercity travel by different transportation modes. Although an energy comparison of transportation modes usually only takes into account costs between terminals, this study examines the effect of adding suburban-to-terminal and terminal-to-suburban travel. The total energy costs are considered along with the total travel times and dollar costs to the traveler. Trips between origins in seven suburbs of Newark, New Jersey, and destinations in two Washington, D.C., suburbs are analyzed. Five main nodes are investigated: automobile, air, Metroliner, conventional rail, and bus. The zones from terminal to suburban include automobile, bus, rail, and walking. Energy and time costs appear to be inversely correlated, and energy and dollar expenditures are directly correlated. The more energy-intensive and dollar-costly trips (in increasing order: bus, rail, Metroliner, auto, and air) take less time. However, there is overlap among trip types, and some exceptions and unanticipated results are discussed. To make a decision on type of transportation, a traveler probably considers time and dollar costs, not energy costs. This study attempts to combine time and dollar costs by (1) comparing money saved per extra hour spent in travel (this analysis places metro trips in a favorable light); and by (2) adding dollar and time expenditures together to reflect the value a traveler places on his own time. If no dollar value is assigned to a traveler’s time, the preferred main modes are in order of increasing dollar costs, i.e., bus and rail, metro, car, and air. However, energy cost results in a different ordering with bus trips as the most “expensive.” (15 references) (EYB)

Availability: RTIS

Fels, M.P.
Princeton Univ., School of Engineering and Applied Science, Center for Environmental Studies
Address: Princeton, NJ 08540

Energy Costs of Highways

Jan 1977
Sponsor: General Motors Corp., Transportation Systems Division

Abstract: This paper is intended to evaluate a piece of the automobile’s total energy consumption: the energy required to construct and maintain a highway system. Included will be energy requirements for the manufacture of necessary materials, in addition to the fuel consumed during the process of excavation and pavement construction or repair. The analysis consists of three steps: A) evaluation of the energy requirements for the materials contained in asphalt and Portland concrete pavements; B) total energy requirements per lane-mile for the construction of highways of the two pavement types; and C) additional energy requirements over the highway’s lifetime due to maintenance. To some extent the construction analysis was based on a specific segment of Interstate I-95 in Trenton, New Jersey, which was felt to be representative of most new Interstate. Energy costs to construct other types of highways and roads, and detailed (and regular) data are available, may be approximated by applying pavement dimensions to the materials analysis. Maintenance programs depend on the specific highway, its traffic and weather conditions. To estimate the maintenance energy costs, we have

examined the New Jersey Turnpike (NJTP) system. (5 references) (From Introduction)

Fels, M. P.
Princeton Univ., Center for Environmental Studies
Address: Engineering Quadrangle, Princeton, NJ 08540

Breakdown of Energy Costs for Rapid Rail Systems

Jan 1977
Sponsor: General Motors Corp., Transportation Systems Division

Abstract: Operational energy requirements of rapid rail systems are calculated, including energy used for traction (propulsion, dead-heading, lighting, and space conditioning of vehicles) station operation (lights, recharging, escalators, and space conditioning), and maintenance. Three existing systems are analyzed: the Bay Area Rapid Transit, serving the San Francisco area; the Port Authority Transit Company of Pennsylvania and New Jersey, a high-speed line connecting New Jersey suburbs to Philadelphia; and the Port Authority Trans-Hudson, a system connecting an area of New Jersey to New York City. A system’s exact use is dependent on use factors (how much vehicles are used), configuration (e.g., number of stations, station spacing, etc.), and internal workings of machinery and structures in the system. Several tentative conclusions are drawn from this study: climate seems to affect the amount of energy consumed more for systems in cold climates than those in milder climates; idling of cars accounts for a large percentage of the total energy consumption when cars are kept “hot” during non-operation; lighting represents two-thirds of the energy consumed for unheated, uncooled stations; lighting needs for underground stations are considerably higher than they are for aerial stations; escalators and train controls are other major energy use factors in stations; during cold weather, heating can double the amount of energy consumed by stations; and system maintenance is responsible for up to 6% of the total energy consumption. Significant variations among systems and among six periods within one system could not yet be explained from available data. (14 references) (BtE)

Finegold, J. O.
California Institute of Technology, Jet Propulsion Laboratory
Address: Pasadena, CA

Hydrogen: Primary or Supplementary Fuel for Automotive Engines


1976
Sponsor: National Aeronautics and Space Administration; Society of Automotive Engineers

Abstract: Some hydrogen, gasolene, and mixtures thereof were compared as fuels for lean burn engines. Hydrogen for the mixed fuels tests was generated by partial oxidation of gasoline. Hydrogen combustion yields the highest thermal efficiency at any NOx level. Gasoline yielded the highest NOx efficiency for NOx levels lower than or approximately equal to two ppm. For lower NOx levels and high vehicle inertia weights, progressively more hydrogen supplementation was the second most efficient system. For vehicle inertia weights below 5000 lbs (2300
Specifically, the individual and joint effects of national trends in gasoline price, transit funding, and fuel economy of automobiles are examined with respect to their influence on two Sacramento regional variables: transit usage and transportation fuel consumption. The authors conclude that given the uncertain future of causal forces that are beyond the region's control (e.g., gasoline price), a macrolevel analysis may be a more judicious use of limited transportation planning resources. (50 references) (auth)

Ford Foundation, Energy Policy Project
Address: 1755 Massachusetts Avenue NW
Washington, DC 20036

A Time to Choose: America's Energy Future

Abstract: This book is the final report of the Ford Foundation Energy Policy Project, a two and one-half year research effort on the nation's energy crisis. The principal conclusion is that it is desirable and technically and economically feasible to reduce the rate of energy growth. The U.S. can lessen energy growth from the current 4.5% to about 2% per year without harm to jobs, incomes, or quality of life. After 1985 it appears feasible to sustain growth in the economy without any further increases in the annual consumption of energy. The largest savings in energy consumption can be achieved by "technical fixes" in three areas: construction and operation of buildings to reduce energy consumed for heating and cooling; better mileage for automobiles; and water energy efficiency in industrial plants through new technology and use of waste heat. The book contains six appendixes with the following titles: Energy requirements for scenarios; Capital requirements for conservation; Technical Fix vs. Historical Growth; Energy supply notes; Major energy resources; Government organization and re-organization for energy; and Economic analysis of alternative energy growth patterns, 1975-2000, a report by R. A. Hudson and D. W. Jorgenson, Data Resources, Inc. (NPG)

Availability: Ballinger Publishing Co., Cambridge, MA

Message to Congress from the President; Summary Fact Sheet: President's Energy Message
26 Feb 1976

Abstract: The President's message to Congress reiterated the importance of energy independence, outlined actions he had taken to achieve energy goals, and urged Congressional action on 18 major energy proposals. The President summarized his energy program, which were designed to stimulate energy conservation; to increase the domestic supply of nuclear energy, coal, and oil; and to develop advanced technology to obtain energy from solar, geothermal, fusion, and other sources. In addition, he announced these new actions: Legislation to expedite the delivery of natural gas from the north slope of Alaska; a new policy for encouraging needed liquefied natural gas imports; a special contribution of up to $5 million over the next five years to strengthen the safeguards program of the International Atomic Energy Agency; and a $1 billion program of financial assistance to areas impacted by the development of Federally-owned energy resources. The 18 proposals awaiting Congressional action include proposals to: deregulate the price of new natural gas; provide the added short-term authorities needed to manage
Potential applicability of a lead-acid battery powered two-passenger electric car

Abstract: This paper assesses the potential applicability of a two-passenger electric car. Information regarding the applications of two-passenger electric cars sold recently in the United States was assessed, as were the results of market analyses, customer surveys, and testing reports. Operational costs are estimated for the two-passenger car compared with costs of the four-passenger electric car from the same study and conventional internal-combustion automobiles. Nationwide estimates of potential applications and markets, and levels of market penetration, are then developed for both electric cars. (11 references) (auth)

Availability: NTIS (when available)

Potential Applicability of a Lead-Acid Battery-Powered Two-Passenger Electric Car

Internal Memorandum No. IM-2042, 63 p.

Jun 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This paper assesses the potential applicability of a two-passenger electric car. Information regarding the applications of two-passenger electric cars sold recently in the United States was assessed, as were the results of market analyses, customer surveys, and testing reports. Operational costs are estimated for the two-passenger car compared with costs of the four-passenger electric car from the same study and conventional internal-combustion automobiles. Nationwide estimates of potential applications and markets, and levels of market penetration, are then developed for both electric cars. (11 references) (auth)

Availability: NTIS (when available)

Potential Applicability of a Lead-Acid Battery-Powered Two-Passenger Electric Car

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Availability: NTIS (when available)

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Availability: NTIS (when available)

Potential Applicability of a Lead-Acid Battery-Powered Two-Passenger Electric Car

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Availability: NTIS (when available)

Potential Applicability of a Lead-Acid Battery-Powered Two-Passenger Electric Car

Internal Memorandum No. IM-2042, 63 p.

Jun 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This paper assesses the potential applicability of a two-passenger electric car. Information regarding the applications of two-passenger electric cars sold recently in the United States was assessed, as were the results of market analyses, customer surveys, and testing reports. Operational costs are estimated for the two-passenger car compared with costs of the four-passenger electric car from the same study and conventional internal-combustion automobiles. Nationwide estimates of potential applications and markets, and levels of market penetration, are then developed for both electric cars. (11 references) (auth)

Availability: NTIS (when available)
Official: U.S. Dept. of Transportation, Federal Highway Administration; National Academy of Sciences, National Research Council, Highway Research Board, Division of Engineering

Abstract: Information on establishing a framework that permits the simultaneous economic evaluation of highway and transit improvements with interchangeable measures of benefits and costs (also called "transfer payments"). The objectives of this project were to review currently used methods of evaluating the economics of alternative transportation systems, develop a framework within which to evaluate the economics of alternative rail and transit systems, and develop quantitative methods for such factors as accessibility and capacity that relate them to all modes. The research was to include sensitivity analysis to identify those aspects of a model investment policy that have major impacts on the output variables and therefore should be included in the results presented to transportation decision makers. The research team identified four major techniques for evaluating alternative transit improvements proposals: 1. transit costs versus transit revenues; 2. transit system "least transportation cost" criterion; 3. simultaneously calculated highway-transit "total least transportation cost" criterion; and 4. multiple criteria for evaluating alternative transit plans (transit revenues and other regional benefits). Use of a purely economic analysis, the research team addressed the specific questions of (a) appropriate interest rates applicable to transportation system investments, (b) common economics of bonded versus tax-financed projects, (c) factors basic to changes in assessed valuation, (d) appropriate limits of accounting of costs and benefits, and (e) transfer payments. After criteria to be included in the economic evaluation framework were established, a demonstration analysis of a hypothetical metropolitan area with five alternative transportation system plans was conducted. (96 references) (Eric Foreword)

Availability: National Academy of Sciences, National Research Council, Highway Research Board, 2101 Constitution Avenue, Washington, DC 20418 $4.00

<188> Dickson, J.C.; Karavelas, L.P.
Nonpart and Source Associates Inc.
Address: 500 Jefferson Bldg., Houston, TX 77002

The Impact of Automotive Fuel Changes on the U.S. Refining Industry: An Economic/Technological Assessment
Sponsor: Energy Research and Development Administration, Division of Transportation

Abstract: This study examines the economic and technological effects which would occur within the U.S. refining industry if, by the year 2000, the U.S. automotive fleet should require: more gasoline than currently projected; less gasoline than currently projected; or fuels other than gasoline—namely, diesel fuel or a "broadcut" fuel composed of crude fractions within a very broad boiling range. The investigation was conducted by imposing various fuel demand forecasts (1975 through 2000) upon a mathematical model of the U.S. refining industry. Study results indicate that: (1) existing refining technology will not allow the U.S. refining industry to meet the demand imposed by introduction of an all-diesel auto fleet; (2) demands for "broadcut" fuel could be met, but the varying characteristics for this fuel would create marketing and auto fuel system problems; and (3) all of the fuel demand patterns studied have measurable and important economic impacts on the refining industry. These impacts, however, are overshadowed by the effect which varying automotive fuel requirements have on the U.S. demand for crude oil. ... A special study under slightly different fuel demand patterns is reported in Addendum 1 to the report.

Availability: NTIS

<189> Freeman, S.D.
Energy: The New Era
Walker Publishing Co., Inc., 386 p. 1974
Sponsor: Twentieth Century Fund

Abstract: This book discusses the energy crisis and the "age of energy," in which we are now living. Some of the problems considered are the huge demand for energy, the environmental impact of producing energy, energy supplies, foreign policy and energy policy, the price of energy, government policies, and the politics of energy. Possible solutions that are suggested are energy conservation, the better use of existing sources, and inexhaustible sources of energy such as geothermal, solar, and nuclear fusion. The book concludes with a discussion of a national energy policy for the next ten years and for 1985 and beyond. The author presents serious questions that no one has presented growth pattern and makes suggestions about ways to modify our growth in energy demand.

Availability: Walker Publishing Co., Inc. $12.50

<190> Frye, F.P.
Creighton, Hamburg Inc.
Address: Delavan, NY

Alternative Multimodal Passenger Transportation Systems, Comparative Economic Analysis
National Cooperative Highway Research Program
Report No. 146, 68 p. 1973
Sponsor: American Association of State Highway
charge-discharge mechanism involving only the intercalation of lithium ions between the \( \text{Li} \text{SISO}_{2} \text{SISO}_{2} \text{L} \) layers; and 3) an attractive cost level. This paper focuses on the preliminary design engineering aspects of the \( \text{Li} / \text{TiSISO}_{2} \) battery system. Using design data obtained through the laboratory evaluation of pre-prototype cells, a computer program was developed to evaluate any combination of required electrode design parameters. In addition to providing an assessment of performance characteristics for any combination of electrode design parameters, the computer-optimized component designs were used in the laboratory experimental programs and evaluation regimes to provide a high degree of relevance to the final battery system design. (11 references) (auth)

Availability: American Institute of Chemical Engineers, 345 East 47 St., New York, NY 10017 $90.00 for entire proceedings

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The Incidence of Air Travel Among the General Public

14 p.

Sep 1974

Sponsor: Air Transport Association

Abstract: This report presents the results of the annual survey conducted for the Air Transport Association to measure the incidence of flying on regular passenger airlines by the national adult population, 18 years of age and older. The survey investigates how many people have ever flown and how many trips flyers have taken during the year preceding the survey. Those who have flown during the last year are asked how many of the trips taken were business trips and how many were for pleasure or personal reasons. Also included is a measurement of the estimated number of business and personal or pleasure trips that people expect to take during the coming year. (From Introduction)

Availability: Air Transport Association of America, 1709 New York Ave. NW, Washington, DC 20006

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The Development of Lithium/Sulfur Cells for Application to Electric Automobiles


Sponsor: National Science Foundation

Abstract: A high-specific-energy (>200 W-hr/kg), high-specific-power (>2000 W/kg) lithium/sulfur battery is being developed for electric automobiles. Several sealed cells, having one electrode (20.3 cm sq active area) consisting of sulfur, arsenic, and carbon black, and the other of lithium in porous nickel or stainless steel, with a molten LiF-LiCl-KCl electrolyte, were operated at temperatures of about 380 to 425 degrees centigrade. The short-time peak power density exceeded the goal of 1.5-2.0 W/cm sq, but the capacity per unit volume of sulfur electrode was only 0.3 A-hr/cm cubed, which was less than the goal of approximately 1 A-hr/cm cubed, which had been achieved with smaller cells. Lifetimes of the cells were a few hundred hours. Materials studies involved the evaluation and selection of materials suitable for the cell environment, and the design, development and fabrication of cell components such as feedthroughs, ion exchange membranes. Laboratory experiments were conducted on the electrochemical oxidation of various materials, electrochemical testing, and palladium separations. (13 references) (auth)

Availability: American Institute of Aeronautics and Astronautics, Order Dept., 1290 Avenue of the Americas, New York, NY 10019 ($650.00 for entire proceedings)

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Energy Statistics - A Supplement to the Summary of National Transportation Statistics


Jun 1975; Jun 1976

Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Policy, Plans and International Affairs

Abstract: These periodic reports are compendiums of selected national-level transportation statistics. Included are cost, inventory, and performance data describing the passenger and cargo operations of the following modes: air carrier, general aviation, automobile, bus, truck, local transit, rail, water, and oil pipeline. The report includes basic descriptors of U.S. transportation, such as operating revenues and expenses, number of vehicles and employees, vehicle-miles and passenger-miles, etc. As the name implies, these reports are summaries of a larger database, consisting of time-series collected from a variety of government and private statistical handbooks. In the 1975 and 1976 editions, the selected data cover the periods 1963 through 1973 and 1964 through 1974, respectively. (284)

Availability: GPO $5.05, Stock No. 050-003-00220-8 for 1975 report; GPO $1.85, Stock No. 050-000-00118-1 for 1976 report

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Energy Statistics - A Supplement to the Summary of National Transportation Statistics


Aug 1974; Aug 1975; Aug 1976

Abstract: These reports are compendiums of selected time-series data relevant to the transportation, production, processing, and consumption of energy. The statistics have been assembled from a wide variety of sources, such as the U.S. Department of the Interior, the Interstate Commerce Commission, and the American Petroleum Institute. These reports are divided into three main sections. The first, entitled "Energy Transport", contains data related to the transportation of energy and energy-related materials. The second section, entitled "Energy Conversion", contains data related to the conversion of energy resources to usable forms. The third section, entitled "Energy Use by Industry and End Uses", contains data related to the use of energy by industry and end users.
Gaynor, J. (ed.)<ref>Monthly Energy Review</ref>

Federal Energy Administration, National Energy Information Center
Address: Washington, DC 20461

Monthly publication, approximately 90 p.

Abstract: Monthly statistics are presented on crude oil and refined products, natural gas, coal, electricity, utilities, nuclear power, energy consumption, conservation, development, energy prices, and international petroleum consumption and crude oil production. Tables provide data on production, price, imports and exports, stocks, demand, and development of fuels and refined petroleum products. The section on electric utilities looks at energy production, fuel consumption, sales, and sales. An examination of nuclear power includes data on energy production and development. The report is designed to provide essential statistical data concerning worldwide Federal motor vehicle fleet operations. The report was supplemented by a special report on the status of nuclear power plants, U.S. uranium enrichment, and the status of U.S. oil and natural gas reserves, refinery capacity, and yields. Trends in the demand for fuel and power are displayed in the third section, entitled "Energy Consumption." Throughout this part, the transportation sector is emphasized. Included are the gasoline and oil costs of autos and different types of buses, trucks, and railroads. The report does not include data on trailers, trailer-vans, motorcycles, firetrucks, trucks with special purposes, or military vehicles. Review of the data in this report will assist government agencies in evaluating the effectiveness of the operation and management of their individual vehicle fleets.


Geraghty, J.J.; Miller, D.V.; Van Der Leeden, P.; Troise, F.L.
Geraghty & Miller Inc.

Water Atlas of the United States

1973

Abstract: The Water Atlas is the only publication available which provides a comprehensive visual guide to the water situation in the U.S. This expanded second edition contains a total of 122 maps, including material on water resources and water use, pollution and water quality, water conservation, water law, and water-based recreation. The primary purpose of this Atlas is to display complex national water data in easily understandable form.

Availability: Water Information Center

Geraghty, J.J.

One Hundred Years of the Otto-Cycle Engine


Sponsor: Society of Automotive Engineers

Abstract: This paper is presented in observance of the centennial of the Otto-Cycle engine. Although it briefly traces the history of the
Abstract: Residents of households make 87 billion automobile or taxi trips in one year, accounting for 776 billion vehicle-miles of travel. Each household averages 1.4 thousand trips and 12.4 thousand vehicle-miles annually, or 3.6 trips and 34 vehicle-miles per day. The trip rate and vehicle-miles are analyzed by purpose of trip (i.e., earning a living, conducting family business, and engaging in social and recreational activities). Data indicate that household tripmaking by purpose of trip changes as the level of household income increases. The number of trips by passenger cars and the vehicle-miles traveled also vary among incorporated places according to the population size.

Availability: NTIS
CONT.
crankcase oil, and solid waste problems
caused by junked cars. Its assessments are
offered from legal and economic, as well as
technological, perspectives. In this study,
the authors examine in great detail a number of
alternative strategies for contending with
automotive pollution. These include
a
rollback strategy relying on emission
controls, mandatory inspection, and repair
strategies, traffic control, and legislative
action. In each of these areas, careful
consideration is given to the legislative
history of pollution control and to the
current and projected impact of the Clean Air
Amendments of 1970. (from publisher's
description)
Availability: University of Oklahoma Press,
Norman, OK $19.95

Review of Candidate Batteries for Electric
Vehicles
Energy Conversion, an International Journal,
Sponsor: Seattle City Light
Abstract: Short summaries are presented of most
of the battery systems that can be considered
for electric vehicles. Many little-known
systems are included, some with little or no
experimental background, and thus are worth
considering for future research. Electric
vehicle battery requirements are postulated,
and based on these requirements the battery
candidates are evaluated for their short-term
and long-term prospects. (206 references)

Hafer, P. R.; Sicker, A., Jr.; Yoder, R.D.
Battlecruiser Truck Corp.; Boyettown Auto Body Works
The Electric Multistop Fleet Delivery
Vehicle--Fact or Fantasy
Paper No. 750057, presented at the Automotive
Engineering Congress and Exposition, Detroit,
Sponsor: Society of Automotive Engineers
Abstract: The purpose of this presentation is to
alert the fleet delivery vehicle operators and
operators of the facts relating to the
performance breakthrough achieved by the
Electric Vehicle Council's (EVC) work
vehicle. Their declared desire to advance
the state-of-the-art by a factor of two has
actually been exceeded. The 108 vehicles now
in operation throughout the U.S. and Canada
are proving with actual costs—energy
consumption, freeway speed, and distance
performance records that the energy storage
battery powered fleet delivery vehicle is
indeed a present day fact. These records
forecast actual savings in fuel energy costs
that add up to substantial savings when
compared accurately with the increased gas
and/or diesel fuel costs faced by the
multistop fleet delivery vehicles now available with
1975 EPA pollution control devices. The impact of the increased first cost for these
pollution control devices, plus the increased
fuel cost, and the higher service and
maintenance costs may cause fleet
operators to examine the facts about the
family of electric multistop fleet delivery
vehicles available now. The potential for
cost and energy savings are real and
substantial. They can make great
contributions to combat inflation and
conserve fossil fuels by the more efficient
use of electric energy that can be stored in
the vehicle batteries during off peak
generating periods. They can now be used
with substantial increase in non-polluting
efficiency in the multistop fleet delivery
vehicles in our sprawling megapolis areas.
(7 references)
Availability: Society of Automotive Engineers,
Inc., 400 Commonwealth Dr., Warrendale, PA
15096 22.75

Hayes, G.; Hamilton, W.
Energy Research and Development Administration,
Division of Transportation Energy
Conservation; General Research Corp.
The Future Role of Electric Land
Transportation in the United States
Paper No. 750118, presented at the Automotive
Engineering Congress and Exposition, Detroit,
1976
Abstract: Existing regional impact studies were reviewed as a basis for national impact projection. These studies projected impacts of electric car use on energy, air quality, and the economy in three different urban regions: Los Angeles, St. Louis, and Philadelphia. Though these regions span a wide range of possibilities, the diversity of other urban regions in the United States was found to be so great that impacts previously calculated cannot accurately be extrapolated to a national total. Adequate data are readily available in machine-readable form, however, to facilitate development of a national energy and air quality impact projections made individually for each large urban region. Data sources and data processing procedures for this purpose were planned. Furthermore, the regional results appear unsuitable for a national impact assessment because they are outdated. Prospects for future storage batteries have shifted towards longer operating life, together with relatively higher performance and lower cost for the near term as lead-acid systems. Prospects for a viable electric car have thus been enhanced. The growth planned by electric utilities, on the other hand, has recently slowed drastically, so that the availability of nuclear and other non-petroleum sources of electric power for recharging electric cars will be reduced relative to that projected in the regional studies. Finally a two-passenger, limited-performance electric car is now being merchandized with considerable success, pointing to new possibilities for economical, low-impact electric cars not considered in the regional studies. Preparations for the national impact assessment also included refinement of modeling and performance estimates for electric cars, consideration of the applicability of safety standards to electric cars, and in an urban region uniquely suited to electric cars: Honolulu, Hawaii. (6 references) (auth)
Availability: NTIS (when available)
Abstract: The total energy and employment demands of various transportation modes are determined using a large matrix model. The results are then used to examine the resource demands of policies and alternatives such as car-bus substitutions, competitive freight transport alternatives, and strategies to the Federal Government’s Highway Trust Fund. (14 references) (auth)

Availability: Center for Advanced Computation, University of Illinois at Urbana-Champaign, Urbana, IL 61801

The key ideas of the plan is the creation of urban environments that make such of the movement of people unnecessary. (13 references) (BR)
government policies on transportation. Presently, the Federal government transportation policies concern to be inadequately coordinated, causing substantial diseconomies and other misallocations. This report purports that a reassessment of existing government policies is needed and would be demanded if the public were better informed on the options available. The study is organized under these sections: Institutional and Economic Considerations; Urban Transportation; Air Transportation; InterCity Freight; Intercity Ground Passenger Transportation; and Energy and Environmental Considerations. (Bit)

Availability: MITE Corp., Westgate Research Park, McLean, VA 22101

A New Design for the High-Performance Sodium-Sulfur Battery
Sponsor: Society of Automotive Engineers
Abstract: This paper describes a new design for the sodium-sulfur battery employing a new cell construction including a new method to join the solid electrolyte tube with the sodium reservoir made of metal, and an improved composition of the cell case to solve the problems of premature cell destruction and capacity decrease associated with a conventional design. As a result a higher and more stable performance of the new design than that of a conventional design has been shown through various evaluation tests. (5 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

Healy, T.J.
The Energy Use of Public Transit Systems
Aug 1974
Sponsor: California State, Business and Transportation Agency, Dept. of Transportation, Division of Mass Transportation
Abstract: The purpose of this study is to determine the amount of energy used by a variety of transit modes operating under different conditions. Section 2 reviews projections of energy availability in California through 1985 and 1990. The implications for transportation are discussed. Section 3 is a short summary of the ways in which vehicles use energy, and an analysis of the resulting implications for energy-limiting or conserving strategies. Section 4 gives data on energy use for a wide variety of vehicles operating in a number of modes. In section 5 the data given in section 4 are compared with nationally aggregated data, and why differences exist is indicated. In section 6 the energy demands of various modes are compared in a way which should allow the reader (planner) to know relative energy requirements of different systems. In section 7 the report concludes with a discussion of how the planner may use the data presented in this report. The energy shortages of 1971 and 1974 brought a new awareness of the problems of energy
supply. The future indicates the very real possibility of serious new shortages. It is crucial that the U.S. anticipate and account for this possibility in planning. In the United States, transportation requires 25% of all energy for fuels alone. Another 15% is used in building and maintaining our transportation systems. Perhaps no other sector of our economy is more sensitive to energy limitations or has greater potential for energy conservation. The U.S. is highly dependent on transportation. As energy costs rise and scarcity threatens, increasing consideration must be given to the question of transportation energy use. However, systems cannot be selected on the basis of minimum energy use alone. It follows that energy considerations must become a more important part in planning.

Availability: NTIS

Authors: Wayne State University


Hemphill, J.
Federal Energy Administration, Office of Energy Conservation and Environment, Office of Transportation Programs

Address: Washington, DC 20461

Gasoline Consumption

5 Mar 1975

Abstract: Tables and an analysis of gasoline consumption in the U.S. are presented in this report. Tables are provided for the following: a breakdown of gasoline by mode for highway use and by sector for nonhighway use; the percent highway gasoline use by mode and by sector; historical and forecasted automobile gasoline consumption, historical and forecasted total gasoline consumption, and the annual rate of growth for each for the period 1970-85; 1972 regional total and per capita gasoline consumption by state; a breakdown of percent vehicle miles traveled by trip purpose estimated for 1974; and the annual household gasoline expenditures for 1972.

Availability: NTIS

Author: Wayne State University

The Diesel as an Alternative Automotive Engine

Paper No. 750931, presented at the Automobile Engineering Meeting, Detroit, Michigan, October 13-17, 1975, 15 p.

1975

Sponsor: Society of Automotive Engineers

Abstract: An evaluation has been made of the use of the diesel as an alternative engine in passenger cars. This includes the technological feasibility for meeting the different emission standards and the techniques for emission control. The emissions studied include both the presently regulated species—hydrocarbons, carbon monoxide, and nitrogen oxides—and the following nonregulated emissions: aldehydes, ammonia, smoke and particulates, polynuclear aromatics, and sulfur compounds. A comparison has been made between the emissions, performance and economy of currently produced diesel powered cars and gasoline powered cars, of which are being developed and powered by the stratified charge, Wankel, and the gas turbine engines are also compared. Intrinsic problem areas in the diesel engine that need further research are also identified and discussed. (94 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096 $2.75

Abstract: An overview paper presents background information and statistics on various aspects of the helicopter industry. The paper documents the growth of the helicopter fleet and illustrates recent trends in helicopter use. It emphasizes the fact that the helicopter industry has been highly dependent on the U.S. military forces; for example, military production constituted 84 percent of total production in 1968. By 1973, the military share had declined to 51 percent. In the civil application, the primary stimulus to development in recent years has been the exploration and development of natural resources, particularly offshore oil. Other important civilian uses include traffic control, emergency rescue operations, crime control, and business and executive transportation. In 1975, there were 10,600 helicopters in the United States; approximately 7,200 were military aircraft. In 1975, helicopters flew approximately 2.7 million hours (1.5 million hours by the military). U.S. manufacturers of civil helicopters depend heavily on the export market. In 1974, for example, nearly 40 percent of the 830 civil helicopters made in the United States were exported. Europe and Latin America received 33 percent of the exports. During the 1972-73 period, about 10 percent of the military helicopters produced in the U.S. were purchased by foreign governments. In 1974, there were 4,900 public and private use airports in the United States. California contained 499 and New Jersey had 446. The paper suggests that the use of instrument flight rule (IFR) equipped helicopters is increasing. Problems affecting the helicopter industry include safety and noise. Government and industry are working toward solutions of these problems. (81 references) (from Executive Summary)
Heydinger, E. R.
National Petroleums Council, Committee on Energy Conservation, Transportation Task Group
Address: 1625 K Street NW, Washington, DC 20006
Abstract: Opportunities to conserve energy in the transportation sector (highways, airports, railways, waterways, urban public transit, and pipelines) are discussed, emphasizing measures that could be put into effect by 1978. In evaluating conservation potentials, measures are appraised according to: savings potential; factors of implementation (methods, incentives, relative time, and costs); social, economic, political, and environmental impacts; public acceptance; and overall feasibility. The amount of energy-savings potentials are projected for 1974 and 1978 for each measure. Six conservation actions that offer the greatest conservation potential are as follows: more small cars; increased car-pooling; modified exhaust emissions and gasoline lead regulations; improved auto design; reduced speed limits; and improved vehicle maintenance. Energy conservation can also be achieved through higher cost and/or direct conservation actions, both regulatory and voluntary. Possible changes in current regulations are evaluated, and potential voluntary actions for industry or consumers are identified. (868)
Availability: National Petroleum Council, 1625 K St. NW, Washington, DC 20006 $5.00

Heywood, J.B.; Jacoby, H.D.; Linden, L.H.
Massachusetts Institute of Technology, Energy Laboratory
Address: Cambridge, MA 02139
The Role of Federal R & D on Alternative Automotive Power Systems
Nov 1974
Sponsor: National Science Foundation, Office of Energy & R & D Policy
Abstract: This question is examined: Is it appropriate for the Federal Government to support R & D on alternative automotive power systems? Potential alternatives to the ICE include the stratified charge, Wankel, diesel, Rankine cycle, Stirling cycle, gas turbine, electric and hybrid systems. These engines may offer advantages over the ICE but considerable development would be required, and Federal support has been proposed. The five sections of the report are: a description of the central issue and a set of underlying assumptions, a review of the relevant technology, an exploration of the role for Federal R & D in overall Federal policy concerning the automobile, an update of the analysis of present programs in industry and government, and conclusions. Appendices review the history of Federal efforts to describe the content of present industry and government programs. The principal conclusions of the report are that it cannot now be forecast whether the ICE or any of the alternatives will be the dominant engine later in this century, that the effort is economically justifiable research and development efforts in this area will be carried out, that the Federal funded, Federally supported effort is well justified. (54 references)
Availability: NTRS

Hightower, J.W.; Butt, J.B.; Ollin, D.F.; Wise, E.
National Academy of Sciences, National Research Council, Commission on Sociotechnical Systems, Committee on Motor Vehicle Emissions
Address: Washington, DC
125 p.
Sep 1974
Sponsor: U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Mobile Source Air Pollution Control
Abstract: The purpose of this report was to assess the status of catalysts for automobile emission control and to estimate the future development capabilities in catalytic converters, especially for NOx removal. ... The report begins with a general description of basic performance of the various systems, catalysts, and testing methods. The next chapter contains durability data and discusses factors that can lead to catalyst deactivation, e.g., thermal effects, chemical poisons, physical attrition, and blockage. The sulfation formation and possible toxicological effects of debris emitted from the converters are evaluated in the following chapter. The last chapter summarizes mathematical modeling studies and what is known about the kinetics and mechanisms of the various reactions. (97 references)
(from Introduction)

Hirst, E.
Oak Ridge National Laboratory, ORNL-85P
Environmental Program
Address: P.O. Box X, Oak Ridge, TN 37830
Apr 1973
Sponsor: National Science Foundation, RANN Program
Abstract: Previous work at ORNL evaluated the energy intensiveness of changes in freight and passenger traffic levels and shifts in modal mix for the period 1950 to 1970. The research reported here extends this work to include an analysis of changes in energy intensiveness for individual modes during this period. Examination of individual modes shows that airplanes are energy-intensive and...
that cars and trucks are less so. Buses, mass transit, railroads,pipelines, and boats are relatively energy-efficient. Railroad energy intensiveness increased only slightly during this 20-year period because of the shift from steam engines to diesel engines. On the other hand, airplane energy intensiveness increased rapidly because of increased speed. Other modes generally showed slight increases in energy intensiveness.

Energy intensiveness of inter-city freight declined during this period because of the large drop in railroad energy intensiveness. However, passenger transport became more energy intensive because of shifts to airplanes and automobiles and because of a general increase in energy intensiveness for all passenger modes. Results derived here are summarized in a number of ways to highlight important shifts in energy use patterns for transportation. (Auth.)

Availability: NTIS

**Direct and Indirect Energy Requirements for Automobiles**

Hirst, E.
Oak Ridge National Laboratory, ORNL-MSF Environmental Program
Address: P.O. Box I, Oak Ridge, TN 37830

Direct and indirect energy requirements for automobiles are calculated. Direct use includes that used for both the passenger traffic and the automobile transport. Although mass transit systems carry only 2.5% of the urban passenger traffic, the energy implications of mass transit and car usage are examined. Urban mass transit energy use and conservation potential are discussed. Policies aimed at shifting travelers from individual cars to mass transit and carpooling are described. These recommendations are made: (1) technological development to reduce fuel consumption should be pursued; and (2) the public should be informed about energy conservation. Energy conservation is one of the most important energy problems in the U.S. (18 references) (Auth., from Introduction)

Availability: NTIS

**Total Energy Use for Commercial Aviation in the U.S.**

Hirst, E.
Oak Ridge National Laboratory, ORNL-MSF Environmental Program
Address: P.O. Box I, Oak Ridge, TN 37830

Total energy use for commercial aviation in the U.S. is discussed. Direct fuel use for commercial aircraft propulsion amounted to 1,450 trillion Btu in 1971, 2% of the national energy budget. Direct fuel use for commercial airline service in 1971 was 1,450 trillion Btu, 2% of the national energy budget. (13 references) (Auth., from Introduction)

Availability: NTIS

**Transportation Energy Conservation Policies**

Hirst, E.
Oak Ridge National Laboratory, Energy Division
Address: Oak Ridge, TN 37830

**Abstract:** Economic factors and government policies affect energy use in general and energy use of the transportation sector. The principal factors are: (1) the technological development of alternative fuels and energy source; (2) the development and adoption of new technologies; (3) the development and adoption of new transportation systems; (4) the development and adoption of new transportation policies; and (5) the development and adoption of new transportation regulations.

Policies which have a direct impact on car ownership and use (gasoline taxes and fuel economy standards) are considered far more effective than policies aimed at shifting travelers from individual cars to mass transit and carpooling. These recommendations are made: (1) technological development to reduce fuel consumption should be pursued; and (2) the public should be informed about energy conservation. Energy conservation is one of the most important energy problems in the U.S. (18 references) (Author).

Availability: NTIS

**Urban Mass Transit Energy Use and Conservation Potential**

Hirst, E.; Stantx, A., Jr.
Oak Ridge National Laboratory, Energy Division
Address: Harvard Univ., School of Business
Address: ORNL, Oak Ridge, TN 37830; B9

**Abstract:** Trends in urban passenger travel show a steady decline in mass transit ridership after World War II; presently bus and rail systems carry only 2.5% of the urban passenger traffic. Although mass transit carries only a tiny fraction of urban traffic, existing bus and rail systems are two to three times as energy efficient as automobiles. Transit efficiencies vary widely depending on city size, time of day, and type of route. Based on the limited data presented here, it appears that transit efficiency improves with increasing metropolitan income per capita. For example, the energy efficiency of the Albuquerque, New Mexico, bus system is less than half that of either the Chicago or the Baltimore bus systems. Bus system efficiency also depends strongly on both time of day and direction of flow: bus system efficiency is highest during the morning and evening peaks on routes that flow with the dominant stream of traffic. The energy implications of a number of recent transit improvements are discussed. Unfortunately, the energy impacts are slight—in part because transit now carries so few people relative to the private automobile—in part because the increased ridership only slightly reduces automobile traffic. This
the short-term energy-saving potential of improved and expanded transit service is small relative to the savings possible through measures that directly affect the automobile and its use. (77 references) (auth)

Hittman Associates Inc.
Address: Columbia, MD 21045

A Technology Assessment of the Transition to Advanced Automotive Propulsion Systems (Summary Volume - Revised Draft)

Jan 1973

Sponsor: National Science Foundation

Abstract: Automotive propulsion systems that have the potential to meet Federal emission standards are assessed; such secondary effects as the impact of these technologies on materials, energy consumption, socio-economic factors, and the environment are considered. These principal types of vehicles are studied: full-size conventional car; advanced, full-size conventional car with emission controls; advanced, compact conventional car with emission controls; compact, tanked-powered car with emission controls; full-size, Rankine-cycle powered car; full-size, regeneratated gas-turbine powered car; compact, flywheel hybrid with emission controls; and the mini-compact, lead-acid battery or sodium-sulfur advanced battery powered car for urban use. A computer model is developed to determine the effect of current and future policies on the transition from conventional to alternative automotive engines. The effects of these potential policies are considered: relaxation of the NOX standard; policies to reduce the demand for vehicle-sizes; sales taxes on consumption associated with the automobile; subsidization of alternative vehicles; and restrictions on fossil fuel combustion in urban areas. A shift toward smaller vehicles would have significant secondary effects: (1) fuel consumption would decline; and (2) negative impacts would be felt by the automobile industry and some of its suppliers. For the near term, a modified internal engine will be the dominant system. The after-market should be some delivered in assessing the material effects of a switch to an advanced automobile system. Increased recycling of materials can lessen transition material impact in the long run. A transition from conventional automobiles to urban battery cars would lead to substantial alterations in the automotive industry's capital and labor requirement due to the lighter weight of these urban vehicles. Better fuel economy data are needed to assess gas turbine and Rankine systems. (BYH)

Hittman Associates Inc.
Address: Columbia, MD 21045

Fuel Economy/Cost Relationships for Future Automobiles

Jan 1976

Sponsor: Faucht (Jack) Associates Inc.; Federal Energy Administration

Abstract: This study investigates those technologies available to automobile manufacturers for improving the fuel economy of their new automobiles and how such technologies will affect automobile retail prices. ... The effect of future emissions and safety regulations is integrated into the fuel economy/cost analyses of this document. ... Previous studies which focus on technologies to improve fuel economy provide adequate data on possible fuel savings and costs as well as their impacts as reflected in the manufacturer's suggested retail price to the consumer. The work described in this report draws on these numerous studies to synthesize a relationship between (1) technological options available to automakers for improving the fuel economy and the cost of that product in future years as seen by the new automobile buyer in the context of potential government emissions and safety regulations. This study centers on the 1976-1990 time frame with most improvements assumed to be available by 1990. The intent is to provide a generalized automated ability to predict the response of automobile manufacturers to government policies encouraging fuel economy improvement in terms of the most likely change in cost for a given change in fuel economy. ... These analyses are based on data with large uncertainties and have required frequent judgments. As a result, it is recommended that the fuel economy/cost relationships of this work be viewed more as a tool for subsequent policy/demand analyses than as a definitive prediction of actual fuel economy/cost relationships. (35 references) (from Overview)

Availability: Jack Faucett Associates Inc., 5454 Wisconsin Ave., Chevy Chase, MD 20015
Onboard Hydrogen Generation for Automobiles
California Institute of Technology, Jet Propulsion Laboratory

Paper No. 769001 presented in the "Eleventh Intersociety Energy Conversion Engineering Conference Proceedings" (conference held at the Sahara Tahoe Hotel, State Line, Nevada, on September 12-17, 1976), pp. 6-16

1976 Sponsor: National Aeronautics and Space Administration

Abstract: The concept of onboard hydrogen generation from liquid hydrocarbon fuels is presented. Different processes for carrying out this concept are discussed, namely steam reforming, partial oxidation, and shift conversion. The critical aspects of each process for an onboard application are reviewed. The results of thermochemical equilibrium calculations for both steam reforming and partial oxidation are presented for gasoline and methanol. Direct decomposition of methanol has also been included. The thermal efficiencies and product composition for the various cases are discussed in detail. In the case of partial oxidation, system efficiency improvements can be obtained by running the hot product gas from the hydrogen generator through a turbo expander which can be coupled to the engine crankshaft. Experimental data are presented on steam reforming of gasoline and on partial oxidation of methanol. A table is presented that shows the required equivalence ratios for meeting 0.4, 1.0, and 2.0 gms NOx/HP-hr in engine combustion for steam reforming and partial oxidation. The corresponding engine power and system efficiency are also calculated. Overall, the use of onboard hydrogen generation from gasoline or methanol represents a potential approach to meeting the 1976 emission standards without the use of catalysts and without a loss in fuel economy. The energy requirements for hydrogen generation are balanced by increases in engine efficiency under lean operation conditions. The trade-offs are the extra complexity of the hydrogen generator and a loss in maximum power capacity. (14 references) (auth)

Availability: American Institute of Chemical Engineers, 365 47 St., New York, NY 10017 $90.00 for entire proceedings
The Effectiveness of Miles-per-Gallon Meters as a Means to conserve gasoline in automobiles

**Abstract:** Citations in this bibliography are from worldwide research covering the design of electric automobiles, vans, buses, and hybrid vehicles. Included are studies on lead–acid, zinc-air, lithium-sulfur, and nickel-cadmium batteries; fuel cells; drive trains; and chassis construction. (Contains 294 abstracts) (GRA)

*Availability: NTIS*

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**Address:** Kendall Square, Cambridge, MA 02142
**Date:** Jul 1976

**Sponsor:** U.S. Dept. of Transportation, Office of the Assistant Secretary for Systems Development and Technology

**Abstract:** This report is the response of the U.S. Department of Transportation to a request of the Energy Policy and Conservation Act (PL-163) for an assessment of fuel flow meter instruments reading directly in miles per gallon (mpg). The report describes currently available mpg meters, their installation, utility, and safety and presents an analysis of potential cost savings. It discusses means of encouraging purchase and the use of mpg meters as add-on equipment and considers issues associated with the mandatory installation of mpg meters in new cars. It concludes that it has not yet been demonstrated that the use of available mpg meters will improve fuel economy for typical drivers. It recommends that the Congress not require that each new automobile be equipped with an mpg meter and that no action be taken to promote the use of mpg meters in used cars at this time. Appendix A discusses other driver aids for conserving gasoline. Appendix B contains a summary to the request for information and public comment on fuel flow meters. Appendix C lists thirteen references. (GRA)

*Availability: NTIS*

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**Address:** Bartlesville Energy Research Center
**Date:** Apr 1977

**Sponsor:** U.S. Dept. of Transportation, Office of the Assistant Secretary for Systems Development and Technology

**Abstract:** The character of automotive fuels may change significantly within the next decade either as a result of turning to new primary energy sources (coal, shale, agricrude, or organic wastes) or as a result of a need for different fuels to better accommodate new engine technologies that can combine improved fuel efficiency with low emissions. On the other hand, fuel may change very little within the decade. This paper puts into perspective those elements of the technological situation that appear likely to change.
cause changes and those elements that may work to maintain fuels relatively unchanged.

More specifically, the paper reviews the characteristics of fuels and the characteristics of engines as the basis for conventional fuel economy. Modification of fuel or fuel use patterns and process energy requirements are also reviewed in the context of technical feasibility and fuel availability. In brief, the paper reviews technical factors in the outlook for improved utilization of primary source energy through better match of powertrain systems with high thermal efficiency and fuels that are produced with minimal energy requirement in comparison to products of conventional energy use. Technical papers on existing types of fuel have been made available, and a number of the papers have been selected for potential improvement based on innovative design and components. Standard and compact-size reference vehicles were selected, and a study of how power was used was conducted. Previous technological innovations (e.g., powerplants [such as spark-ignited, turbocharged, stratified charge, electronic fuel injection, and diesel]), transmissions and drive train systems, tires, accessories and auxiliaries, aerodynamics, and weight) that would save on fuel consumption were identified and evaluated.

HURTER, D.; LEE, W.D.  
Truck Fuel Economy State-of-the-Art Assessment  

1975  
Sponsor: American Society of Mechanical Engineers  
Abstract: The potential for fuel economy improvement from technical innovations in new trucks was examined. An innovation was selected on the basis of its impact on fuel economy and on the cost and operation of trucks. Promising innovations were combined into synthesis vehicles, which were modeled by computer analysis to calculate the amount of fuel saved over the lifetime of a vehicle. In addition, the economic impact of an innovation was determined through fuel-cost-effective measurements. For the truck classes I, II, VI, and VIII, which consume the majority of fuel (55%), fuel economy improvement can be accomplished within eight years. The suggested improvements are based on existing technology and, therefore, carry little risk. It is pointed out that emphasis must be placed on developing reliable devices that can be easily maintained and repaired by truck drivers and mechanics. The truck industry needs to continue to develop and produce reliable, cost-effective, and efficient engines. Moreover, the industry is also urged to develop means for informing truck owners of fuel savings equipment. Conclusions and recommendations are made for specific technological improvements, including power plant improvement, radial tires, transmissions and drive train, cooling systems, and aerodynamic drag reduction. (30 references) (auth, abstract modified)

HURTER, D.A.; LEE, W.D.  
A Study of Technological Improvements to Optimize Truck Configurations for Fuel Economy  
Sep 1975  
Sponsor: U.S. Dept. of Transportation,  
Transportation Systems Center; J.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology  
Abstract: The technological innovations (available in the time period of July 1974 to January 1975) that would better truck fuel economy are described, compared, and evaluated. The report explains each improvement option, considers constraints, discloses results of combing improvements, and, using computerized simulation techniques, estimates possible fuel economy gains and compares cost-effectiveness of the changes. These improvements are considered: power plant improvements, such as diesel engine substitution, lean burn engines, closed-loop stoichiometric engines, turbocharge gasoline engines, and stratified charge engines; improvements on the cooling system; power train improvements (four-speed uto with lock-up, continuously variable ratio transmission, and substitution of radial tires for bias ply tires); aerodynamic improvements; and weight reduction. It is concluded that for the classes of trucks (I, II, VI, and VIII) that consume 85% of the fuel used by all trucks, fuel economy improvements can be made in a reliable, cost-effective manner within about 10 years. (52 references) (GRA)

Availability: NTIS

HURTER, D.A.  
Little (Arthur D. Inc.)  
Address: Cambridge, MA  
Dec 1974  
Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology; J.S. Dept. of Transportation, Environmental Protection Agency; J.S. Dept. of Transportation, Transportation Systems Center  
Abstract: A study was conducted to determine potential improvements in automobile fuel consumption based on innovative design and components. Standard and compact-size reference vehicles were selected, and a study of how power was used was conducted. Previous technological innovations (e.g., powerplants [such as spark-ignited, turbocharged, stratified charge, electronic fuel injection, and diesel]), transmissions and drive train systems, tires, accessories and auxiliaries, aerodynamics, and weight) that would save on fuel consumption were identified and evaluated, and then screened against program constraints. Optimization of reference vehicles equipped with innovative components or redesigned was computer-simulated to predict fuel usage and performance. Techniques to measure fuel economy performance were also developed, and a statistical evaluation of published driving modes was performed. Compliance of innovative components with constraints (such as emissions and safety) and user requirements was determined. Optimized synthesized standard and compact-size vehicles were simulated and total system evaluation of each vehicle was performed on the basis of fuel usage, performance, technical compatibility, compliance with constraints, user acceptability, and manufacturer adaptability. Synthesized vehicles were ranked in accordance with study objectives, and conclusions and recommendations on designs were drawn. Program plans for synthesized vehicles were also selected. (55 references) (auth, abstract modified)  
Availability: GPO $9.90/set, Superintendent of Documents No. TD 1.20/2:74-40/v.1,2,3A,3B, Stock No. 050-000-0095  

Availability: NTIS
76
<252>
< 252> CONT .

Electric Vehicle"; "The Computer Sinulation
of Automobile Ose Patterns for Defining
Battery Requirements for Electric Cars"; and

Address : 1828 l St. NW, Suite 709, Washington, DC
20036

Gasoline and Distillate Shortage Situation:

"Comparison of Electrical Drives for Road
The last section of these

Vehicles ."

19 72- 197 6

proceedings contains data on 27 electric

vehicles , including information on the

1976

propulsion notor, controller, propulsion
battery, auxiliary battery, vehicle weight,
off-board charger, on -board charger, axle ,

Sponsor : 0.S. Environmental Protection Agency
Abstract : The results of a study on the
short -to-nodera te term gasoline and
distillate supply situation are presented in
this report . In order to provide background
for the demand and supply forecast, Section I
summarizes the 0.9. petroleum supply
situation from 1966 through 1971, details the
gasoline and distillate demand and supply
events happening during 1972 and the first
quarter of 1973 , and examines the effects of

government policies during this time period .
Section II estimates gasoline and distillate
demand and supply fortwo time periods:
third quarter 1973 through second quarter
1974 (short term), and 1974 through 1976
(modera te term). The vulnerability of 0.s.
supply to an interruption of imports is
discussed . The supply and demand outlook is

not optimistic. Refining bottlenecks will
perpetuate a tight supply situation through

body, frame, brakes, vehicle size,

performance, seat, springs, steering, tires,
cargo space, and price of each vehicle. (BYB)

<254 )

International Lead Zinc Research organization Inc.
Address: 292 Madison Ave. , New York, NY 10017
The Design and Marketing of a Battery Electric Van
132 p.
1976

Abstract: This document reports on a study in
which a one-fourth to one -half ton ,

limited-mission, lead acid battery-electric
vehicle (the QT--quiettouck) was designed,

constructed , and tested, and its market

1976, and maintenance of supply through 1976

potential was assessed .

is dependent on the uncertain availability of
foreign crude and refined products and on
high level of performance from domestic

disadvantages and economic and ecological
advantages of electric vehicles were taken
into consideration in the design of the QT,

refineries. A seve n-point strategy to meet
short -to-noderate ter objectives is outlined
in the final section : (1) assure a celiable
crude supply ; (2) reduce administrative and
other bottlenecks and decouple the sequential

nature of the downstrean investment process;

The speed and range

which has a top working speed of about 48
kilometers (30 miles) per hour, a minimum
range of approximately 48 kilometers (30
miles ), and a payload of about 227 kilograms
(500 pounds). The specific design of the QT,

based on progressive improvements of four
prototypes (QT-1, 2, 3, and 4), is described .

(3) reverse the pressure on oil demand
resulting from substitutions caused by

studies indicate that there is a significant

lagging supplies of alternative fuels; (4)

market potential for a limited -performance ,

curb as much discretionary demand as
possible ; (5) facilitate maximum performance

of the existing supply capability; (6)
develop a contingency plan for different
levels of shortage of different types of
petroleum products; and (7) improve current
data , information , and analytical tools .
Specific policy options available to the
government with respect to each of these
seven strategic elements are described . (BY B)
Availability: NTIS

battery-powered electric vehicle designed for
use on inner-city fleet delivery nissions .
one such study estimates that there exists a
demand for about 326,000 vehicles of this
type . Results of testing the QT are

presented, and a five-year marketing and
manufacturing plan for the it is proposed.

(16 references) (BYB)

<255)

Interstate commerce Commission
Address: Washington , DC

<253)

Institute of Electrical and Electronic Engineers

90th Annual Report of the Interstate Commerce
Commission, Fiscal Year Ending June 30, 1976

Inc. , Vehicle Technology Group, Automotive
Electronics Committee
Address : 345 East 47th St. , New York , NY

10017

Proceedings of International Conference on
Automotive Electronics and Electric Vehicles
(Convergence)

IEEE Catalog No. 76CH 1146-0 VT, SAE Catalog No.
P-68 , conference held at Hyatt Regency
Dearborn and Ford Motor Company Proving
Ground, Dea rborn, Michigan, September 20-22 ,
1976

163 p .
1976

Abstract: This annual report on activities and
performances of the Interstate commerce

Commission, with an analysis of the condition
of the transportation industries regulated,
was submitted to Congress in accordance with
section 21 of the Interstate Connerce Act .

The publication summarizes the actions of the

Commission involving : formal cases on rates ,

operating rights, and finance proceedings ;
informal cases acted on under public

Sponsor: Society of Automotive Engineers;
Electric Vehicle Council ; Institution of
Electrical Engineers; Energy Research and
Development Administration ; Michigan Univ.

Abstract: Experts in automotive electronics and
electric vehicles presented 25 papers at this
conference in these sessions : Automotive
Electronics Tutorial, Automotive Electronics ,

observation but without the need for public
hearing ; challenges in the Federal court
system;tariffs requiring agency review;
examinations of accounting systens of
regulated carriers ; service orders designed
to reduce shortages and buildups of railroad

freight cars and achieve more equitable
distribution of the 0.s, car fleet ;

Electric Vehicles, Autonotive Electronics,

prosecutions of violatorsof the Interstate

Automotive Electronics-- A New Horizon (a

Commerce Act or Commission orders ;

panel discussion), Emerging Technology,and

appearances before Congressional Committees;
judges assigned to the Commission. Two new

Electrical Vehicle Demonstration. Session
III on electric vehicles includes the
following papers: "Development of Electric

and hearing -days before administrative lav

Vehicles at Toyota": "Electric Delivery Vans

"Regulation Under Review," which looks at the

Above the 45th Parallel in North America ";
"Development of a High Performance and Light
Weight Hybrid Flywheel/Battery Powered

and "Progress and Problems," which examines
the development of regulation. An appendix

chapters are included in this report:
role of regulation in surface transportation ;


Quarterly publication, approximately 25 p.

Abstract: These periodic publications provide statistics on the economic situation of different transport modes (e.g., rail, truck, bus, and water transportation). Tables present data on operating results, capital expenditures, operating revenues, intercity ton miles, revenue traffic, piggyback traffic movements, carloading trends, average revenue per passenger mile, and price index for railroad freight. (BYB)

<256>

Interscience Commerce Commission, Bureau of Accounts
Address: Washington, D.C. 20423

Transport Economics

Quarterly publication, approximately 25 p.

Abstract: These annual statistics provide data on the operating efficiency and productivity of trucks in the U.S., 13,151 truck drivers were surveyed during the period January 1, 1976 through January 4, 1977. In particular, questions were asked about the extent to which the truck was loaded, the commodity being carried, the reason for the truck being empty (if known), etc. Basic information on the operation of the truck, including origination, destination, type of equipment, fuel used, and other information was also collected. Results of the survey are presented in these tables and graphs: Percent Empty Truck Miles on the Interstate Highway System; Percent Empty Trucks Passing Sample Checkpoints; Comparison of Percent Empty Truck Miles by Type of Equipment and Authority; Comparison of Percent Empty Truck Miles for Interstate and Intrastate Truck Trips by Type of Equipment and Authority; Comparison of Percent Empty Truck Miles for ICC Authorized Trucks—Non-Owner Operated vs. Owner Operated with Long Term Lease; Percent Partially Loaded Truck Miles on the Interstate Highway System; Percent Empty Truck Capacity Miles on the Interstate Highway System; Percent Empty Truck Capacity Passing Sample Checkpoints; Comparison of Percent Empty Truck Capacity Miles by Type and Authority; Percent Empty Truck Miles on the Interstate Highway System by Time of Day, by Day of Week, and by Month; and Mean Number of Trucks Passing the Sample Checkpoints in One Direction per Hour by Time of Day, by Day of Week, and by Month. The percentage of truck miles found to be operated entirely empty was 20.4%, and 14.4% of the truck miles were found not to be used to full capacity. (BYB)

<257>

Interscience Commerce Commission, Bureau of Economics
Address: Washington, D.C. 20423

Quarterly publication, approximately 25 p.

Abstract: This report presents a research program plan aimed at achieving improved fuel economy for internal combustion engines and associated powertrains components as used in passenger cars, trucks, and buses. The types of engines considered include reciprocating and rotary spark ignition gasoline engines, stratified charge variants, and diesel engines.
Abstract: Aero engine design for subsonic engines. Also included is an assessment of the impact of the potential use of non-petroleum-based alternative fuels on modified or improved internal combustion engines and the research needed to support such future implementation. The research program plan was formulated after an evaluation of internal combustion engine and powertrain alternatives which offer potential for significant reductions in fuel consumption, and a survey of current research in government, universities, and industry (both foreign and domestic). The plan defines needed work in the areas of combustion research, materials research, friction reduction, alternative fuels, engine controls, and diagnostic instrumentation research. Emphasis was placed on identification of near-term (to 1985) benefits. A summary of recent and ongoing research programs in the field is also included. (228 references) (auth, abstract modified)

Availability: NTIS

Jackson, A.J.B.
Boilis-Royce Ltd.
Address: Derby, England
Some Future Trends in Aero Engine Design for Subsonic Transport Aircraft
Journal of Engineering for Power, 98(2), pp. 261-269 (April 1976); paper presented at the Gas Turbine Conference, Houston, TX, March 2-6, 1975, of the American Society of Mechanical Engineers
Apr 1976
Abstract: Aero engine design for subsonic transport aircraft must consider the world oil and aviation supply situation and aviation fuel prices as well as noise and pollution regulations. Oil-based aviation fuel will probably be available through the end of this century, but aviation engines should be designed to optimize fuel economy. Reducing specific fuel consumption of engines and specific weight and other improvements are discussed. One factor in specific fuel consumption, propulsive efficiency, is considered. The propulsive efficiency of an engine increases as its specific thrust (thrust per unit inlet airflow) is reduced, i.e., bypass ratio is increased. Historically bypass ratio has increased with time; therefore, today's subsonic transport engines are operating at a very high level of propulsive efficiency. Further increases in propulsive efficiency would have little impact. An engine forecast for 1984 predicts gains in direct operating cost and payload-range, but these advances will not result from increases in propulsive efficiency through reductions in specific thrust. (7 references) (BIB)
Abstract: This first volume of a three-volume study on transportation of energy resources in the U.S. describes the nodes by which each energy form is moved, its historical background, the technologies required, the current movements, the industries involved, and the energy systems that serve as background for volumes II and III, which examine the Federal role in energy transportation and impending energy transportation issues, respectively.

Accompanying this document are 19 maps of energy movements and nodes, showing graphically the types and amounts of energy used, their sources, points of consumption, and patterns of flow. In addition, the maps depict the systems of transportation used for energy movement, the production and consumption of energy by state, and the geographic extent and nature of the energy resources drawn upon. Titles of the maps are as follows: Natural Gas Movement by Pipeline; Coal Movements by Railroad; Coal Movements by Water; Total Coal Movement; Coal Resources and Distribution; Crude Oil Movement by Pipeline; Crude Oil Movement by Water; Total Crude Oil Movement; Petroleum Products Movement by Pipeline; Petroleum Products Movement by Water; Total Fuel Material Movements by Highways (Btus); Total Fuel Material Movements by Rail (Btus); Pipeline Transportation Systems; Railroad, Highway, and Water Transportation Systems; and Total Interstate Energy Movement. U.S. energy transportation has involved moving fuels to the industrial Northeast and Atlantic projections that water power energy has been found—Appalachian coal and oil at first, later resources from Texas and Louisiana, and recently supplies from the Middle East and Africa. With the expected shift in energy supplies to Western coal and uranium supplies, Alaskan oil and gas supplies, and Atlantic and Pacific Ocean Continental Shelf oil and gas supplies, major energy transportation patterns will have to change in direction. (28 references) (auth)

Availability: GPO $5.25, Stock No. 052-070-03674-5
A V Lability: Society of Automotive Engineers, Center for the Environment and Man Inc.
Kain, J. F.; Fauth, G. R.
May 1976
Analysis of the Future Effects of the Fuel Shortage and Increased Small Car Usage Upon Traffic Deaths and Injuries
Sponsor: U.S. Dept. of Transportation, Transportation Systems Center; U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology
Abstract: The literature was reviewed and accident data were analyzed to establish relations between automobile size and the frequency of occupant death and injury. On the assumption of four future scenarios for the size of automobiles, the consequences for car occupant deaths were calculated. The present effects of the 55 mph speed limit and results that may be achieved by strict enforcement were estimated. The effects of the potential reduction of commuter traffic on vehicle deaths were estimated. The question of how the elimination of Sunday travel would affect motor vehicle deaths was addressed. (39 references) (GBA)
Availability: NTIS; the Executive Summary is also available separately as PB-251893

Kain, J. F.; Fauth, G. R.
Harvard Univ.
The Effects of Urban Structure on Household Auto Ownership Decisions and Journey to Work Mode Choices
Sponsor: U.S. Dept. of Transportation, Office of University Research
Abstract: This report documents the first phase of a larger investigation directed towards a clearer understanding of the effects of intermetropolitan differences in transit and highway service levels, and in overall urban development patterns, upon auto ownership and use. Specifically, this report presents models of the determinants of auto ownership and mode choice for 163,488 white single-worker households residing in the largest 125 SMSAs in 1970, using an explanatory variables indices of SMSA highway capacity, transit service levels, and overall residential density, along with each household's socio-economic characteristics, workplace location, and residence choice. The models offer a framework for considering the effects of alternative urban development patterns and infrastructure policy options upon auto ownership and use. For example, the models project that a typical Phoenix worker living in characteristic suburban housing and working in the central business district will have a probability of .59 of owning more than one car, and a probability of .31 of driving to work. An otherwise identical worker in Phoenix, a newer, more sprawling, auto-oriented city, will have probabilities of .84 and .84, respectively, for the same events. (175 references) (BYB)
Availability: NTIS

Kant, P. H.; Cahn, R. P.; Cunninghams, A. R.; Farmer, M. R.; Herb, M. N.; Manny, E. H.
Exxon Research and Engineering Co.
Effects of Changing the Proportions of Automotive Distillate and Gasoline Produced by Petroleum Refining
Sponsor: U.S. Environmental Protection Agency, Office of Air and Waste Management, Office of Mobile Source Air Pollution Control
Abstract: This study examines the effects of

Address: Pittsburgh, PA 15235

High Power Density Bipolar Lead-Acid Battery for Electric Vehicle Propulsion


Abstract: A study was conducted to test the concept of using bipolar lead-acid batteries for electric vehicle propulsion. The goal of an experimental program was the construction and testing of a battery of sufficient size to permit valid extrapolation to larger size batteries. Peak specific power figures of over 200 watts per pound were achieved and the specific energy of a bipolar battery was 12 to 13 watt hours per pound at the two hour discharge rate. It was considered that such a new battery system could be used as power sources for buses, service vehicles and personal automobiles, with a cruising range of approximately 30 miles (48.27 km) but with good acceleration and hill capability. It is hypothesized that the bipolar battery concept will also allow rapid battery recharge to extend the cruising range. A vehicle mission study was conducted using computer programs developed and verified for the various types of vehicle systems on other programs. The urban area of Seattle, Washington, was chosen for the mission studies, and terrain data on actual urban bus and suburban commuter vehicle routes were obtained. These data were combined with the performance data of prototype bipolar lead acid batteries. Vehicle system performance for various missions was computed and is reported. (3 references) (auth)

Availability: American Institute of Chemical Engineers, 345 East 47th St., New York, N.Y. 10017 $90.00 for entire proceedings

Kearin, D.H.; LaSoureux, R.L.; Goodwin, B.C.; System Development Corp.

Address: 2500 Colorado Ave., Santa Monica, CA 90406

A Survey of Driving Patterns in Six Urban Areas of the United States: Summary Report

Report No. TA-4119/007/00, 125 p. 29 Jan 1971

Sponsor: U.S. Dept. of Health, Education and Welfare, National Center for Air Pollution Control; Coordinating Research Council Inc.

Abstract: A study was performed to survey the characteristic use patterns of privately operated automobiles in six major metropolitan areas: Los Angeles, Houston, Cincinnati, Chicago, Minneapolis-St. Paul, and New York City. ... The findings of the surveys in each city have been published in the series of SDC Technical Memoranda, Volumes 0 through 6. This report presents a summary of the data from six cities and some comparison between cities. Although strict interpretation of the results of classical hypothesis testing would seem to indicate that there are significant differences in the automobile use patterns which stood out clearly. The distribution of these daily patterns was quite similar among Houston, Cincinnati, Chicago, and Minneapolis-St. Paul, while New York differed in having more zero trip-days and Los Angeles had more multiple trip-days. Section Three presents the distributions of the automobile utilization variables and an interpretation of their comparisons. The trip descriptors compared were trip distance, trip elapsed time, stops with engine running, average speed, elapsed time between trips, overnight, and overnight fuel tank readings. While New York was different from the other cities in almost all respects, and the stops with engine running exhibited no similarities, the other cities were quite homogeneous in all except weekday elapsed time and average speed. These distributions are discussed in Section 4. (From Introduction and Summary, Section One)

Kearney (J.T.) Inc.

Address: 190 South Wacker Drive, Chicago, IL 60606

Industrial Energy Study of the Motor Vehicles Industry


Jul 1971

Sponsor: Federal Energy Administration; U.S. Dept. of Interior, Bureau of Mines

Abstract: The aim of this investigation was to assess the economic effects of possible energy shortages in the motor vehicle and equipment industry. The industry's energy consumption is characterized in terms of manufacturing process, geographic pattern of use, types of energy, supply dynamics, use efficiencies, and options for substitution and conservation. Although the motor vehicle industry is not directly energy-intensive, supplier industries are large energy users. It is possible that an isolated shortage in a supplier industry could shut down an entire assembly line. Even though there have been some instances of energy shortages, production has continued by conservation measures, by substituting other forms of energy, and because of reduced production schedules. Energy can be conserved principally in these areas: building heating, lighting, and services. Longer-range conservation schemes are under study, e.g., using recuperators or heat pumps.
Carpooling: Status and Potential

Abstract: One goal of this study was to assemble all available data and combine it with practical experience in urban goods movement and urban transportation planning to develop a more complete understanding of problems encountered in urban goods movement. A second objective was to identify solutions to such problems and to develop a methodology for testing and implementing these solutions.

The report is divided into seven sections. Section I presents a discussion of urban goods transportation as compared to the nation's total transportation, plus a discussion of the physical distribution of goods as it sets the demand for goods transportation in urban areas. Section II provides estimates, in some detail, of the characteristics and amounts of transportation currently used to move goods in our major cities. Section III presents estimates of the impact of this transportation on cities in terms of cost, congestion, energy consumption, air pollution, noise pollution and land use. Section IV focuses on each of these impacts as viewed by several identifiable interest groups in the community: commuters, consumers, goods haulers, shippers/receivers, etc. Section V presents an attempt to isolate fundamental causes of urban goods movement problems and Section VI discusses nearly 100 possible solutions to them. Section VII presents several recommendations for further action. Appendix A, contained in this main report, provides a glossary of terms. Appendix B is "Bibliography and Literature Abstracts," and Appendix C contains "Distribution and Analysis and Findings." Appendices D, E, F, and G are the congestion analysis, energy analysis, air pollution analysis, and noise analysis. Appendix H contains "Potential Solutions to Urban Goods Movement Problems."

Availability: NTIS

Para-Transit: A Summary Assessment of Experience and Potential


Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration

Abstract: Para-transit modes offer an alternative to both the private automobile, which causes an increase in traffic congestion, travel time, and noise and air pollution, and to public transit services, which tend to be inflexible, overcrowded during peak hours, and inadequate during off-peak hours. This report reviews, evaluates, and assesses the potential of para-transit modes, which can be broken down into three main categories: (1) hire and drive services, such as daily and short-term rental cars; (2) bail or phone service; and (3) prearranged ride-sharing services, i.e., car pools, van pools, and subscription bus services. Several major applications of para-transit services are identified that could improve the efficiency and effectiveness of urban transportation. Increased use of high-occupancy para-transit modes—such as car pools, subscription bases, and jitneys—for commuting could alleviate congestion, pollution, and energy problems. Low density travel demand, including travel needs of people unable to use a car, could be more effectively served by para-transit. Para-transit feeder services can increase the effectiveness of conventional transit services by collecting and distributing passengers in areas of low demand density.

Availability: NTIS
Abstract: An automobile design model is described, which is capable of assessing the effects of design changes on fuel economy, lifetime energy required, sticker price, and annual cost of ownership of automobiles having certain acceleration capabilities, passenger and trunk compartment dimensions, and unrefueled range. The effects of the following improvements have been evaluated: aeroodynamic design changes, radial tires, structural materials, continuously variable transmissions, improved versions of spark ignition engines, other engine types, and nonpetroleum fuels. Technical advances (e.g., the use of a continuously variable transmission, improvements to the internal combustion engine, and the use of lighter weight structural materials) seem to provide greatest energy conservation potential. It was found that these improvements also result in reducing the cost of ownership. None of the new engine types now being researched (Rankine, gas turbine, and Stirling) appear to offer greater potential for energy conservation than improved internal combustion engines. Important energy savings can be achieved by reducing the space occupied by the car. Using methanol or hydrogen as automotive fuels does not conserve energy overall, but could conserve petroleum if nonpetroleum energy sources are used to produce these fuels.

Kirby, R.P.; Bhatt, K.U.; Kemp, M.A.; Reporting Agency: National Science Foundation, National Science Foundation, Office of R and D & D program as needed to identify important innovations in the provisions of para-transit services which would be beneficial. Services studied were grouped into 3 categories: (1) "hire and drive" - daily car rentals and fo rces of short-term car rentals that have been proposed including Minicar and Public Automobile System; (2) "hail or phone" - taxi, dial-a-ride, jitney and related services; and (3) pre-arranged ride-sharing - forms of car pool, van pool, and subscription bus services. Four major applications of para-transit services are identified. Chapters include comparative study of para-transit modes, innovations in para-transit regulations, and case studies. A para-transit bibliography is furnished. Tables and figures complement the text. A summary of this report is "Para-Transit: A Summary Assessment of Experience and Potential." (GRA)

Klein, K. R. Energy Research Corp. Address: Danbury, CT 06810

Abstract: A review of vehicle use patterns on September 12-17, 1976, pp. 377-381 1976


Abstract: A review of vehicle use patterns reveals that an electric vehicle capable of achieving a 75 mile range on a typical city driving cycle would fulfill the requirements of the second car in multi-car families at a minimal disruption to trip freedom. There are currently 30 to 40 million multi-car families and the penetration of this segment of the transportation market by electric vehicles would have significant beneficial effects on the type and quantity of energy consumed within the United States. For the 75 mile mission and a compact size vehicle, a critical battery energy density exists in the 30 to 35 watt hour per lb. range. The nickel-zinc battery system appears to be the leading contender to fulfill the mission requirement of a 75 mile range vehicle. For the scenario of coal to liquid synthetic fuel to internal combustion engine vehicle vs. coal to electric energy to electric vehicle, a two to one energy savings is possible by the electric route. The use of approximately 15 million such vehicles in the United States would reduce our liquid petroleum imports and consumption by one million barrels a day. (2 references) (auth)

Available: American Institute of Chemical Engineers, 345 East 47 St., New York, NY 10017 $90.00 for entire proceedings

Kraus, J.H.; Kraus, C.E.; Gres, M.E. Excelermatic Inc.

A Continuously Variable Transmission for Automotive Fuel Economy

Paper No. 751180, 12 p. 1975

Sponsor: Society of Automotive Engineers

Abstract: The use of a high efficiency continuously variable transmission (CVT) with a wide ratio range is required in order to operate an automotive engine at minimum brake specific fuel consumption (bsfc). Such operation will increase fuel economy from 21-40% over conventional practice. This paper describes a 12:1 ratio range CVT, and
CONT. shows a simplified control system capable of allowing a vehicle to operate with the engine at or very near minimum basic under all demand power conditions for optimized fuel economy. Also described is the effect such a transmission has on vehicle performance. The paper raises the possibility of reducing engine size to maintain normal performance, and further increase fuel economy. (6 references) (auth, abstract modified)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15094 $2.75

Krzyczkowski, E.; Henneman, S.S.; Hudson, C.L.; Thiessen, D.J.
Interplan Corp.
Address: 190 North Hope Ave., Suite 18, Santa Barbara, CA 93110
Joint Strategies for Urban Transportation, Air Quality and Energy Conservation: Joint Action Programs
Report No. P-28-24497, UMTA-RT-06-0005-75-1
Dec 1974
Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration; U.S. Environmental Protection Agency; Federal Energy Administration
Abstract: Problems of mobility in the cities, the quality of urban air, and transportation-related energy consumption constitute major issues of national concern. This report represents the joint efforts of the Urban Mass Transportation Administration, the Environmental Protection Agency, and the Federal Energy Administration to develop an integrated approach for resolving problems created by traffic congestion, air pollution, and petroleum shortages. The purposes of this report were to: (1) identify all principal strategies and actions which impact on each of the agencies' transportation-related goals; (2) systematically elucidate the interrelationships among these; and (3) devise a way of isolating those groups of strategies and actions whose total impacts would be synergistically enhanced if implemented jointly. The report represents the culmination of the study effort to attain these objectives. In Part I, the basic relationships among the strategies and actions are summarized in a matrix display. Each item is ranked to assess its impact on six subgoals, or phenomena, in the near or long term: improved auto alternatives, improved vehicular flow; reduced auto use; reduced travel demand; reduced vehicular emissions; and reduced vehicular petroleum consumption. Two synergistic joint action programs are presented. Part II contains an information review of experience, impacts on goals (mobility, air quality, energy conservation), and an overall evaluation of 56 specific actions, based on the 376 sources listed in the appendix. (544 pages)

Availability: NTIS

Kumer, J.T.
Ford Motor Co., Chemistry Dept.
The Automobile as an Energy Converter
Technology Review, 77(4), pp. 27-37 (Feb 1975)
Feb 1975
Abstract: The main factors that influence how efficiently automobiles consume gasoline are discussed in this article. The efficiency of the internal combustion (ic) engine increases as the compression ratio increases, but the extent that this ratio can be increased is limited by the tendency of the engine to "knock." With high-octane gasoline higher compression ratios can be realized. Internal combustion engines realize high thermal efficiencies by compressing air using a compression ratio that is about two times that of the engine. Although the average ic engine compression ratio and engine operation efficiency has increased since 1930, the average vehicle fuel economy has declined. This decrease is due to the use of larger engines; heavier and larger vehicles; such accessories as automatic transmission, power steering, and air conditioning; and higher vehicle speeds. Vehicle design must begin to reduce fuel economy improvement, e.g., a smaller engine and good aerodynamic design. In addition to design, driving habits, traffic patterns, and tire characteristics help determine the fuel economy of cars. A loss in fuel economy has resulted from emission control methods. The potential for developing alternate power plants (e.g., automotive gas turbine, Stirling engine, fuel cell, and stratified charge engine) is examined. Two general conclusions are reached: 1) because fuel economy of the Otto cycle ic engine is lowered by part-load operation, the convenience of accessories, and high vehicle weight, these factors must be worked on; and 2) although extensive R & D has been done, further fuel economy improvement, many engineering developments cannot be implemented until there is enough benefit economically to pay for their initial costs. (888 pages)

Landis, R.
Charles River Associates Inc.
Address: 16 Garden St., Cambridge, MA
The Effect of Automotive Fuel Conservation Measures on Air Pollution
Report No. EPA-600/5-76-006, CRA-218, 598 p.
Sep 1976
Abstract: The energy crisis of the winter of 1973-74 highlighted the risks of dependence on foreign sources of crude oil. In response to this crisis, government policies are being considered to reduce our dependence on imported crude oil. In addition, these policies have been designed to reduce gasoline consumption by automobiles, including: gasoline rationing, gasoline rate increases in the federal excise tax on gasoline; excise taxes on new cars, in inverse proportion to their fuel economy; and regulations to set minimum levels on average fuel economy of new cars. This study is addressed to two questions dealing with these proposed policies. First, what will be the impact on fuel consumption by automobiles and by other competing modes of transportation, if different levels of these policies are put into effect? Second, what impact would these policies have on emissions and concentrations of automotive pollutants? The major conclusions of this study are: 1) increases in the federal excise tax on gasoline and gasoline rationing are more effective in conserving fuel than excise taxes and fuel economy restrictions on new cars, especially in the early years of the policies; 2) the policies aimed at new cars also lead, within several years of the date of the policy, to significant decreases in emissions relative to base case emissions; and 3) the effect of all of the policies will be small in the first year of analysis, but the effects will become more pronounced over time. The rest of this study presents the background analysis and documentation--including quantitative
estimates of gasoline consumption, automotive emissions and concentrations for several levels of freight modes. This analysis of the demand for automobiles is to determine and analyze the operational and technological changes which will have both new and used cars. Trucks can be considered as an extreme form of specialization. Trucks are used as partial substitutes for cars, but they rarely replace the automobile. Because most trips are less than a five mile distance, there could be a large market for electric vehicles among multiple car households. (14 references) (BYB)

The study examines current and future energy impacts for each major freight mode (trucks, railroads, inland waterways, coastal and Great Lake ships, pipelines, and air freight), by commodity, and, in many cases, by vehicle type. It also discusses potential economic impacts of these anticipated changes. The study is limited to intercity freight movements of both private and for-hire carriers. The study includes a determination of base case energy scenarios for 1972, 1980, and 1985 to serve as a basis for evaluating operational and technological impacts by 1980 and 1985 for an industry change scenario and the government influence scenario. The report discusses in detail operational and technological changes which will have energy and economic impacts on each of the freight modes. (GBA)

Availability: NTIS

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A statistical overview is presented of the regulated surface transportation industry during 1974 by extracting, tabulating, and summarizing data from quarterly reports filed with the Interstate Commerce Commission by companies under its jurisdiction. Five modes (Class I railroads, Class I truck lines, Class I bus lines, Class I pipelines, and Class A and B water carriers), twenty-six categories of statistics (including both financial results and performance measures), and over 1100 separate companies are included. The quarterly data have been summed to produce annual results. This report consists of two summary pages, one for financial statistics and one for operating (performance) results, and twenty-six sections containing detailed carrier-by-carrier results, one section for each of the categories of data tabulated. (From introduction)

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oil production could increase from 10.0 million barrels per day (b/d) in 1976 to 10.4 million b/d in 1985, and 11.4 million b/d by 1990; natural gas production would decline only gradually from 10.7 trillion cubic feet (Tcf) in 1976 to 17.4 Tcf in 1985 and 16.9 Tcf in 1985 and 1990. Synthetic gas from coal will probably make a significant contribution to energy supplies by 1985. By 1990 a significant amount of oil is expected to supply 200,000 b/d. Despite vast reserves of oil, production will be expected only 775 million tons in 1980, 940 million tons in 1985, and 1,225 million tons by 1990. The major limitation to expansion of nuclear power capacity has been the rate of licensing new nuclear power plants. Hydroelectric power will increase slowly. Geothermal energy is not expected to make a significant contribution in the next 15 years. Solar energy is likely to supply approximately 1% of the total U.S. energy demand in 1985 and 2% by 1990. Investment decisions in the energy industry have been delayed by uncertainties about energy policy. Government support (e.g., price floors or loan guarantees) may be necessary to encourage development of shale oil, tar sands, synthetic gas, and other alternative energy resources. It is anticipated that natural gas imports will grow from 0.9 Tcf in 1976 to 1.5 Tcf in 1980, 2.1 Tcf in 1985, and 2.4 Tcf by 1990. Oil imports will rise from 7.2 million b/d in 1976 to 10 million b/d in 1980, 11.0 million b/d in 1985, and 12.9 million b/d by 1990. Another oil embargo could have a disastrous impact on the U.S. economy. Although world oil production capacity can probably meet demand through the 1980's, there is no guarantee that producing countries will continue to increase oil production. Therefore, the U.S. must adopt an aggressive conservation ethic and a major program of energy resource development. (87E)

availability: GPO, Stock No. 052-070-04990-4

hybrid vehicles

Abstract: A study was made to determine the emissions reduction potential of piston engine-electric hybrid vehicles. Series and parallel hybrids were considered in a 1815 kg vehicle. To facilitate this study, a computer program was written which modeled the vehicle and, using experimental data, computed its emissions and fuel consumption over the 1972 FTP driving cycle, starting with a fully warmed-up engine. This study indicates that, under certain conditions, the fuel consumption or emissions of the hybrid vehicle may be reduced as compared to its non-hybrid counterpart. But under other conditions, they may be increased. It is not possible to reduce fuel consumption and all of the emissions simultaneously. The reduction of one pollutant is usually accompanied by an increase in one of the others. The extent of the reduction or increase experienced with hybrid operation depends on the particular type of hybrid and on the engine operating conditions. It must be concluded that the hybrid vehicle does not automatically guarantee lower fuel consumption or emissions. (11 references) (auth, abstract modified)

availability: Society of Automotive Engineers, Inc., 480 Commonwealth Drive, Warrendale, PA 15096 $2.75
Abstract: Even with significant market penetration (10%) in the 1990's, electric vehicles (EV's) in the present market for automobiles and the associated costs in fuel economy, maintenance, sticker price, and investment cost penalties to consumers are estimated and appear to be significant. For instance, a 20 percent decrease in the weight of a PRT vehicle would reduce system fuel consumption by 12 percent. (19 reference(s) (auth)

Availability: NTIS

Liles, A.W.; Fetterman, G.P., Jr.

Address: Florham Park, N.J.


Address: Washington, DC

326 p.

Sponsor: U.S. Environmental Protection Agency, Office of Mobile Source Air Pollution Control

Abstract: The capability of the U.S. automobile industry to manufacture proposed low-emission automobile engine systems is assessed, and the associated costs in fuel economy, maintenance, sticker price, and investment cost penalties to consumers are compared. U.S. auto manufacturing has become a more dynamic, difficult, and uncertain business in the latter part of the 1970's. Although the industry has invested over $300 million per year for emissions control R & D, the control equipment has been very costly to consumers. The emission control systems have resulted in a 10 to 15% reduction in fuel economy over that of the 1970 cars. The oxidizing catalytic converter, now designed for mass production, substantially decreases, in 1975 model year cars, previous fuel-economy losses. Full acceptance of the catalytic converter depends on several factors, e.g., durability of the equipment, consequences of a converter burnout, government policies, and rapid development of effective base-metal catalysts. For the short term (1975 to 1980), a shift to smaller cars with improved gasoline economy will be the trend. If the current law, which requires 0.4 g/mi NOx (x) by 1978, is upheld, new vehicles that year will cost about $850 more over their lifetime than 1970 models. All emission control systems under development use catalytic converters, either serially or with closed-loop controls. Other systems that offer superior fuel economy to that of the serial catalytic system will probably be introduced in time. If the 1978 NOx standard were relaxed to 1.0 to 1.5 g/mi, other alternate engine technologies would again be under consideration, including diesel, stratified charge, and Wankel engine regulation and test procedure is suggested for automotive diesel cars. (83H)
**Cost of Owning and Operating an Automobile**

**Abstract:** This report studies the possible electrification of sectors of the Conrail system which would be economically and operationally viable. Investments required and costs incurred for electrified operation are identified. Economic feasibility is evaluated. Energy consumption for electrified and diesel systems are considered. An algorithm is developed and applied to establish the preference of sectors for electrification. The study concludes that electrification warrants serious consideration as one of the available options to improve rail transportation in the Northeast. (GRA)

**Availability:** NTIS

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**Cost of Owning and Operating a Car**

**Abstract:** This report examines the factors affecting the costs of automobile ownership and operation and pinpoints opportunities to save on these costs. Four tables provide cost estimates of owning and operating standard, compact, and subcompact size cars, per year and per mile, from the first to the tenth years. These costs include: depreciation, repairs and maintenance, tire replacement, accessories, gasoline and oil, insurance, parking and tolls, and state and federal taxes and fees. Total cost per mile to own and operate a standard sized car is 17.9 cents; 14.6 cents for a compact car; and 12.6 cents for a subcompact. The following suggestions are made to keep car costs to a minimum: use radial tires rather than bias ply tires, join a carpool, shop for money to finance a car, keep the car properly tuned, and make sure that the car insurance is suited to the particular use patterns, buy small cars without automatic transmission, air conditioning, and power steering, be sure to read and make full use of a new car warranty, and make minor repairs and replacements instead of paying a mechanic to have them done. (RTA)

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**Study of Automobile Market Dynamics:**

**Abstract:** This study examines policies the Federal government could implement to reduce automobile gasoline consumption during the time period 1976 to 1980 and beyond. A survey of new car buyers was conducted in early 1976 to determine which car they would buy in each of five possible future scenarios: (1) a base case; (2) the gasoline tax case; (3) the excise tax case, in which new luxury cars would have an excise tax of $100 added to the price of the car; (4) the regulation case, in which Congress would require manufacturers to achieve a sales-weighted average of cars with better fuel economy. Survey results show that forecasts of new car sales distributions differ depending on the scenario. Forecasts of new car sales from 1976 to 1980 are presented. Sales of small and medium-size cars are expected to increase while large car sales diminish, particularly in the gas tax scenario. Foreign car sales are also projected to rise under these scenarios. (RTS)

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**Study of Automobile Market Dynamics:**

**Abstract:** This report is part of a study which compares and evaluates options which the Federal government could implement to reduce automobile gasoline consumption during the time period 1976 to 1980 and beyond. Survey results show that forecasts of new car sales distributions differ depending on the scenario. Forecasts of new car sales from 1976 to 1980 are presented. Sales of small and medium-size cars are expected to increase while large car sales diminish, particularly in the gas tax scenario. Foreign car sales are also projected to rise under these scenarios. (RTS)

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**Attachment 1. Study of Automobile Market Dynamics:**

**Abstract:** This document reports on work done on Task 5 (Final Test of Consumer Responses) of a study of automobile market dynamics, which examines policies the Federal government might implement to reduce gasoline consumed by passenger automobiles during the period 1976 through 1980. The study determines how each policy option would affect the number of cars sold; the distribution of sales among small, medium, and large cars; the distribution between cars manufactured by foreign companies; and the gross revenues from these car sales. The purpose of Task 5 was to provide data on these impacts and to furnish statistical inputs to a computer model. A total of 705 new car buyers were interviewed, covering these topics: the reference car, the new car that will be purchased between June 1976 and 1981; the replaced car, that car which would be replaced by the reference car; a second car owned by household; various proposed scenarios; background information about the respondent's household; and estimated and observed odometer readings. The scenarios developed for this study are: (1) a base case; (2) the gasoline tax case; (3) the excise tax case, in which new luxury cars would have an excise tax of $100 added to the price of the car; (4) the regulation case, in which Congress would require manufacturers to achieve a sales-weighted average of cars with better fuel economy. Survey results show that forecasts of new car sales distributions differ depending on the scenario. Forecasts of new car sales from 1976 to 1980 are presented. Sales of small and medium-size cars are expected to increase while large car sales diminish, particularly in the gas tax scenario. Foreign car sales are also projected to rise under these scenarios, at the expense of domestic car sales. (RTS)
<302> CONT.

Impact of the policy options studied. The regulation case is already in effect. Automobile manufacturers are able to meet the sales-weighted-average criterion through technological improvements and weight reduction. If they meet the sales-weighted-average criterion by shifting the size distribution of their product, (i.e., designing the less fuel-efficient models), unfavorable secondary effects would result. Recommendations for further research are made. (878)

<303>

Locklin, D.P.
Economics of Transportation


Abstract: The book begins with chapters on transportation in general, its economic significance, the U.S. transportation system, and freight rates. Many chapters are devoted to rail transportation, including rate theory and structures, the evolution of the regulatory system, and railway regulation and policies. Other modes of transport, pipelines, highways, water, and air, are treated more briefly, with attention called to similarities and differences between these modes and railways. Differences in regulatory statutes and policies along the various modes of transportation are brought out. The book ends with chapters dealing with transport coordination, the relationship between the various modes, and consideration of overall transportation policy. (NFG)

Availability: Richard D. Irwin, Inc.

<304>

Loeb, A.S.
Oak Ridge National Laboratory, Energy Division, Regional and Urban Studies Section
Address: Oak Ridge, TN 37830

Transportation Energy Conservation Data Book: Supplement III


Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This document represents the initial effort of the Oak Ridge National Laboratory to develop a transportation energy conservation data book for use as a desk-top reference by the Transportation Energy Conservation Division of the Energy Research and Development Administration. It represents an assembly and refinement of statistics which characterize the major transportation modes and presents data on other factors which influence the transportation sector in the nation. Statistical data on energy use in the transportation sector are presented in the form of tables, graphs, and charts. The purpose of this publication is to present a large amount of relevant data in an easily retrievable and usable format. The following topics are covered in six chapters: Characteristic of Transportation Modes; Energy Consumption; Characteristics, including energy consumption by source and by sector and energy intensiveness; Conservation Alternatives; Government Impacts, including expenditures, regulations and research, development and demonstration spending; Energy Supply, including domestic petroleum production, prices, and projections; and Transportation Demand, including population characteristics and economic determinants. A bibliography of data sources is provided at the end of each chapter, and a more general bibliography is included at the end of the book. (154 references) (auth)

Availability: NTIS

<305>

Loeb, A.S.; Bjornstad, D.J.; Burck, D.F.; Howard, E.B.; Hull, J.; Radoveli, D.G.; Malthouse, N.S.; Ogle, N.C.
Oak Ridge National Laboratory, Energy Division, Regional and Urban Studies Section
Address: Oak Ridge, TN 37830

Transportation Energy Conservation Data Book


Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

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Availability: NTIS

<306>

Luchter, S.; Renner, R.A.
Energy Research and Development Administration, Division of Transportation Energy Conservation
Address: Washington, DC

An Assessment of the Technology of Rankine Engines for Automobiles

Report No. EEDA-77-54, 97 p. Apr 1977

Abstract: During the past 7 years, much work has been accomplished in advancing the development of the Rankine-powered automobile. This report is intended to be a critical review of the work, with emphasis on the Federal government's development program. The information is presented in four major parts. The section on the state of the art in 1970 describes where the technology was prior to the government development program. The section describing the program initiated within the Environmental Protection Agency and concluded by the Energy Research and Development Administration presents an overview of the components and systems. A third section describes the work done during this time. The major conclusions of the report are that the Rankine engine can provide very low emissions, that the fuel economy is not competitive with...
Abstract: The subject is treated on the basis of detailed engineering test data regarding components and parameters of 1975 autos. The applicability of the simulation approach is examined by extensive comparisons with integrated vehicle test results. It is found that fuel economy, for the EPA driving schedules, is adequately simulated with 5% to 10% uncertainties. Uncertainties of the same magnitude are also encountered in performance simulations. Larger uncertainties are evident in the simulation of emissions. Nor prediction has an uncertainty up to 25% but no significant bias, while CO and HC are very substantially over-predicted and under-predicted respectively. Excepting NOx, and CO, several applications are made in the evaluation of sensitivities to various auto components and parameters. Evaluations are made of changes in auto weight, engine displacement and rear axle ratio, considered individually and in combinations. Drivetrain changes are also evaluated for three-speed automatic transmissions. These include individually or in combinations: a wider range of gear ratios, the addition of a fourth gear and various schemes of torque converter lock-up. (14 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15086 $2.75
Abstract: These annual reference issues of Automotive News contain statistics and information on the automotive industry. Data are included on U.S. new cars and trucks sales, registration, imports, retail prices, specifications, and equipment options. U.S. and Canadian automobile production is covered as is used cars sales and used cars in operation. Financial data on the automobile industry are provided, and U.S. and foreign top executives in the industry are listed. A section is included in the 1976 issue on the industry government policies affecting car manufacture. The 1977 issue describes the progress the automotive industry made in 1976. A record 41.5 million motor vehicles were manufactured throughout the world in 1976, and a good sales year is expected in 1977. U.S. new car registrations increased from 8,261,840 in 1975 to 9,751,885 in 1976. Excluding American Motors, U.S. automobile manufacturers and dealers experienced a good year financially in 1976. Future success of the industry is largely dependent on President Carter's energy program. Although government regulations formed small cars, the free market showed that many consumers wanted large automobiles. (BFB)

Availability: Marketing Services Inc., 2300 N St., NW, Washington, DC 20037 $50.00

<312>

Marketing Services Inc.
Address: 965 E. Jefferson, Detroit, MI 48207

Automotive News Market Data Book (Formerly Almanac)
Annual publication, v.p.
1973; 1974; 1975; 1976; 1977
Abstract: These annual reference issues of Automotive News contain statistics and information on the automotive industry. Data are included on U.S. new cars and trucks sales, registration, imports, retail prices, specifications, and equipment options. U.S. and Canadian automobile production is covered as is used cars sales and used cars in operation. Financial data on the automobile industry are provided, and U.S. and foreign top executives in the industry are listed. A section is included in the 1976 issue on the industry government policies affecting car manufacture. The 1977 issue describes the progress the automotive industry made in 1976. A record 41.5 million motor vehicles were manufactured throughout the world in 1976, and a good sales year is expected in 1977. U.S. new car registrations increased from 8,261,840 in 1975 to 9,751,885 in 1976. Excluding American Motors, U.S. automobile manufacturers and dealers experienced a good year financially in 1976. Future success of the industry is largely dependent on President Carter's energy program. Although government regulations formed small cars, the free market showed that many consumers wanted large automobiles. (BFB)


<314>

Mcllome, A.F.; Davis, D.A.
Ford Rotoc Co.
The Ceramic Gas Turbine--A Candidate Powerplant for the Middle- and Long-Term Future


1976
Sponsor: Society of Automotive Engineers

Abstract: The paper reviews our problems of energy availability in the middle and long-term future as well as our problems of environmental pollution and materials availability. Against this background the ceramic gas turbine engine is examined and shown to have potential as an attractive candidate powerplant for both the middle and long-term future. The paper reports on Ford's ceramic gas turbine program which is a systems development program encompassing all aspects of turbine ceramics technology---design, materials, fabrication processes, testing and evaluation. (37 references) (auth)

Availability: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096

<315>

Mehl, R.H.
Transportation and Distribution Associates Inc.
Address: 600 N. Jackson St., Media, PA 19063

reviewed. It is concluded that emission constraints are important and can limit the effectiveness of nose design changes to improve fuel economy. With present technology, it can be shown that stringent exhaust emission standards will reduce fuel economy more than it can be improved by car design changes which do not seriously degrade any customer perceived values such as useful capes. (11 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096 $2.75

<316>

Narcy, A.C.; Williams, L.J.
National Aeronautics and Space Administration, Ames Research Center
Address: Moffett Field, CA

Air Transportation Energy Consumption: Yesterday, Today, and Tomorrow


1975
Abstract: The energy consumption by aviation is reviewed and projections of its growth are discussed. Forecasts of domestic passenger demand are presented, and the effect of restricted fuel supply and increased fuel prices is considered. The most promising sources for aircraft fuels, their availability and cost, and possible alternative fuels are reviewed. The energy consumption by various air and surface transportation modes is identified and compared on typical portal-to-portal trips. A measure of the indirect energy consumed by ground and air modes is defined. Historical trends in aircraft energy intensities are presented and the potential fuel savings with new technologies are discussed. (29 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096

<317>

McLean, A.F.; Davis, D.A.
Ford Rotoc Co.
The Ceramic Gas Turbine--A Candidate Powerplant for the Middle- and Long-Term Future


1976
Sponsor: Society of Automotive Engineers

Abstract: The paper reviews our problems of energy availability in the middle and long-term future as well as our problems of environmental pollution and materials availability. Against this background the ceramic gas turbine engine is examined and shown to have potential as an attractive candidate powerplant for both the middle and long-term future. The paper reports on Ford's ceramic gas turbine program which is a systems development program encompassing all aspects of turbine ceramics technology---design, materials, fabrication processes, testing and evaluation. (37 references) (auth)

Availability: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096

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Transportation and Distribution Associates Inc.
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<319>

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Address: 600 N. Jackson St., Media, PA 19063

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National Aeronautics and Space Administration, Ames Research Center
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Energy Considerations for Electric Railway Systems

Transportation Research, 8(4/5), pp. 465-469
(Oct. 1974)

Oct 1974
Abstract: The present energy crisis has called attention to a fundamental problem of electric railway systems. While the design of railway equipment or plant leads to energy specifications, the two are joined according to some plan of train operation to provide energy relationships for input to the systems analysis process (energy input). This joining of plant and equipment for the development of energy input generally has not been done. Several applications of energy input exist. They include the identification of means to reduce overall energy consumption as well as peak usage reflected in "demand charges" and the design specifications for new or modified systems. A sound methodology exists for energy analysis of electric railway systems. The underlying theory is discussed, and the application of the technique is presented. The theory and application include principles of physics, judgement of railway operations and computer simulation. (auth)

Mencher, S.K.; Ellis, H.M.
Address: 299 Park Ave., New York, NY

The Comparative Environmental Impact in 1980 of Gasoline-Powered Motor Vehicles versus Electric-Powered Vehicles

Oct 1971
Abstract: This study examines the comparative environmental impact from all motor vehicles being powered by electricity versus gasoline in 1960. The results were obtained by determining the pollutant emissions from each component of the transportation systems, beginning with extraction of fuels from the earth and ending with actual motor vehicle operation. The results are not conclusive, but appear to indicate that the electric vehicle represents a cleaner form of transportation. (EPG)

Availability: Electric Vehicle Council, 90 Park Ave., New York, NY 10016

Michels, A.P.J.
Philips Laboratories
Address: Briarcliff Manor, NY

The Philips Stirling Engine: A Study of its Efficiency as a Function of Operating Temperatures and Working Fluids

Paper No. 769258 presented in the "Eleventh Intersociety Energy Conversion Engineering Conference Proceedings" (conference held at the Sahara Tahoe Hotel, State Line, Nevada, on September 12-17, 1976), pp. 1506-1510
1976
Abstract: The efficiency of the Philips Stirling engine, as well as that of other heat engines, increases with increasing heat source temperatures and with decreasing heat sink temperatures. In the past, the Philips organization has therefore emphasized Stirling engine applications where both heat source temperature and heat sink temperature are available. High temperature require the use of heat resistant materials, which are relatively expensive. There are other applications, however, where high efficiencies can be traded off for lower cost, i.e., where the heat source itself is at lower temperature, and thus use of conventional or less expensive "hot side" materials is possible. A typical application in the latter category is the conversion of solar energy. When this energy is collected by flat plate or parabolic reflectors, the usable heat is in the 200 degrees C to 500 degrees C range. Engine efficiency, in addition to being a function of the hot side temperature, also depends on the heat sink temperature and the working fluid used. The effect of the heat source and heat sink temperatures on engine efficiency follow directly from Carnot's law. The properties of the working fluids influence the heat transfer and the flow losses in the engine. Furthermore, some of the operating conditions for which an engine has to be designed, especially the specific power output, also have a marked influence on engine efficiency. The inter-relationship of these various parameters was studied at Philips and is presented in this paper. A Philips 1-98 Stirling engine having one cylinder and a piston swept volume of 98 cubic cm was used as the basis of the study. Philips having built about thirty engines of this type. The maximum obtainable efficiencies were determined as a function of heater temperature, using three different working fluids. (7 references) (auth)

Availability: American Institute of Chemical Engineers, 305 East 47 St., New York, NY 10017 $20.00 for entire proceedings

Miller, B.M.; Thomas, H.L.; Doltin, G.L.; Coury, A.B.; Hendricks, T.A.; Lennartz, F.E.; Powers, R.B.; Sabie, E.G.; Yarnes, E.L.
U.S. Dept. of Interior, Geological Survey
Address: National Center, Reston, VA 22092

Geological Estimates of Undiscovered Recoverable Oil and Gas Resources in the United States

1975
Sponsor: Federal Energy Administration
Abstract: The primary purpose of this study was to estimate the amount of oil and gas available for discovery and recovery under conditions representing a continuation of historical trends of technology and economics; no attempt has been made to predict how much will be discovered, nor when discoveries will be made. The uncertainties involved are emphasized by reporting undiscovered recoverable resource estimates in terms of ranges of values. ... Thus, the current appraisals indicate that the estimated statistical mean of undiscovered recoverable resources of crude oil in the United States, onshore and offshore, amounts to 82 billion barrels, but this value lies within a range of 50 to 127 billion barrels. The corresponding figures for gas are: a statistical mean of 484 trillion cubic feet, within a range of 322 to 655 trillion cubic feet. In each case the mean value of the undiscovered recoverable quantity is on the order of one-half the amount which has been identified and produced to date. The results also suggest that nearly one-half of the undiscovered recoverable oil resources and more than one-quarter of the undiscovered recoverable gas resources may occur in offshore regions of the United States and in the onshore frontier provinces of the State of Alaska. It is important to note that these resources are located in regions of difficult and costly operations—particularly in the hostile physical environment of the Arctic—and require long lead times for exploration and development. (77 references)
Abstract: At the time of the conference, transportation problems were in the news due to the proposal of the Transportation Improvement Act, seven bankrupt railroads being reorganized, and the energy crisis again focusing on mass transportation. Economists who have studied the various modes of transportation are critical of the effects of government regulation on the nation's transportation system. They have raised the question of whether the consumer is better served with existing government regulation of the various modes of transportation than he would be with less regulation, but transportation specialists still maintain that government regulation of transportation is necessary for the public's interest to be safeguarded. The first two sections analyze government regulation of surface and air transportation; the third deals with different approaches to problems solving among economists and government officials; the fourth analyzes four Federal transportation programs; and the fifth and sixth present the responses of transportation policy makers to the questions raised. (TIC)

Availability: American Enterprise Institute for Public Policy Research, 1150 17th St. NW, Washington, D.C. 20036 $4.00

<320>
Miller, J.C., III (ed.)
Tucson A.F.M. Div.
Address: College Station, TX

Perspectives on Federal Transportation Policy
1975
Sponsor: American Enterprise Institute for Public Policy Research

Abstract: At the time of the conference, transportation problems were in the news due to the proposal of the Transportation Improvement Act, seven bankrupt railroads being reorganized, and the energy crisis again focusing on mass transportation. Economists who have studied the various modes of transportation are critical of the effects of government regulation on the nation's transportation system. They have raised the question of whether the consumer is better served with existing government regulation of the various modes of transportation than he would be with less regulation, but transportation specialists still maintain that government regulation of transportation is necessary for the public's interest to be safeguarded. The first two sections analyze government regulation of surface and air transportation; the third deals with different approaches to problems solving among economists and government officials; the fourth analyzes four Federal transportation programs; and the fifth and sixth present the responses of transportation policy makers to the questions raised. (TIC)

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<321>
<321>
Miller, H.G.
U.S. Dept. of Transportation, Transportation Systems Center
Address: Kendall Square, Cambridge, MA 02142

Automotive Energy Efficiency Program
Presented papers at the Contractors Coordination Meeting, January 15-17, 1975

Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology

Abstract: This volume contains working papers presented at the Contractors Coordination Meeting of the Automotive Energy Efficiency Program held at the DOT Transportation Systems Center, January 15-17, 1975. This program is the Federal Government's major effort to assess the capability of the automotive industry to significantly improve the fuel economy of production vehicles and assess the related socio-economic effects. The primary objective of the conference was to report on progress to date and future plans of the Automotive Energy Efficiency Program and to promote the exchange of information between government, industry and university investigators. Twenty-two papers and illustrated lectures were presented at the conference, 20 of which are included in this volume. Some are copies of visual material and others are more formal technical papers. (auth)

Availability: NTIS

<322>
Mintel, J.S.
Federal Energy Administration, Office of Energy Conservation and Environment

Address: Washington, DC 20461

Abstract: American consumers, who use one-third of our energy, favor energy conservation, but generally do not practice it. This paper presents empirical data and analyses of psychological, cultural, economic, and political reasons for this; indicates effective incentives and motivations for conservation; and spells out the implications for governmental policy and action. (32 references) (auth)

<322>
Mintel, J.S.
Federal Energy Administration, Office of Energy Conservation and Environment

Address: Washington, DC 20461

Abstract: American consumers, who use one-third of our energy, favor energy conservation, but generally do not practice it. This paper presents empirical data and analyses of psychological, cultural, economic, and political reasons for this; indicates effective incentives and motivations for conservation; and spells out the implications for governmental policy and action. (32 references) (auth)

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Effects of Energy Constraints on Transportation Systems

Mittal, R.K.
Union College, Mechanical Engineering Dept.
Address: Schenectady, N.Y. 12308

Abstract: This report addresses the question of how the energy constraints influence transportation systems. The study also provides techniques for energy conservation and suggests ways to reduce energy consumption. (197 references) (auth)

Energy Trends and Their Future Effects Upon Transportation

Mooz, W.E.
Rand Corp.
Address: Santa Monica, CA 90406

Abstract: Comparisons of planning models indicate that the energy trends and their future effects upon transportation systems have considerable impact. The report provides a framework for assessing these effects. (197 references) (auth)

The Effect of Fuel Price Increases on Energy Intensiveness of Freight Transport

Mooz, W.E.
Rand Corp.
Address: Santa Monica, CA 90406

Abstract: This report addresses the question of the effect of fuel price increases on the energy intensiveness of freight transportation in the United States. The study first required the identification of the energy intensiveness of each of the freight transport modes and the historical share of the transport market enjoyed by each mode. It was found that the modes differ substantially in their use of energy, the lowest value being 500 Btu per ton-mile for water transport and the highest being 63,000 Btu per ton-mile for air cargo. At the present time, the weighted average energy intensity is about 1,400 Btu per ton-mile, but it is expected to increase rapidly in the share of total cargo carried by air. Air cargo presently accounts for less than 0.2 percent of the total intercity ton-miles, but if present trends continue, it will reach a value of over 2 percent prior to the year 2000. This seemingly modest expansion would, nonetheless, produce a doubling of the average transport energy per ton-mile—34 to 68 Btu per ton-mile—by the year 2000. (29 references) (auth)

Energy Trends and Their Future Effects Upon Transportation

Mooz, W.E.
Rand Corp.
Address: Santa Monica, CA 90406

Abstract: Comparisons of planning models indicate that the energy trends and their future effects upon transportation systems have considerable impact. The report provides a framework for assessing these effects. (197 references) (auth)

Availability: NTIS

Jul 1973
Sponsor: National Science Foundation, RANN Program

Transportation presently consumes about 25 percent of the nation's energy budget, with about 96 percent of this energy deriving from petroleum sources. The consumption of energy by transportation is growing at an average annual rate of about 4 percent, due to changes in average modal energy intensiveness, increasing population, and growing per capita use of transportation. There are emerging problems with the supply of petroleum fuels which will cause the prices to increase. These problems result from the increasing difficulty of supplying the fuels in an environmentally acceptable way, the fact that increasing amounts of imported oil will be required to meet projected demands, and the fact that all suppliers are ultimately limited in extent. As the growing demand for transportation energy comes into conflict with rising energy prices, transportation systems as we presently know them will undergo changes. These are likely to be moves in the direction of less energy intensive transportation modes for people and freight, and lesser amounts of transportation per capita. New perceptions of the role of transportation in society may result which help to bring about urban developments minimizing transportation, innovative communication methods which substitute for travel, and changed ideas about vacations. (auth)

Availability: NTIS

Transportation Report No. PB-231225, DHA-Ca-11-00067-3-9, 409 p.
Dec 1973
Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration

Abstract: Comparisons of planning models indicate that the energy trends and their future effects upon transportation systems have considerable impact. The report provides a framework for assessing these effects. (197 references) (auth)

Availability: NTIS

Transportation Report No. PB-231225, DHA-Ca-11-00067-3-9, 409 p.
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Availability: NTIS

Transportation Report No. PB-231225, DHA-Ca-11-00067-3-9, 409 p.
Dec 1973
Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration

Abstract: Comparisons of planning models indicate that the energy trends and their future effects upon transportation systems have considerable impact. The report provides a framework for assessing these effects. (197 references) (auth)

Availability: NTIS
that trip distribution factors are more sensitive than traffic assignment factors in modeling transportation systems. In this study, trip distribution (matching of trip origins and destinations), traffic assignment (determining the specific route to be traveled), trip generation (determining how trips will originate) and modal split (allocating trips among available modes of travel) are examined, with emphasis on the first two. Other modeling processes should be explored in order to determine which components of the modeling process will have significance in regard to investment decisions. Techniques developed in setting up these models could be extended to allow better travel forecasts and more efficient transportation systems. Many factors, including political, financial, and environmental, affect the planning of proposed transport facilities. The interactions of these forces have not been satisfactorily modeled yet. (88 references) (DCK)

Availability: NTIS

Motor Vehicle Manufacturers Association of the U.S. Inc.
Address: 320 New Center Bldg., Detroit, MI 48202
* Automobile Facts & Figures

Annual Report, 72 p.
1975

Abstract: The motor vehicle industry, along with the entire national economy, has been adversely affected by the recession, inflation, energy shortages, and ecological problems during 1974 and 1975. In response to the public's demand for less fuel-intensive cars, the winter of 1973, the automobile industry switched from producing large cars to manufacturing smaller models. However, the public demand has now turned back to large cars, leaving automobile manufacturers with increasing inventories of unsold compact and subcompact cars. Price increases due to inflation and to the costs of complying with federal controls also hurt car sales. Industry reported that profits for 1974 were the lowest since the Great Depression of the 1930's. The rebate program in early 1975 stimulated sales, but cars were sold with little, if any, profit. In order for the automobile industry to obtain a 40% fuel economy improvement on all cars by 1980, Congress is asked to freeze emission standards. These pollution regulations also increase the cost of production, increase prices, and, therefore, have an adverse impact of the economy. A shift from individualized transportation to mass transit is considered improbable. Automobile manufacturers are continuing research on alternate power sources and on variations in the conventional gasoline system. Industry and government are called upon to work together in resolving the automobile industry's problems. Statistical data are presented on production and registration, and use and ownership of automobiles, and on the economic impact of the automobile industry. (BYB)

Availability: Statistics Dept., Motor Vehicle Manufacturers Association, 320 New Center Bldg., Detroit, MI 48202

Motor Vehicle Manufacturers Association of the U.S. Inc.
Address: 320 New Center Building, Detroit, MI 48202
* Motor Truck Facts

Annual report, 64 p.
1974; 1975

Abstract: These annual reports describe the truck industry situation in 1973 and in 1974. In 1973 new records were reached in U.S. motor truck production and use. Even with the economic downturn at the end of 1973, the use of light trucks for personal transportation and recreation increased. Inflation, recession, energy shortages, and government safety and emission regulations contributed to a substantial decline in truck sales during late 1974 and 1975. However, with the expected increase in tonnage shipped by trucks, more and better trucks will be in demand. Progress that U.S. truck manufacturers are making in environmental protection, highway safety, and energy conservation is discussed. Statistical data are presented on production and registration, and use and ownership of trucks, and on the economic impact of the trucking industry. (BYB)

Availability: Statistics Dept., Motor Vehicle Manufacturers Association, 320 New Center Bldg., Detroit, MI 48202
**The Administration's Task: Educating the Public**

Abstract: Data on energy consumption of motor vehicles are presented. Tables are included on the percent of households owning cars and light trucks; on purposes of passenger car usage; average automobile occupancy; person miles of travel by mode; average speeds of vehicles by type of roads; vehicle miles traveled and fuel consumption by class of vehicle; consumption of energy resources, by major sources and user; U.S. consumption of petroleum fuel and power; gasoline prices; U.S. new car retail sales by market classes; annual expenditures for gasoline per family by income groups; and gasoline consumption rates at various speeds. (BTB)

Availability: Motor Vehicle Manufacturers Association of the U.S., Inc., 320 New Center Building, Detroit, MI 48202

**Motor Vehicles and Energy. A Selection of Data Relating to the Motor Vehicle and Energy Demands**

**Mullaney, T.E.**

The Administration’s Task: Educating the Public on Energy


3 May 1977

Abstract: The public's reaction to President Carter's energy policy, with its emphasis on conservation, is noted in this article, and energy conservation efforts in the U.S. are assessed. The New York Times/CBS survey of public reaction to Carter's energy program shows that while 56% of those surveyed approved the President's handling of the energy problem, only 45% concurred with his assessment of the seriousness of the situation. A large majority were opposed to higher taxes and increased oil and gas prices. The Administration faces a difficult public education effort. Although the U.S. has made gains in energy efficiency, it lags behind other leading nations and has not come near its own potential, according to an International Energy Agency report. A Conference Board report points out that the relatively low energy prices in the U.S. are largely due to relatively low taxes (in comparison to other leading Western nations). In order to cut down energy consumption, the public and business sectors must be properly motivated and given conservation incentives proposed by the Administration. The U.S. may also have to deal with the impact of energy conservation on economic growth. (BTB)

**Factors Affecting Automotive Fuel Economy**

Paper No. 750958, presented at the Automobile Engineering Meeting, Detroit, Michigan, October 13-17, 1975, 24 p.

Sponsor: Society of Automotive Engineers

Abstract: The Environmental Protection Agency certification data base is the most extensive available body of information relating engineering variables to fuel economy. The range and distributions of these variables are presented in a non-sales weighted context. A multiple regression analysis, performed with careful attention to selection of optimal non-linear forms for some of the variables, shows that the most significant determinant of fuel economy is the parameter engine displacement (CID) times drive train (N/V). Vehicle weight is second. A sensitivity study on the isolated fuel economy effects of CID, N/V, and weight confirms the superiority of CID as an influencing factor, and opens avenues for improving the structure of the forms of these variables in future regression equations. A method is devised for quantifying ignition timing over a driving cycle in terms of a single "labeling" value usable as an engineering variable. Although not illustrated, the method is applicable to carburation in similar fashion. Relative fuel economy comparisons drawn between Federal (49-States) and California certification cars from the 1974, 1975, and 1976 model years show that an apparent inverse relationship between fuel economy and the stringency of emission controls can be overcome with the concurrent passage of time and the evolutionary application of improved technology. (10 references) (auth)

Availability: Society of Automotive Engineers, Inc. 400 Commonwealth Dr., Warrendale, PA 15096 $2.75
Abstract: The purpose of this symposium was to provide the latest information and to include the following: Data for all major passenger and freight transport modes; Data for both domestic and international operations; Tabular time-series data from 1955 to 1971 (1972 where available) in both energy units (trillion Ett) and physical quantities (gallons, barrels, etc.); Discussions of each mode, explaining trends and causes, the data, their source, and any cautions needed in their interpretation; Careful estimation of otherwise unavailable data; and Reference to all primary and secondary sources to aid in updating the statistics in the future. (25 references) (auth, from Reasons for This Study)

Availability: NTIS

Abstract: To investigate the potential of advanced energy storage systems, this report analyzes the criteria (e.g., storage capacity; charge/discharge rates; replacement lifetimes; weight; volume; and other physical limits; critical safety parameters; environmental standards; and acceptable capital and operating costs) that these energy storage systems would have to meet in order to be feasible for commercial use. The opportunities and requirements for storage systems are examined in these current and potential applications areas: electric utilities; residential/commercial applications; industrial applications, transportation applications, solar-electric systems; and fusion reactors. The U.S. market for electric vehicles, using stored externally-generated energy, will depend upon the intended use of the vehicle. A six-passenger, compact car with a range of 50 miles might be technologically possible within a decade. A competitive, electric family vehicle with room for four to six passengers, having a 200-mile range and 55 mph speed,
The Social and Economic Costs and Benefits of various strategies for achieving ambient carbon monoxide and oxides of nitrogen. Under the automobile emission standards mandated by the Clean Air Amendments of 1970, it is impossible to provide a definitive evaluation of costs and benefits. However, a number of ongoing and unpublished studies give promise of providing a deeper understanding of the problems involved in determining the ranges of costs and benefits of various strategies for achieving ambient air quality standards. This report is limited to a consideration of the air pollutants referred to specifically in Title II of the Clean Air Act, namely hydrocarbons, carbon monoxide, and oxides of nitrogen. (Auth. Summary modified)

Available: GPO $0.70

Inland Waterway Transportation

ISBN 0-309-02456-0, Transportation Research Board 548, 8 reports prepared for the 54th Annual Meeting of the Transportation Research Board, 40 p. 1975

Abstract: Eight reports examine the nature of inland waterways as a significant part of the national transportation system. Water transportation offers the advantages of fuel economy, low cost, and the capacity of expanding and increasing service. The role of various Federal agencies in examined, and the conclusion is reached that a relatively unregulated environment can result in an efficient, competitive system. The papers cover economic policies, statistical data on tonnage and market shares, trends in shipping on the Great Lakes, multi-purpose water resource projects on the Tennessee River, and information on the planning, operation, personnel levels, and maintenance of the waterways. (DCF)

Available: NTIS; also available from 's Transportation Research Board, National Academy of Sciences, 2101 Constitution Ave. NW, Washington, DC 20418

Application of Economic Analysis to Transportation Problems

ISBN 0-309-02456-0, Transportation Research Board

National Academy of Sciences, National Research Council, Transportation Research Board

Address: Washington, DC

Transportation Energy Conservation and Demand

Transportation Research Record 561, 71 p. 1976

Abstract: Six reports from the Transportation Research Board's 54th annual meeting are reproduced. While conclusions in the reports vary, some principal observations are that (1) neither the energy shortage nor high gasoline prices significantly changed driving habits; (2) legislative benefits might improve public transit systems to a point of public acceptance; (3) states and local agencies could acquire railroad rights of way to reestablish transportation systems to rural areas; (4) policies in New Jersey should give top priority to the use of smaller, economical cars, then to the development of public transit in selected areas, the reduction of unnecessary travel, and finally to the development of a state-wide transportation system; (5) a profile can be made of driver characteristics in relation to gasoline consumption, car purchases, and driving habits; (6) the environment will benefit in the long term from cost-benefit economic analyses; and (7) structured citizen involvement is necessary in dealing with complex planning problems. (44 references) (DCF)

Available: Transportation Research Board, National Academy of Sciences, 2101 Constitution Ave. NW, Washington, DC 20418 $5.00
Abstract: Six papers examine various aspects of the application of economic analysis to transportation problems. A challenge is made to the concept that consumer surplus can be applied to highway investment alternative in an economic sense. Information from a survey made to determine if states are currently applying highway user charges is presented with a list of recommendations derived from the questionnaires. Other papers focus on the relationship of sensitivity analysis to computer program flexibility. (61 references) (ECC)

Availability: Transportation Research Board, National Academy of Sciences, 2101 Constitution Ave. NW, Washington, DC 20418 $3.20

National Academy of Sciences, National Research Council, Transportation Research Board
Address: 2101 Constitution Ave. NW, Washington, DC 20418

Better Use of Existing Transportation Facilities


Abstract: The theme of this meeting, Better Use of Existing Transportation Facilities, was selected due to the demand for increased transportation capacity coupled with growing resistance to new construction. The 29 papers presented at this meeting are organized into these parts: (1) the Management Approach, with papers concerned with an entire metropolitan area; (2) Level-of-Service Improvements, describing capacity and service level aspects of urban freeways and signalized intersections; (3) Public Transportation, with a paper investigating the possibility of providing bus-only lanes; (4) Signalized Intersection Performance; (5) Facility Improvement and Maintenance; (6) Better Management of Traffic Incidents; (7) Peak Demand Reduction; (8) Highway Safety Programs. (ECC)

Availability: Transportation Research Board $9.80

The fuel shortage with respect to the airline industry. The NASA Aircraft Fuel Conservation Technology Program is described, including technological aspects, development schedule, and resource requirements. Six major programs are defined in three sections: (I) Propulsion--engine component improvement, fuel conserving engine, and turboprop: (II) Aerodynamics--fuel consumption control and laminar flow control; and (III) Structures--composite primary aircraft structures. Potential fuel savings resulting from implementation of each technology are estimated. With Interstate industry and government efforts, a 50% reduction is possible in the amount of fuel consumed per unit of passenger travel. (ECC)

National Archives of the United States
Address: Washington, DC


Federal Register, 42(94), pp. 24886-24923
16 May 1977

Abstract: This document announces that the Federal Energy Administration will issue construction orders, pursuant to Section 2(c) of the Energy Supply and Environmental Coordination Act (ESECAC) of 1977, to the following major fuel burning installations: United Steel Corporation in New Jersey; International Paper Company in Georgia; South Carolina; Shell Oil Company in Mobile, Alabama; Goodyear Tire & Rubber Company in Gadsden, Alabama; J.P. Stevens & Company in Wallace, South Carolina; Kimberly-Clark Corporation in Memphis, Tennessee; Philip Morris Incorporated in Eden, North Carolina; B.F. Goodrich Company in Louisville, Kentucky; and Federal Paper Board Company in Hickory, North Carolina. The proposed orders would require these installations to be designed and constructed to use coal as their main source of energy. Also included in this document is a notice of FEA's intention to issue Prohibition Orders, pursuant to authority provided by Section 2(a) and (b) of the ESECAC and Title 10, Code of Federal Regulations (10 CFR), Parts 303 and 305 to these installations: Union Camp Corporation in Savannah, Georgia; Scott Paper Company in Mobile, Alabama; International Paper Company in Vicksburg, Mississippi; Continental Forest Industries, in Port Wentworth, Georgia; Weyerhaeuser Company in Plymouth, North Carolina; Monsanto Company in Pensacola, Florida; Bowater Southern Paper Corporation in Dalton, Tennessee; and Westvaco Corporation, in Charleston, South Carolina. The proposed orders would prohibit these installations from using natural gas or petroleum products as their primary source of energy. (ECC)

Availability: FEO

National Aeronautics and Space Administration
Address: Washington, DC 20546

NASA Aircraft Fuel Conservation Technology Program Task Force Report


1975

Abstract: In response to a request by the Senate Committee on Aeronautics and Space Science, NASA has developed a comprehensive program plan (described in this report) for aeronautical technology improvement. The goals of the programs are to improve the efficiency of air transportation fuel use while minimizing adverse environmental effects on air transportation. This task force report first details the background of
<349> COST.
expenses and a survey on use, maintenance, safety, and resale policies. Also included in each issue is a Directory of Auto Auctions and a Classified Advertising Dealers Directory for Fleet Cars. (BYB)

National Association of Motor Bus Owners
Address: 1025 Connecticut Ave., Washington, DC 20036
Bus Facts. 1974 Statistical Supplement
5 p.

Jan 1975
Abstract: Final bus industry operating and financial data are presented for years through 1973, and preliminary results are provided for 1974. Tables are included on the following: Intercity Bus Industry in the United States; Scope of Class 1 Intercity Bus Operations; Income and Expenses of Class 1 Carriers; Passenger Traffic and Vehicle-Miles; Taxes of Class 1 Carriers; Employees and Their Compensation; Revenue and Operating Expenses; Expenses; Labor Cost Averages; and Accident Death Rates in Passenger Transportation. (BYB)

National Automobile Dealers Association
Address: 8400 Westpark Dr., McLean, VA 22101
Franchised New Car & Truck Dealer Facts, 1976 Edition
Annual publication, 32 p.

1976
Abstract: Statistics summarizing activities of new car and truck dealers during 1976 are presented in this booklet. Included are tables on sales, inventories, installment credit, employment, advertising expenditures, production, and prices. (BYB)

National Industrial Pollution Control Council
Address: Washington, DC 20230
Railroads and the Environment in Rail Freight Operations

Aug 1972
Abstract: Member railroads of the Association of American Railroads have spent in excess of $25 million from 1968 to 1970 in attempting to control and, where possible, eliminate pollution. Additional annual operating expenditures for pollution abatement are continuing at a rate of at least $10 million. Railroads will continue to spend many millions of dollars each year in capital improvements and on operating programs to control pollution. Because a large number of railroads operate in more than one state, equipment is interchanged on a national basis. Therefore, it is essential that national standards be established for pollution control measures that will preempt local or regional measures, rather than forcing the railroads to face a panoply of partial attempts at environmental controls set at state and local levels. In the fight against pollution, railroads need assistance from all levels of government in supporting research that can lead to new concepts for methods of achieving effective pollution abatement and environmental control. Individually and through the Association of American Railroads, the Nation's railroads are encouraging cooperative efforts between the public and the private sector to improve our common environment. (Auth, Summary)
Availability: GPO $3.30

National Science Foundation
Address: Washington, DC 20550
Energy Increase of 10 Percent Faces Industrial R & D Spending in 1975
Science Resources Studies Highlights, Report No. NSF 75-324, 4 p.
27 Oct 1976
Abstract: Statistics on industrial R & D spending in 1975 are presented in this article. In 1975 industry spent $23.8 billion on R & D, a 5% increase over the 1974 level. Industry spent $1.4 billion on energy R & D in 1975, an 18% increase over the 1974 level. Pollution abatement R & D totaled approximately $550 million in 1975, down 1% from 1974. Basic research spending was up 4% over 1974; applied research spending rose 6%; and development spending increased 5%. Six industries were responsible for 85% of the total R & D activities in 1975: aircraft and missiles, $5.7 billion; electrical equipment and communication, $5.5 billion; machinery, $2.7 billion; chemicals and allied products, $2.6 billion; motor vehicles and motor vehicle equipment, $2.3 billion; and professional and scientific instruments, $1.0 billion. (BYB)
Availability: NSF, Division of Science Resources Studies, Washington, DC 20550 free

Nicholas, M.W.
National Petroleum Council
Address: Washington, DC
Balancing Requirements for World Oil and Energy
Chemical Engineering Progress, 70(10), pp. 36-48 (Oct. 1974)
Oct 1974
Abstract: The U.S. and world problems of balancing energy supply and demand are addressed in this article, which draws upon the National Petroleum Council's study entitled "U.S. Energy Outlook." The relationship between the U.S. and the world energy situation is treated. With domestic consumption of petroleum products greatly exceeding domestic production, the U.S. needs to increase production while decreasing demand through more efficient use of energy. The NPC study has concluded that existing reserves along with undiscovered resources in the non-Communist World are sufficient to meet energy needs through 1985. Non-Communist World petroleum supplies will begin to tighten during the 1973 to 1985 time period. The cost of locating, developing, and supplying oil will probably rise sharply over this time period. The U.S. energy resource potential could sustain higher production rates for all fuels. Recommendations to increase future U.S. energy supplies are made. Tables are included on: Projections of U.S. Total Energy Demand Under Three Different Sets of Assumptions; Non-Communist Foreign Population and Energy Oil Consumption; Potential Developable U.S. and Non-Communist Foreign Liquid Hydrocarbon Capacity; Western Hemisphere Liquid Hydrocarbon Supply—Oil Consumption Balance (1960-1985); Oil-in-Place Resources; Recoverable Gas Supply; Underground Coal Reserves and Production; Surface Coal Reserves and Production; and Domestic Resources of Uranium as Estimated by ABC—January 1, 1972. (BYB)
North Atlantic Treaty Organization, Committee on the Challenges of Modern Society

Fourth International Symposium on Automotive Propulsion Systems

Symposium held in Washington, DC on April 17-22, 1977, 5 volumes and several individually bound papers, v.p.

1977

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The purpose of this fourth international symposium was to exchange the most up-to-date technical and scientific information on the development and demonstration of energy-efficient, low-polluting vehicles. The proceedings are printed in five volumes and several individual papers not bound in the volumes. Sessions were included on Gas Turbines, Alternative Fuels, Diesel Engines, Stirling and Rankine Engines, Electric and Hybrids, Stratified Charge Engines, Spark Ignition Improvements, Automotive Emissions, Powertrain Components, and Vehicle Improvement (BTE)

Availability: Supply of published volumes has been exhausted. Author preprints may be available

Northwestern Univ., Transportation Center Library

Current Literature in Traffic and Transportation

Monthly bibliography

Abstract: This bibliography of world-wide publications in the field of traffic and transportation is published monthly. Given are author, title, and publication information. In some cases, a brief abstract is included. Items are arranged by subject category. (JMC)

Butter, R.D.

Mitre Corp.

Address: Westgate Research Park, McLean, VA 22101

A Perspective of Transportation Fuel Economy


Apr 1976

Abstract: This paper discusses placing none of the differing measures of energy usage into perspective. It points out that fuel economy measures are useful in the transportation area, particularly in the planning process, in estimating fuel requirements in existing or developing transportation patterns and as clues to areas likely to yield the most benefit from research and development and from external incentives to change travel patterns. In either case, it is important that a proper perspective be maintained. (auth)

Olson, C.L.; Bernstein, H.

Aerospace Corp.

Address: 2350 East El Segundo Blvd., El Segundo, CA 90265

Personal Rapid Transit Research Conducted at the Aerospace Corporation


Jun 1976

Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration, Office of Research and Development

Abstract: This report summarizes company-sponsored research which the Aerospace Corporation conducted on the conceptual and experimental development of Personal Rapid Transit (PRT) during the period from 1968 to 1975. The work considered not only the technical and operational aspects of the PRT concept, but also included estimates of PRT capital and operating costs, analyses of system safety and reliability, analyses of urban applications and associated economics, evaluation of PRT energy utilization, development of PRT planning methodologies, and assessments of PRT deployment impacts. Technology shortfalls associated with the possible future implementation of the specific PRT concept studied at Aerospace are identified, and R & D activities to overcome these shortfalls are recommended. Also described in this summary is an experimental 1/10 scale model PRT system developed at Aerospace which successfully demonstrated the feasibility of a particular integrated concept of longitudinal control, propulsion, braking, and switching for accomplishment of safe fractional-second headways. The appendix describes planning software developed at Aerospace for analysis of vehicle management on large PRT networks and assessment of network element performance. (15 references) (GRA)

Availability: NTIS $4.00

Abstract: The lithium-battery described in this report represents a new class of batteries. A modification of this battery, the lithium-water-air battery, is also discussed. The latter provides high specific energy and specific power and thus is a candidate power source for electric vehicle propulsion. The utilization of this battery class for such a purpose is examined. The report includes other possible batteries in this class. (auth)

Availability: NTIS $4.00

Organization for Economic Cooperation and Development, Consultative Group on Transportation Research

Address: Paris

Urban Traffic Noise: Strategy for an Improved Environment

167 p.

1971

Abstract: After assessing the scope and magnitude of the urban traffic noise problem, this study reviews the state-of-the-art of the technology of noise abatement and suggests measures for the control and reduction of traffic noise. The role of government in noise abatement is discussed in Part One, which looks at the economics of noise abatement, research, development and training, and international cooperation. Technical and ground is covered in Part Two, including chapters on: (1) The Urban Traffic Noise Environment; (2) the Effects of Traffic Noise, including subjective effects, and physiological

(102)
A Technique for Measuring Interior Wind Rush

Abstract: A technique has been developed to evaluate interior wind rush noise during wind tunnel tests of full-size clay models of vehicles. A small, box-like enclosure with acoustic characteristics similar to those of a typical vehicle interior is inserted into the clay model behind an actual front side glass. The wind rush noise coming through the side glass is directly measured by microphones located within the enclosure. The technique can readily detect wind rush noise changes due to body modifications in the vicinity of the windshield-pillar. In addition, the wind tunnel results agree well with those found on-road. (13 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

Hydrogen Automotive Fuel: Production and Delivery

Abstract: Today’s principal and cheapest source of hydrogen in the United States, steam-reformed natural gas, does not have attractive prospects in the far-term future. Alternative procedures or processes therefore are in various phases of research and development. Hydrogen can be produced by the electrolysis of water, and production of hydrogen from coal and water is under study. Thermochemical, photochemical, and biochemical procedures are being researched as long-term routes to hydrogen. Feasibility studies indicate the possibility of long-distance transmission of hydrogen gas via pipeline. Local distribution of hydrogen fuel presents a major problem that requires investigation and development. Technically and economically, large scale sources, such as liquid hydrocarbons from coal or oil shale, are favored alternative automotive fuels for the mid-term future. (20 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

The Stirling Engine - Engineering Considerations in View of Future Needs

Abstract: The efficiency of the Stirling cycle engine can be excellent. The high efficiency of these power converters has been shown on paper as well as in some field tests, but input energy is in the form of heat, hence it is compatible with nuclear and solar energy sources. The development and application of these engines in the past has been limited. With the low cost of fossil fuels that used to prevail, the Stirling engine was not able to compete with the gasoline internal combustion engine. In the future, scarcity of fossil fuels and doubts on the ability of the existing fuel economy improvements to meet the balance, the Stirling engine will find many new applications. It is the purpose of this paper to examine the Stirling engine from an engineering point of view, and to discuss some of its features and components likely to receive most engineering effort in the future. (14 references) (auth)

Availability: American Institute of Chemical Engineers, 345 East 47 St., New York, NY 10017
Peers, E.L.; Marsik, P.V.
Federal Energy Administration, Office of Oil and Gas
Address: Washington, DC 20461

Trends in Refinery Capacity and Utilization, Foreign Refinery Exporting Centers

Abstract: In response to the gasoline shortage of 1973-74, a small-scale home interview survey was conducted in an attempt to identify and define (1) changes in the price elasticity of demand for gasoline, (2) procedures for characterizing gasoline supply in travel behavior models, and (3) key implications for the development of transportation and urban design policies.

The survey, conducted in the northern suburbs of Chicago among households with a high level of automobile ownership, used a questionnaire designed to measure changes in travel behavior, attitudes, and perceptions as a result of the increased price and decreased availability of gasoline. Analysis showed that price was the most important consideration for automobile use while the supply of gasoline was constrained. Use of public transportation was the least common trip-making decision, while combining trips was most common. There was a significant reduction in non-work trips during the shortage. No change in the desired location of home or work was found. The study suggests that only an artificially constrained supply of gasoline, rather than modest increases in price, seems to be a controlling factor for consumption. Policy implications for urban planners and public officials are a primary concern of the public about more energy-efficient modes and providing incentives to encourage their use. (GRA)
Airplane Energy Use and Conservation Strategies

Abstract: A variety of situations where the substitution of communication for transportation could be made, resulting in a reduction of fuel consumption. The paper examines the fuel savings that can be achieved when mobile radio communication is used to reduce the amount of driving by automobiles and trucks. Although this benefit is as varied as the operations which use radio, the general magnitude of the fuel savings in the range of 14% to 260% can be expected. Fuel consumption for purposes other than flying directly between airports is examined. Over 10% of the total fuel use is for those portions of the flight in which no enroute distance is achieved. Delays account for at least 4.2% of the fuel consumption and auxiliary power units use over 1%. Fuel requirements for attempting to recover lost time and for fuel ferrying are also discussed. Airplane fuel efficiency can be increased in the short term by operational changes. Increased load factor offers the greatest potential for reducing airplane energy intensiveness. A load factor increase from 50 to 60% would reduce airplane fuel use by 16% for the same traffic. Other fuel-conserving options include reducing cruise speeds, increasing cruise altitudes, and changing ground operations. Each of these strategies offers savings of 1-3%. As fuel prices increase, these options become economically attractive. Total transportation energy use can be reduced by shifting air passengers to ground modes. Such a shift may be desirable for the inefficient carrier in a traffic. The net energy savings for diverting half the flights under 200 miles to buses or trains is equivalent to 6% of the fleet fuel use.

Availability: NBS

Pilati, D.A.
Oak Ridge National Laboratory, ORNL-NSPS
Airplane Energy Use and Conservation Strategies
May 1974

Sponsor: National Science Foundation, RANN Program
Abstract: Domestic commercial airplane fuel use is examined as a function of stage length. A fuel use model is developed using eight of the most popular airplanes. Small short-stage flights are very fuel inefficient - a 100-mile flight consumes 2.5 times as much fuel per passenger-mile as a 1,000-mile fight. There are more inefficient short flights than one might expect - half of the flights are for distances under 200 miles. Fuel consumption for purposes other than flying directly between airports is examined. Over 10% of the total fuel use is for those portions of the flight in which no enroute distance is achieved. Delays account for at least 4.2% of the fuel consumption and auxiliary power units use over 1%. Fuel requirements for attempting to recover lost time and for fuel ferrying are also discussed. Airplane fuel efficiency can be increased in the short term by operational changes. Increased load factor offers the greatest potential for reducing airplane energy intensiveness. A load factor increase from 50 to 60% would reduce airplane fuel use by 16% for the same traffic. Other fuel-conserving options include reducing cruise speeds, increasing cruise altitudes, and changing ground operations. Each of these strategies offers savings of 1-3%. As fuel prices increase, these options become economically attractive. Total transportation energy use can be reduced by shifting air passengers to ground modes. Such a shift may be desirable for the inefficient carrier in a traffic. The net energy savings for diverting half the flights under 200 miles to buses or trains is equivalent to 6% of the fleet fuel use.

Availability: NBS
Sponsor: Society of Automotive Engineers

Abstract: Another step in the development of electric vehicles has been completed by the Copper Development Association Inc. with the construction of a two-passenger, electrically-powered automobile. This paper describes the engineering and development of this vehicle, which was designed from the ground up to be electrically powered. (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

<375>

Povel, S. P., III; Rosenberg, W.
U.S. Dept. of Transportation, Transportation Systems Center
Address: Kendall Square, Cambridge, MA 02142

Report No. PB-260667, DOT-TSC-OST-76-37, a report to the Congress and the President from the Secretary of Transportation, 236 p.

Aug 1976

Sponsor: U.S. Dept. of Transportation, Office of the Secretary, Office of the Assistant Secretary for Systems Development and Technology

Abstract: Vehicles that do not consume fuel are examined to determine if they should be included under the provisions of the Motor Vehicle Information and Cost Savings Act, as amended by Title III of the Energy Policy and Conservation Act. The paper compares the energy requirements of these vehicles with energy requirements of fuel-consuming vehicles is considered as the application of the Act to vehicles that do not consume fuel, their market potential, and the effects of regulations on their production and introduction into commerce. (GRA)

Availability: NTIS

<376>

Pratt, R.H.; Pedersen, R.J.; Rather, J.J.
Pratt (R.H.) Associates Inc.
Address: 10400 Connecticut Ave., Kensington, MD 20795

Traveler Response to Transportation System Changes - A Handbook for Transportation Planners

292 p.

Feb 1977

Sponsor: U.S. Dept. of Transportation, Federal Highway Administration

Abstract: Transportation planners and decisionmakers need an understanding of how travelers respond to changes in the urban transportation system if they are to correctly identify the most favorable opportunities to maximize beneficial use of highways and transit operations. This Handbook seeks to bring under one cover a compendium of knowledge based on past observation and estimation of traveler responses to different types of transportation system change. It is intended to aid transportation planners and decisionmakers by providing familiarization with results obtained elsewhere and by providing insight pertinent to planning decisions concerning urban transportation options. Traveler response to the following 10 types of transportation change are investigated: pool/bus priority lanes, variable work hours, carpooling encouragement activities, buspools/vanpools, area auto restraints, auto facility pricing, transit scheduling/frequency, bus routing/coverage, transit fare changes, and transit market segment. Within this Handbook, Chapter I is an executive introduction. Chapter II provides a user's guide to its application. Chapter III is comprised of topical summaries addressing the 10 types of transportation system change. Each topical summary includes a digest of state-of-the-art
<376> CONT.
information on how travelers respond to the system change in question, and also reviews of papers and documented case studies relevant to the subject. Chapter IV consists of an alphabetical bibliography with cross-reference lists, covering the 10 plus 16 additional types of transportation system change. (323 references) (from Executive Introduction)
Availability: NTIS
Nov 1973
Abstract: This report of the 1969-1970 Nationwide Personal Transportation Survey presents personal characteristics of all individuals 5 years old and over who reported making a one-way trip ("person trip") by a motorized vehicle. The survey data were expanded to represent travel habits on an annual basis for the entire U.S. population. The percentage distributions of these trips by mode are related to age, sex, race, and place of residence. Trips are aggregated to show personal travel for all purposes. The age-groupings have been selected to provide data for a variety of transportation planning needs; for example, to furnish information about school children (5-13), teenagers (16-20), young adults (21-25), persons normally included in the work force (21-59), and several usual break points for classifying older persons: 60-64, 65-69, and 70 and over. (from Introduction)
Availability: NTIS
1976
Abstract: Data on distribution of speeds of vehicles and vehicle-trips traveled on various kinds of roads in the United States are analyzed to determine how much driving takes place at various speeds above 55 mph. Data on dependence of fuel consumption on highway speeds are then used to estimate the saving in fuel produced by the 55-mph speed limit. It is assumed that vehicles that would have traveled at speeds up to 60 mph before the speed limit continue to do so, and that vehicles that would have gone faster than 60 mph before the speed limit are reduced to 57 mph by the speed limit. It is found that the annual saving produced by the speed limit amounts to 2.5% of fuel exhaust on vehicles, or 1.3% of the total petroleum used in the United States. It is argued that this is a minimal saving compared with our annual growth of over 4%/yr in usage of petroleum, and that the 55-mph speed limit does not even begin to be an effective policy to save petroleum. A comprehensive and equitable policy to save petroleum is outlined: it includes measures reduction in size, weight, and engine displacement of automobiles produced in and imported to this country, various mechanical improvements in the efficiency of cars, differentiation between interstate and other roads in setting speed limits, and sharp increases in the retail price of petroleum products. This program will require both governmental action and a determined effort by U.S. automobile manufacturers to concentrate on building efficient machines instead of glasour-coated iron monsters. (8 references) (auth)
<381>
Rappoport, M.; Labaw, P.
Opinion Research Corp.
Address: North Harrison St., Princeton, NJ
Aug 1975
Sponsor: federal Energy Administration, Office of Energy Conservation and Environment, Office
Abstract: This report contains tabulations of results of telephone interviews conducted by Opinion Research Corporation on the following topics: Attitudes Toward Nuclear Power Plants; The Impact of School Programs on Home Energy Conservation; The Public’s Use of Mass Transit; Company Efforts at Energy Conservation. The interviewing period for Wave 28 began on April 7 and continued through April 21, 1975. There were 604 interviews gathered on Wave 28. Interviewing for Wave 29 began on April 21 and ended on May 4, 1975. Six hundred and four interviews were obtained in this wave. 

(RGA)

Availability: NTIS

Rappeport, M.; Labaw, P.
Opinion Research Corp.
Address: N. Harrison St., Princeton, NJ
Opinion Research Corporation
Availability: NTIS

* Recreation Vehicle Industry Association: Facts and Trends
Recreation Vehicle Industry Association, Marketing and Public Relations Department
Address: P.O. Box 204, 14650 Lee Road, Chantilly, VA 22021

** Recreation Vehicle Industry: Facts and Trends
Rice, R.A.
Carnegie-Mellon Univ.
Toward More Transportation with Less Energy
Technology Review, 76(4), 44-53 (Feb 1974)

Abstract: This paper explores the various alternatives for achieving the goal of doubling transport output in 25 years while holding oil consumption devoted to transport under the present 100 billion gallons per year. Shifting intercity and urban traffic to modified systems with better energy efficiencies, higher traffic volumes can still be moved. Surprisingly, if the right choices are made, personal vehicle ownership and auto travel could continue to increase, as could air travel, and actual door-to-door travel convenience could be maintained or improved. (Auth)

Availability: Society of Automotive Engineers, Inc., 2 Pennsylvania Plaza, New York, NY 10001

Rice, R.A.
Carnegie-Mellon Univ.
Toward More Transportation with Less Energy
Technology Review, 76(4), 44-53 (Feb 1974)

Abstract: This paper explores the various alternatives for achieving the goal of doubling transport output in 25 years while holding oil consumption devoted to transport under the present 100 billion gallons per year. Shifting intercity and urban traffic to modified systems with better energy efficiencies are proposed. It is then shown that, if the right choices are made, personal vehicle ownership and auto travel could continue to increase, as could air travel. However, it is shown that if per capita transportation is maintained or increased and door-to-door travel convenience maintained or increased, certain hypothesized constraints must be applied to the predictions. No particular policy or specific system design are proposed to achieve the specified goal. (BLM)

Efficiencies of the various transport modes are compared. The human being and bicycle are shown to be very efficient means of transportation, and recreation, and recent data on automobile, transport modes, such as jet airplanes and the SST, are very inefficient. The report suggests that some changes should be made in intercity transport development, and drastic changes should be considered for urban transportation. (RGA)
Chrysler Corp.
Address: Detroit, MI
Availability: Society of Automotive Engineers, Sponsor: Society of Automotive Engineers

OBJECTIVE METHOD OF ESTIMATING CAR INTERIOR AERODYNAMIC NOISE


Sponsor: Society of Automotive Engineers
Abstract: A method of breaking down car interior noise measurements into aerodynamic noise, residual noise and aspiration noise is presented. Correlation between car interior aerodynamic noise extracted from "on the road" measurements and car interior aerodynamic noise measured in a wind tunnel indicate the validity of the method. Limitations of the method in both frequency and car airspeed are identified. (9 references) (auth)
Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

<389>

Scardina, V.A.; Birch, J.C.; Vitale, K.
Abt Associates Inc.
Address: 55 Wheeler St., Cambridge, MA 02138
Jun 1976
Sponsor: Federal Energy Administration, Office of Energy Conservation and Environment

ISSN 0-89011-888-9, Abt Publications Order Number: E82-112, 175 p.
Jun 1976
Sponsor: Federal Energy Administration, Office of Energy Conservation and Environment
Abstract: An evaluation of the FEA/EEA Gas Mileage Label (effaced to new cars/light trucks) and the 1976 Gas Mileage Guide of New Car Buyers was conducted. Data for this study were collected via telephone interviews with a national sample of registered car owners of 1976 model vehicles. A total of 796 interviews were conducted (a 76% completion rate) with buyers. The sample was stratified by state (California, other states), by vehicle type (subcompact, compact, intermediate, standard, luxury/specialty, light truck), and by month of registration (September, October, November) in order to increase the accuracy of our estimates as well as to ensure adequate sample sizes for certain subpopulations of interest. Fieldwork for this project was completed during February, 1976, from Abt Associates' Cambridge headquarters. In summary, the study shows that: a majority of new car/light truck buyers considered good fuel economy an "extremely important" variable in their purchase decision; nearly 3/4 of the buyers were aware of the program's existence; about half actually saw the Gas Mileage Label on the vehicle they bought; awareness of the 1976 Gas Mileage Guide for New Car Buyers is extremely low; the FEA/EEA program is having a positive impact on the purchase of more fuel-efficient vehicles; Guide aware buyers obtained a 26.7% increase in gas mileage in replacing their older vehicle, and label aware buyers a 21.1% increase in gas mileage; the FEA/EEA Fuel Economy Information Program is having a positive impact on fuel consumption; buyers generally don't believe the EPA gas mileage estimates; and the EPA combined city/highway estimates seem to be an accurate indication of what actual experience will be like. Overall, the FEA/EEA Fuel Economy Information Program is an effective one. However, the low level of awareness and usage of the Guide combined with the lack of credibility of the EPA estimates appears to have reduced the full potential impact of the program. (auth, abstract modified)

<390>

Scheckter, H.B.; Pfeffer, J.
Chrysler Corp., Transportation Industries
Address: Detroit, MI
An Objective Method of Estimating Car Interior Aerodynamic Noise
Paper No.: 770393, presented at the International Automotive Engineering Congress and Exposition, Cobo Hall, Detroit, Michigan,

<391>
<391> CONT.

Address: BDM, 1920 Aline Ave., Vienna, VA 22180; MITRE, Westgate Research Park, McLean, VA 22101

Policy Assessment of the 55 Mile Per Hour Speed Limit

Report No. PB-243461, 75-00008, 185 p.

May 1975

Sponsor: National Science Foundation, Office of Energy & D Policy

Abstract: An impact analysis is made of the 55 mph speed limit, including an historical description of the development of the policy. Impacts are assessed in the following areas: motor vehicle fuel savings; safety aspects; economic impacts—government revenues, government costs; impacts on the transportation industry and on other business and industry (insurance, etc.); impacts on households; social impacts; and legal impacts—state legislatures, and enforcement. International experience with the 55 mph speed limit is described. Conclusions and Recommendations are detailed on the policy, enforcement, and data requirements. (GRA)

Availability: NTIS

<392>

Schenkel, F.K.

General Motors Corp.

The Origins of Drag and Lift Reductions on Automobiles with Front and Rear Spoilers


1977

Sponsor: Society of Automotive Engineers

Abstract: Front underbody down and rear deck lips ("spoilers") have been in use for some time as aerodynamic aids for automobile drag and lift reduction. However, the flow field effects and associated surface pressure changes which produce these improvements have not been well understood. A series of wind tunnel tests was performed with a 3/8-scale semi-detailed model of a notchback sedan. Force and moment measurements were augmented by model exterior, engine compartment and groundplane surface pressure measurements, as well as flow visualization experiments. Aerodynamic lift and drag contributions of various model components, as well as the changes produced on these components by the addition of "spoilers," have been determined. Flow field mechanisms which will produce the observed pressure and force changes have been proposed. (9 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15086 $2.75

<393>

Schink, G.R.; Loxley, C.J.

Wharton EFA Inc.

An Analysis of the Automobile Market: Modeling the Long-Run Determinants of the Demand for Automobiles. Volume I. The Wharton EFA Automobile Demand Model

155 p.

Feb 1977

Sponsor: U.S. Dept. of Transportation, Office of the Secretary: B.D. Dept. of Transportation, Transportation Systems Center

Abstract: An econometric model is developed which provides long-run policy analysis and forecasting of annual trends, for U.S. auto stock, new sales, and their composition by auto size-class. The concept of "desired" equilibrium stock is introduced. Desired stock and its composition by size-class are related to numerous economic and demographic variables using cross-section data. Among these is a new "capitalized cost per mile" measure, which expresses all costs over time relative to miles driven, discounted back to the present. New registrations, total and by class, and scrappage are found to be strongly related to "desired" stock relative to actual stock, with other influences operating as "speed of adjustment" factors. Fuel efficiency is analyzed in detail, relating mpg by class to physical vehicle characteristics and related technological developments. Purchase prices and options expenditures are analyzed and all cost measures distinguished by foreign vs domestic origin as well as by size-class. Volume I summarizes and describes the study, and contains a forecast through 2000. Volume II contains extensive simulation analysis, with public policy implications. Volume III contains data and methodology appendices. (GRA)

Availability: NTIS

<394>

Schnell, J.B.; Comeau, E.F.; Dinsdale, K.R.

American Transit Association: Institute for Rapid Transit

Address: ATA, 475 L'Enfant Plaza West, SW, Washington, DC 20024

Papers and Proceedings of Two Energy Crisis Seminars


Feb 1975

Sponsor: U.S. Dept. of Transportation, Urban Mass Transportation Administration, Office of Research and Development

Abstract: The papers presented in these two Energy Crisis Seminars cover all aspects of the transit industry's ability to respond to the mobility needs and energy conservation needs of the country in the event of a severe energy shortage. Some of the subjects treated in these papers include: Operational Techniques and Procedures such as preferential transit treatments, busways, bus lanes, fringe parking lots, etc.; fuel and energy conservation techniques; financial aspects; the resolution to interjurisdictional aspects of providing the cooperation necessary to provide mass transit service when fuel is short for automobiles; national carpool/buspool action plan; and the urban mass transportation administration's role in all of these activities. Other subjects included are rail transit—short- and long-range role in energy conservation and general subjects related to the severity of the energy problem and the allocation procedures as well as a presentation by John F. Schaeffer of the Federal Energy Office on the subject of "Mandatory Allocation Procedures." (GRA)

Availability: NTIS

<395>


Perkins Engines Inc.

Credibility of Diesel Over Gasoline Fuel Economy Claims by Association


1976

Sponsor: Society of Automotive Engineers

Abstract: Recent economic and environmental
<395> COPE.
Developments, such as the fossil fuel shortage, have improved the potential for the use of diesel engines as the power plant for small commercial vehicles and possibly certain passenger cars. Many variables affect fuel economy comparisons. Most of these variables can be associated with either the vehicle design or operation. The objectives of this paper are to relate fuel economy claims with a variety of cycles, to show how much of these claims can be justified, and to show how some of the more impressive diesel over gasoline economy claims relate more to the real world than comparisons based on EPA (Environmental Protection Agency) and SAE (Society of Automotive Engineers) cycles. (12 references) (auth, abstract modified)
Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096 $2.75

<396>
Scott, H.W.
Energy Past, Present, and Future
Sponsor: Society of Automotive Engineers
Abstract: The purpose of this paper is to discuss primarily the critical events of the past years that have affected the petroleum industry. By doing so, it shows the state of affairs now and what must be done in order to see that everyone, particularly the United States, has sufficient energy for the future. (auth)
Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Dr., Warrendale, PA 15096

<397>
Seidel, M.R.
New York State Public Service Commission, Office of Economic Research
Address: 44 Holland Ave., Albany, NY 12208
Feasibility of Electric Taxis and Buses in New York City
Sponsor: New York State Dept. of Public Service
Abstract: This report identifies the obstacles and impacts that would arise if New York City adopts an ordinance requiring all taxis and buses to operate on electricity by 1975. The effect of these electric vehicles on Consolidated Edison, the supplier of electricity, on energy consumption and on the City's environment is explored. These impacts are strongly tied to the time distribution of the electricity demanded by electric taxis and buses and the equipment used to generate the electric power. Therefore, the conclusions pertain only to an electric system and may not be representative of vehicles operated on electricity generated by other utilities. Impacts of electric taxis and buses on related industries such as the battery, electric motor, petroleum, automobile and other industries are also discussed in a general fashion. In addition, the annual operating costs of electric gasoline powered taxis are compared. While the analysis is primarily limited to technology which is now available, some comments on potential future improvements in electrically powered road vehicles are presented. (N.Y.S.P.S.C.)
Availability: Mrs. Georgianna Paluba, Librarian, N.Y.S. Public Service Commission, 44 Holland Ave., Albany, NY 12208 (Initial copy free)

<398>
Sebald, A.V.
Illinois Univ., Center for Advanced Computation
Address: Urbana, IL 61801
Energy Intensity of Barge and Rail Freight Hauling
Sponsor: National Science Foundation, RANN Program
Abstract: In an attempt to quantify more of the total system costs associated with transportation alternatives, studies are continuing in the area of energy cost per ton mile for alternate freight and transportation modes. In light of the present energy shortages, energy efficiency is beginning to have a significant economic impact on the various modes. Energy cost per ton mile is also an important parameter in determining the total environmental impact of competing transportation modes. This paper presents results of an energy comparison per ton mile of competing rail freight vs. inland barge freight, including the effects of circuitry and the use of probable competing rail lines instead of national average rail data. (13 references) (auth)
Availability: NTIS

<399>
Seidel, M.R.
Federal Power Commission, Office of Energy Systems
Address: Washington, DC
Economic Benefits of Energy Conservation
Energy Systems and Policy, 2(1), pp. 1-30 (1977); this paper is a revision of one presented at Energy Conservation: A National Forum, Ft. Lauderdale, Florida, December 1-3, 1975
1977
Abstract: The magnitude of cost-effective energy conservation can be estimated from marginal rates of substitution between energy and other factors of production, in response to environmental and other increments of cost. It can be shown that conservation-oriented responses are more cost-effective than supply-expanding responses. This net cost effectiveness constitutes the economic benefit of conservation, which this paper has detailed and quantified in several dimensions of the nation's economy. The benefits of conservation are realized in different ways by the various end-use sectors of the economy. The residential and commercial sectors can achieve numerous benefits by operational improvements, but efficiency-improving changes to the existing stock are much more important. Industry's benefits come through major changes in future processes. For transportation, node shifts are the most important aspect for freight, and increased automobile efficiency is most important for passenger transport. Utility conservation arises through improved generation efficiency and more efficient use of electricity; both kinds of conservation have significant benefits. The benefits of conservation can also be characterized in terms of impacts on various aspects of the economy. The most obvious of these is the capital requirement; while this is large, it is smaller than either the capital for supply expansion or the capitalization of increased fuel costs in lieu of conservation. The environmental benefits of conservation are significant. Finally, conservation means increased labor intensiveness; this implies higher employment, but lower labor
Abstract: This newsletter reports on activities of I.P. Sharp Associates (IPSA) in the aviation data base field. IPSA offers a time-sharing service in 50 cities throughout North America and Europe, allowing users to connect their terminals directly into IPSA's mainframe computer. The Aviation Data Base occupies over 200 million bytes of on-line storage and is expected to grow. Now documents and data bases, as well as personnel, and other changes are described.

Availability: NTIS

Shelton, E.M.
Energy Research and Development Administration, Battelleville Energy Research Center
Address: Battelleville, OK
Motor Gasolines, Winter 1975-76
Report No. BERC/PPS-76/3, 72 p.
Jun 1976
Abstract: Data for 2,699 samples of motor gasolines, from service stations throughout the country, were collected and analyzed under agreement between the Battelleville Energy Research Center and the American Petroleum Institute. The samples represent the products of 56 companies, large and small, which manufacture and supply gasolines. These data are tabulated by groups according to brands (unlabeled) and grades for 17 marketing areas (districts) into which the country is divided. A map in this report shows marketing areas and sampling locations. The report also includes charts indicating the trends of selected properties of motor fuels since 1946 and three bar graphs illustrating the variations of octane numbers in the present survey by frequency for all samples represented. The averages for the antiknock (octane) index (R + M)/2 of gasolines sold in this country were 88.2, 89.7, and 95.2 for unleaded, regular, and premium grades of gasolines, respectively.

Availability: NTIS

Shelton, E.M.
Energy Research and Development Administration, Battelleville Energy Research Center
Address: Battelleville, OK
Aviation Turbine Fuels, 1975
Report No. BERC/PPS-76/2, 15 p.
Mar 1976
Abstract: Properties of some aviation turbine fuels marketed in the United States during 1975 are presented in this report. The samples represented are typical 1975 production and were analyzed in the laboratories of 17 manufacturers of aviation turbine (jet) fuels. The data were submitted for study, calculation, and compilation under a cooperative agreement between the Energy Research and Development Administration (ERDA), Battelleville Energy Research Center (BERC), Battelleville, Oklahoma, and the American Petroleum Institute (API). Results for the properties of 105 samples of aviation turbine fuels are included in the report for military grades JP-1 and JP-5, and commercial types Jet A, Jet A-1, and Jet B. (auth)

Availability: NTIS

Shepherd, P.D.
Goodyear Tire and Rubber Co.
The Effect of a Tire's Reinforcing Material on Rolling Resistance
1977
Sponsor: Society of Automotive Engineers

Abstract: The 1980 requirements for bumpers limit the damage that may be sustained in 5 km/h (3 mph) pendulum and barrier impacts. This paper covers four items of interest for design of one-piece aluminum bumpers: (1) properties of alloys, (2) ton resistance, (3) beam strength, (4) relative behavior of aluminum and steel. Static and dynamic tests are used to define the effects of yield strength and thickness on denting. Finite element calculations agree well with the results of dynamic bending tests of bumpers. Data presented also show that the strain rates during beam bending are low. Relative weights of aluminum and steel bumpers are defined. (6 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA

Goodyear Tire and Rubber Co.
The Effect of a Tire's Reinforcing Material on Rolling Resistance
1977
Sponsor: Society of Automotive Engineers
<405> CONT.

Abstract: The need for fuel conservation has caused increased interest in the rolling resistance and fuel consumption of tires. A study to determine the effect of the tire's fabric reinforcing system, both belt and carcass, on rolling resistance and fuel consumption is described, and its results are presented. (3 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

<406>

General Motors Corp., Research Laboratories
Address: Detroit, MI

A study of the Energy Utilization of Gasoline and Battery-Electric Powered Special Purpose Vehicles


1976

Sponsor: Society of Automotive Engineers

Abstract: In order to compare the efficiency of utilization of the Earth's fossil energy resources (petroleum and coal) by battery-electric and gasoline powered special-purpose urban vehicles, an analytic study was conducted. The guidelines of this study restricted it to three special-purpose cars that are smaller and have lower performance than conventional subcompact cars and a delivery van. ... The most important guideline of the study required the performance levels and load carrying capacity of the gasoline and electric-powered vehicles to be the same. The results of the study indicate that a lead-acid battery powered, two-passenger shopper vehicle with a 40 km range consumed about 90% more petroleum per kilometer of driving than does its spark ignition engine powered counterpart. With coal as the prime source, they consume about the same amount of energy. ... The position of the electric vehicle is improved with respect to the gasoline vehicle by the development of advanced batteries, increased electric component efficiencies and an actual electric vehicle mass less than assumed due to a reduced mass compounding factor. An aspect related to the conventionally powered vehicle that tends to reduce the advantage over the electric is a potential efficiency penalty of the spark ignition engine due to its small size. Incorporation of these considerations into the study produce results more favorable for the electric version. The energy consumption of a nickel-zinc battery powered shopper is only about 30 percent more than its spark ignition engine powered counterpart considering petroleum as the prime source of energy. With coal as the prime source, the advanced technology electric vehicle consumes about 30 percent less than the spark ignition engine powered version. (17 references) (auth, abstract modified)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

<407>

Shipps, P.H.
Shipps Engineering Service
Address: El Cajon, CA 92020

Minimizing Electric Cars to Maximize Performance

Paper No. 76061 presented in the "Eleventh Intersociety Energy Conversion Engineering Conference Proceedings" (conference held on September 12-17, 1976), pp. 369-376

1976

Abstract: A development program for three small, lead-acid battery powered cars is described. Designed for but one or two occupants, the gross weight of the cars range from 680 to 1150 lbs. (310 to 520 kg). During the systems engineering study phase two car types evolved: (1) an upright, comfortable, low-performance "leisure-town" car and (2) a low-slung, good acceleration, sport-commuter vehicle. Extensive structural optimization efforts, shape simplification and the elimination of non-essentials kept total weight low to minimize energy requirements. Drive train and control systems efficiencies also receive much attention; various test data on energy conversion efficiencies are provided. Calculated data showing low energy cost per distance traveled are also provided. This is countered by data on first-cost and weight penalties, compared to gasoline engine energy. Finally, the safety implications of such small and light vehicles are discussed, and safety provisions in the designs are described. (6 references) (auth)

Availability: American Institute of Chemical Engineers, 35 East 47 St., New York, NY 10017 $90.00 for entire proceedings

<408>

Shonka, D.B.
Oak Ridge National Laboratory
Address: Oak Ridge, TN 37830

Transportation Energy Conservation Data Book:

* Supplement II


Feb 1977

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This document is Supplement II to Edition I of the Transportation Energy Conservation Data Book, which was published in October, 1976, by Oak Ridge National Laboratory. The series of documents is intended to provide a desk-top reference for use by the Transportation Energy Conservation Division of the Energy Research and Development Administration. The supplements contain statistics which update and augment data presented in Edition I, such tables, graphs, and other visuals are used to present statistical data on energy use and related activity of the transportation sector. Data in this supplement concentrate on personal travel characteristics and fuel economy options for automobiles. A list of references is provided and an annotated bibliography and glossary is included at the end of this supplement. (auth)

Availability: $7.50

<409>

Shonka, D.B.; Loeb, A.S.; Jalio, N.S.
Oak Ridge National Laboratory, Energy Division, Regional and Urban Studies Section
Address: Oak Ridge, TN 37830

Transportation Energy Conservation Data Book:

* Supplement I


Nov 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This document is Supplement I to Edition I of the Transportation Energy Conservation Data Book, which was published by Oak Ridge National Laboratory in October 1976. The first edition and this supplement
are intended to provide a desk-top reference for use by the Transportation Energy Conservation Division of the Energy Research and Development Administration. This supplement contains statistics which update and supplement data presented in Edition 1. A variety of tables, charts, maps, and graphs are used in this volume to present statistical data on energy use and energy related activity through the following topics: (1) Characteristics of Transportation Modes including information on Air, Rail, Water Vessels, and Pipelines; (2) Energy Characteristics including information on Energy Consumption and Energy Intensity; (3) Government Impacts and Government Regulations. A list of references is provided at the end of each chapter supplement, and an annotated bibliography and glossary is included at the end of the supplement. In particular, nonhighway transportation activities received less emphasis than highway activities in Edition 1. Therefore, this supplement presents additional data on fuel consumption and energy intensiveness of the various modes is included in this document. Periodic updates will ensure the availability of recently released data.

Shonka, D. B.; Loeb, A. S.; Gleg, R. C.; Johnson, N. L.; Howard, F. B.
Oak Ridge National Laboratory, Energy Division
Address: Oak Ridge, TN 37830
Transportation Energy Conservation Data Book: Edition 1.5
1977
Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation
Abstract: This document contains statistical information on the major transportation modes and their respective energy consumption patterns, and other pertinent factors influencing performance in the transportation sector. Data relating to passenger and freight transportation are presented under seven chapter headings. These focus on (1) modal transportation characteristics, (2) energy characteristics of the transportation sector, (3) energy conservation alternatives involving the transportation sector, (4) government impacts on the transportation sector, (5) the supply of energy to the transportation sector, (6) characteristics of transportation demand, and (7) miscellaneous reference materials such as energy conversion factors and geographical maps. References are included for each set of data presented and a more general bibliography is included at the end of the book. In addition, a glossary of key terms and a subject index is provided for the user. This document is one in a series of documents that are being developed by Oak Ridge National Laboratory for use by the Transportation Energy Conservation Division of the Energy Research and Development Administration. A second edition is scheduled for publication in September 1977. (59 references) (auth)
Availability: NTIS

Skinner, L. E.
U.S. Dept. of Transportation, Federal Highway Administration, Urban Planning Development
Address: Washington, DC 20590
The Effect of Energy Constraints on Travel Patterns: Gasoline Purchase Study
35 p.
Jul 1975
Abstract: In response to the OPEC (Organization of Petroleum Exporting Countries) oil embargo of the winter of 1974, the Federal Highway Administration initiated a small scale study into the effect of gasoline shortages on travel patterns. Participants were volunteers from the field staff of the Federal Highway Administration. The conclusions of this study on gasoline purchase patterns are as follows: (a) that the demand for gasoline was not price responsive for the study population, which was high income and small city oriented; (b) that the shortages of the winter of 1974 were of insufficient duration to cause changes in the travel patterns of the study population (such changes were hypothesized to have been smaller car purchases with small engines, lesser miles traveled, higher frequency of gasoline purchase, and changes in home or work location; these changes did not occur); and (c) that the only one of the three to reduce the amount of gasoline purchased for the study population was constrained availability—either by gas rationing or by reduced allocations to stations. (GMA)

Society of Automotive Engineers
Address: 400 Commonwealth Dr., Warrendale, PA 15096
Energy and Transportation
Feb 1976
Abstract: Reprints are given of 12 papers presented at an energy and transportation conference held to consider the transportation needs and availability of various energy sources. Those attending were urged to participate in the discussion of economic policies designed to encourage energy efficiency and supply through competitive markets. Other papers discussed energy needs and fuels for various modern transportation, non-transportation uses of petroleum, alternative fuels and alternative engines, and investment possibilities. Evidence is presented to show that improved automobile and truck efficiency offer the best potential for energy saving. (91 references) (DBX)

Availability: $12.95

Society of Automotive Engineers
Address: 400 Commonwealth Dr., Warrendale, PA 15096


Annual report in 2 volumes, approximately 2000 p. 1977

Abstract: Published annually, this textbook of the automotive industry includes 890 SAE standards recommended practices, and information reports. The handbook, which contains over 70 years of surface vehicle product practices in the U.S., specifies materials, components, hardware, safety, and performance through explanatory text, tables, charts, and engineering drawings. Part One covers materials and hardware and is organized into these broad categories: Ferrous Metals; Nonferrous Metals; and Threads, Fasteners, and Ear Parts. Part Two includes documents on on- and off-highway vehicles with sections on: Electrical Equipment and Lighting; Powerplant Components and Accessories; Emissions; Passenger Cars, Trucks, Buses, and Motorcycles; Off-Highway Vehicles; and Marine Equipment. Many of the reports included in this handbook are referenced by Federal and state governments in their regulations. (BYB)

Availability: Society of Automotive Engineers, Inc., Dept. of Commonwealth Dr., Warrendale, PA 15096 $65.00 set

Society of Automotive Engineers
Address: 400 Commonwealth Dr., Warrendale, PA 15096

Electric Vehicle Test Procedure—SAE J227a: SAE Recommended Practice


Abstract: In order to allow performance characteristics of electric vehicles to be cross-compared on a common basis, this SAE recommended practice establishes uniform procedures for testing electric battery powered vehicles that can be driven on public and private roads. The tests deal with the total vehicle, not subsystems and components. Test conditions and instrumentation are described, and the data to be recorded is detailed. The data is presented in vehicle energy efficiency, vehicle energy economy, and deceleration. (878)

Springer, G.S. (ed.); Patterson, D.J. (ed.)
Michigan Univ., Dept. of Mechanical Engineering
Address: Ann Arbor, MI

Engine Emissions - Pollutant Formation and Measurement


Availability: Plenum Publishing Corp., 227 West 17th Street, New York, NY 10011

Stalb, R.
General Research Corp.
Address: P.O. Box 3587, Santa Barbara, CA 93105

*The Influence of Alternative Electrical Energy Growth Rates on Impacts of Future Use of Electric Cars in Three Metropolitan Areas

Internal Memorandum No. IM-2047, 79 p.
20 Aug 1976

Sponsor: Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: This study reassesses estimates made in two previous General Research Corporation studies of the availability of electrical energy for the large-scale use of electric cars in the Los Angeles, St. Louis, and Philadelphia metropolitan areas. The study was made necessary because of recent rapid changes in projected future demand for electricity in almost all areas of the country. It was shown that in the past two to three years there has been a substantial reduction in the power company projections of the rate of growth in the demand for electricity in all three regions. There is evidence, however, that these projections are not consistent with each other and that considerable uncertainty exists. This uncertainty must naturally be reflected in any estimates of the energy available for automotive use. In this and in previous studies the energy for electric car recharge is assumed to come from the late-night "troughs" in the power companies' daily load profiles. It was shown that the problem associated with substations that recharge occurs only at off-peak hours are such that there can be no assurance that the large-scale use of electric cars will not require an increase in installed generating capacity. ... The effect on petroleum usage in each area was determined assuming that electric cars replace, to varying degrees, the conventional vehicle road energy consumption, vehicle energy economy, and deceleration. (878)
energy analyses are made of six coal-based automotive energy forms: gasoline refined from synthetic crude oil (syncrude), liquid methane, and electricity. The cost analysis is based on the Coal Resource Depletion Model described in a related study, "Synthetic Liquid Fuels Development: Assessment of Critical Factors—Volume III, Regionalized Industry, Social Impact, Coal Resource Depletion." Results of the cost analysis showed that syncrude gasoline is the least expensive alternative, followed by methanol, methane, Fischer-Tropsch gasoline, hydrogen, and electricity. However, when the efficiency of converting these energy forms to active power in a car is considered, electricity is the cheapest fuel, followed by syncrude/gasoline, methanol, methane, hydrogen, and Fischer-Tropsch gasoline. Energy analysis results showed that Fischer-Tropsch gasoline consumes the most energy in production, followed by electricity, hydrogen, methanol, methane, and syncrude/gasoline. Again, consideration of automotive energy efficiency leads to these results: electricity is the least in energy use, followed by syncrude/gasoline; Fischer-Tropsch gasoline is the highest in energy use; and methanol, methane, and hydrogen are in between. This comparison of economic and energy analyses of coal-based automotive energy options shows that economic analyses with the highest costs also require high levels of energy consumption. Economic and energy analyses provide similar results when presented as summary results when the systems studied are capital- and energy-intensive, as is the case in the systems studied in this report. A comparison of economic and energy analyses of systems that are less energy and capital-intensive may show a different trend. (59 references) (BYB)

<1977>
<177> CONT.
Internal-combustion-engine automobiles now in use. (8 references) (auth, abstract modified)
Availability: NTIS (when available)

<180>
Stephenson, R.A.
California Institute of Technology, Jet Propulsion Laboratory, California Institute of Technology, Environmental Quality Laboratory
Address: Pasadena, CA 91103
* Should We Have a New Engine? An Automobile Power Systems Evaluation. Volume I.
Summary. Volume II.
Aug 1975
Sponsor: Ford Motor Co.

Abstract: Alternative automotive power plants were examined for possible introduction during the 1980-1990 time period. Technical analyses were made of the Strahle Otto, Diesel, Rankine (steam), Brayton (gas turbine), Stirling, Electric, and Hybrid power plants as alternatives to the conventional Otto-cycle engine with its likely improvements. These alternatives were evaluated from a societal point of view in terms of energy consumption, urban air quality, cost to the consumer, materials availability, safety, and industry impact. The results show that goals for emission reduction and energy conservation for the automobile over the next 5-10 years can be met by improvements to the Otto-cycle engine and to the vehicle. This provides time for the necessary development work on the Brayton and Stirling engines, which offer the promise of eliminating the automobile as a significant source of urban air pollution, dramatically reducing fuel consumption, and being saleable at a price differential which can be recovered in fuel savings by the first owner. Specifically, Stirling engines require intensive component, system, and manufacturing process development at a funding level considerably higher than that now available.
Availability: Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr., Pasadena, CA 91103 $3.50 (Vol. 1)
Abstract: Data collected in this survey were used to study the effect of seven selected variables on automobile use expressed in average annual miles per vehicle. These seven variables were: number of cars in the household, age of the automobile, number of persons in the household, income of the household, occupation of the principal operator of the automobile, place of residence of the principal operator, and place of residence of principal operator by incorporated and unincorporated areas.

Availability: NTIS
Abstract: This paper presents characteristics of home-to-work travel (in both directions) by various modes of transportation and by population size-group of the workers' place of residence. The first part of the report presents characteristics of workers, including the distribution of workers by place of residence and by place of employment, the characteristics of travel such as distance, origin and destination, time of day, public transit use, and vehicle type. The second part presents characteristic of travel for the following population groups: workers under age 25, workers age 25 to 44, workers age 45 to 64, and workers 65 and over. The report discusses the modes of transportation used by workers for their home-to-work journey and how income, occupation and age of workers affect choice of mode of transportation. The third part of the report discusses the relative energy consumption of the transportation sector, with emphasis on highway vehicles, providing estimates of energy savings and points out the importance of improving the energy efficiency of the transportation sector. Changes in the design of automobiles to obtain greater fuel economy appear to be a promising approach. (12 references) (auth)
Abstract: This article states that, with the rising costs of owning and operating a car and with inadequate public transportation, the only realistic alternative for consumers is the electric vehicle. Industries producing electric vehicles are encouraged to concentrate on developing a systematic method for producing and marketing electric vehicles. Further improvements in design and technology can be made after early models are being introduced. Innovative suppliers are needed in this new and growing electric vehicle industry. The electric vehicle is considered a solution to U.S. pollution problems, its dependence on oil imports, and related economic problems. The recent trend in electric vehicle design is to design a completely new product for the consumer who is looking for a new life style. Technological needs are summarized in these areas: battery technology; mechanical components; electric motors; electronic controls, circuits, switching controls, and instrumentation; tires; light weight material; and hardware. (85R)

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This article states that, with the rising costs of owning and operating a car and with inadequate public transportation, the only realistic alternative for consumers is the electric vehicle. Industries producing electric vehicles are encouraged to concentrate on developing a systematic method for producing and marketing electric vehicles. Further improvements in design and technology can be made after early models are being introduced. Innovative suppliers are needed in this new and growing electric vehicle industry. The electric vehicle is considered a solution to U.S. pollution problems, its dependence on oil imports, and related economic problems. The recent trend in electric vehicle design is to design a completely new product for the consumer who is looking for a new life style. Technological needs are summarized in these areas: battery technology; mechanical components; electric motors; electronic controls, circuits, switching controls, and instrumentation; tires; light weight material; and hardware. (85R)

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powerplants have strongly indicated that it is necessary to optimize the vehicle, its fuel and the refinery as a total system. It is the purpose of this paper to report the relative miles of transportation that can be obtained from a barrel of crude oil by using different types of engines and fuels. This concept is not new. The energy required to manufacture fuels has always been supplied by using part of the energy in the crude oil. However, the importance of the concept is compounded when one considers that large quantities of gasoline are lost due to processing requirements for producing unleaded gasoline octane numbers while concurrently, automotive emission controls and safety regulations increase gasoline consumption. Both of these effects cause a reduced efficiency in the use of crude oil. The only true measure of the impact on energy usage caused by changes in refinery operations and vehicular modifications is to relate the miles of transportation obtained to the energy available in the crude oil. This concept accounts for both the energy needed for fuel manufacture and the energy needed to propel the vehicle. The options that have been studied are: (1) use of leaded gasoline in an internal combustion engine, (2) use of unleaded gasoline, (3) maximum use of diesel engines, (4) maximum use of the direct injection stratified charged engine, and (5) maximum use of gas turbine engines. It will be shown that the engine-fuel option chosen will have a large effect on the crude oil imports required, which, in turn, will have a substantial impact on the United States domestic economy and balance of payments. Furthermore, the choice of the wrong option could seriously restrict the number of vehicles that could be operated if world-wide crude oil availability should become limited in supply. (27 references) (auth)

Availability: Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096 $2.75

Tierney, W. T.; Wilson, R. F.
Texaco Inc.
Address: Beacon, NY

Adequate Future Transportation Demands: Vehicle-Fuel-Refinery System Optimization Today


1976

Sponsor: American Petroleum Institute, Fuels and Lubricants Committee

Abstract: The critical shortage of petroleum resources in the United States as a source of transportation fuels for the future is reviewed briefly. This establishes the well recognized basis for concern with the viability of U.S. transportation systems in the future. It is suggested that the vehicle, its fuel, and the refinery be considered as a total system which must be optimized in order to provide for the most efficient utilization of our crude oil and subsequent synthetic-based fuels. To present the benefits to be derived from such studies, two series of runs were presented on the basis of applying known vehicle fuel economy efficiencies to various transportation fuel product slates obtained from computer runs established to simulate a typical refinery. The first series of runs shows the relative fuel quantities available when a given refinery is so operated as to maximize the production of specific fuels. These fuel are leaded gasoline, taken as the base case;
Transportation and Economic Research Associates Inc.
Address: Suite 888, 1901 N. Pt. Myer Drive, Arlington, VA 22209

Final Rep on Existing Data on Vehicle-Miles Traveled in the United States
60 p.
Jul 1977
Sponsor: Oak Ridge National Laboratory; Energy Research and Development Administration, Division of Transportation Energy Conservation

Abstract: The report documents Vehicle-Mile Statistics for air, highway and rail transportation of passengers and freight. The report is intended as a guide to those who use vehicle-miles data and need further information on the background of the published VMT statistics. The study involved reviewing published sources and tracing the VMT data to its original sources. The report presents an understanding of the scope, definition and methods of collection of VMT statistics. Personal interviews with Federal and state government officials, as well as representatives of private institutions which publish VMT statistics have been conducted to gain this understanding. (15 references) (From Foreword)

Transportation and Economic Research Associates Inc.
Address: 1901 N. Pt. Myer Dr., Arlington, VA 22209
Crude Oil Pipeline Representation
47 p.
9 Jul 1976
Sponsor: U.S. Dept. of Transportation, Transportation Systems Center

Abstract: This report describes work under Task 1 of an economic impact study of proposed deep water ports for anti-competitive implications. The objectives of the overall study were: to create a new version of the Department of Transportation Deepwater Port Model (DPM); and to estimate the impacts that two deep water ports would have on petroleum distribution patterns and transportation costs. Task 1 deals with the creation of a capacitated network of the crude oil trunk pipeline system. This network depicts existing trunk line linkages between domestic crude producing districts (including Caspian and three U.S. refining districts represented in the DPM. (FEB)

Transportation and Economic Research Associates Inc.
Abstract: Diesel engines, as currently produced for trucks and European cars, have a range of fuel economy advantage over gasoline engines of 10% (for new models) to 80% (for pre-1973 models). Heavier automobiles give the greatest fuel economy advantage. Normalizations on a mile per gallon basis give diesel engines higher economy advantages than when based on horsepower to weight ratio, Btu per gallon, or highway driving schedule. Present emission standards can be reached, but lower standards of NOx will wipe out the advantages of diesel engines. Low horsepower/weight ratios can be overcome by supercharging. Disadvantages of diesel, such as smoke, odor, and idle noise, can be corrected with existing technology. Driveability compares with gasoline engines. Acceleration. Eliminating automobile noise will result in a 78% noise reduction for the whole population and an 88% reduction in areas with a mix of cars, trucks, buses, and motorcycles (24 references) (DCI).

Availability: $125.00

Trellis, T.J.
U.S. Dept. of Transportation, Transportation Systems Center
Address: Kendall Square, Cambridge, MA 02142

* Review of Diesel Engine Technology for Automobile Application

Feb 1975

Abstract: Diesel engines, as currently produced for trucks and European cars, have a range of fuel economy advantage over gasoline engines of 10% (for new models) to 80% (for pre-1973 models). Heavier automobiles give the greatest fuel economy advantage. Normalizations on a mile per gallon basis give diesel engines higher economy advantages than when based on horsepower to weight ratio, Btu per gallon, or highway driving schedule. Present emission standards can be reached, but lower standards of NOx will wipe out the advantages of diesel engines. Low horsepower/weight ratios can be overcome by supercharging. Disadvantages of diesel, such as smoke, odor, and idle noise, can be corrected with existing technology. Driveability compares with gasoline engines. Acceleration. Eliminating automobile noise will result in a 78% noise reduction for the whole population and an 88% reduction in areas with a mix of cars, trucks, buses, and motorcycles (24 references) (DCI).

Availability: NTIS

U.S. Department of Transportation, Transportation Systems Center
Address: Kendall Square, Cambridge, MA 02142

* Review of Diesel Engine Technology for Automobile Application

Feb 1975

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Availability: $125.00
Energy Tax Proposals Relating to Transportation.

U.S. Congress, Committee on Ways and Means, House of Representatives, by the Staff of the Joint Committee on Taxation

Prepared for the Committee on Ways and Means, House of Representatives, by the Staff of the Joint Committee on Taxation


1977

Sponsor: U.S. House of Representatives, Committee on Ways and Means

Abstract: This report, which is one of a series of studies written for the Committee on Ways and Means during its consideration of the Administration's energy program (H.R. 6531), describes the Administration's energy tax proposals dealing with transportation. In describing the proposals, sections are included on aviation, motor fuels, and natural gas. The present law, the Administration's proposal, other proposals, and analysis of the proposals are presented. The report concludes with an assessment of theAdministration's proposals and analysis of the Administration's proposal.

U.S. Congress, Congressional Budget Office


Jun 1977

Abstract: This working paper is intended to assist in the Congressional debate by offering an independent evaluation of the proposed energy program. The report focuses on the major energy initiatives of coal conversion, the crude oil equalization tax, natural gas pricing, home insulation and solar equipment tax credits, and the two automobile-related proposals. Secondary proposals, such as standards on new appliances and buildings, which altogether the Administration estimates account for less than 30 percent of the potential savings, are not addressed in this report. Essentially, the paper has five major objectives: to give an overview of the general strategy, to provide analysis of the major initiatives, to convey information about the incentive mechanisms, to indicate short-run macroeconomic impacts, and to specify possible changes in the distribution of income. Chapter II offers a general orientation, describing the overall philosophy of the President's approach and its critical features, and placing it in the spectrum of possible alternatives. Perhaps more important, however, it specifies a framework for evaluating the individual proposals that is used throughout the subsequent chapters. Chapters III through VII evaluate and analyze the major energy initiatives within the package. Chapters VIII through X attempt to assess the general costs and benefits of the major proposals. Budget costs, macroeconomic effects, and distributional impacts are addressed in these final three chapters. (From Scope of the Report)

Availability: GPO, Stock No. 052-070-9404-1

U.S. Congress, Joint Economic Committee, Subcommittee on Urban Affairs

Address: Washington, DC

Productivity in Urban Transportation. Hearings Before the Subcommittee on Urban Affairs of the Joint Economic Committee, Congress of the United States, Ninety-Third Congress, Second Session

Hearings held April 8 and 29, May 6 and 13, and July 3, 1974, 269 p.

1974

Abstract: The purpose of these hearings was to analyze the possible alternatives for improving urban transportation. The testimony focused on a realistic assessment of what urban transportation systems can accomplish in the future. These hearings discussed objectives for urban transportation expenditures, policies to meet these objectives, and ways to measure achievement of these objectives. Witnesses included administration officials, state and local officials, representatives of the transit industry, and other experts. (BTB)

Availability: GPO $2.50
Abstract: Congress, in its deliberations on rail issues, will use this review of national railroad issues that were considered when CORAIL was organized. Appropriate legislation will respond to both a projected cash shortfall of $500 million at the industry level and problems of the individual weak railroads. Solutions will cover the areas of (1) rehabilitating railroad fixed plant through direct grants or low cost loans, (2) restructuring to deal with the short-term bankruptcy problem, (3) rate structuring that provides some flexibility to rail management and avoids disruptive effects, (4) subsidizing low-density lines which meet public needs, and (5) eliminating discriminatory taxation. Inappropriate legislation could lead to rehabilitation efforts of questionable public value and such stringent financial terms that available capital would be constrained. Other potential dangers could result in unsuitable mergers, disruption of railroad traffic, and widespread cost increases. Background information on each of the proposals includes current status, available options, and probable impacts. (DCK)

Availability: GPO $1.70

U.S. Congress, Office of Technology Assessment
Address: Washington, DC
Energy, the Economy, and Mass Transit
166 p.
Dec 1975
Abstract: The Office of Technology Assessment (OTA) reviewed mass transit as it relates to energy consumption and alternative economic conditions. Reasons for recent trends in mass transit are explored, and it is concluded that a stable ridership developed in 1975. Economic conditions, such as unemployment, lower personal income, and general recession have only a small effect on ridership. Investment in mass transit generates more employment than does highway construction, but requires a two-year time. Improved local operations and fixed guideway construction have only local economic impact. A firm commitment and standardized specifications would allow a faster and better inventory buildup. Recommendations are made for policy and funding initiatives to increase use of mass transit, such as incentive rate structures, auto restraints, and improved equipment and service. (21 references) (DCK)
Availability: GPO $2.00

U.S. Dept. of Commerce, Bureau of Economic Analysis
Address: Washington, DC 20231
The National Income and Product Accounts of the United States: Revised Estimates, 1929-74
Survey of Current Business, 56(1) (Jan 1976), Part 2
1976
Abstract: Revised benchmark tables are presented for Personal Consumption and Expenditures by Type, Product, Income, and Employment by Industry. Personal income and outlays tables by type of expenditure and by product cover 1929-1974. Product, income, and employment by industry tables are presented annually from approximately 1947 through 1974. Included are nonfarm National Product by industry, compensation of employees by industry, employer contributions, nonfarm proprietors' income, corporate profits and undistributed corporate taxes. (EBH)
Availability: GPO $4.30 for annual subscription, $3.00 for single copy

U.S. Dept. of Commerce, Bureau of the Census
Address: Washington, DC
* Statistical Abstract of the United States, 1975; 1976
1975; 1976
Abstract: Statistical data are included in the following categories: population; vital statistics, health, and nutrition; immigration and naturalization; education; law enforcement, federal courts, and prisons; area, geography, and climate; public lands, parks, recreation, and travel; labor force, employment, and earnings; national defense and veterans affairs; social insurance and welfare; income, expenditure, and wealth; prices; elections; federal government finances and employment; state and local government finances and employment; banking, finance, and insurance; business enterprise; communications; power; science; transportation - land, air and water; agriculture; forests and forest products; fisheries; mining and mineral products; construction and housing; manufactures; distribution and services; foreign commerce and aid; income, expenditure, and wealth; foreign commerce and aid; outlying areas under the jurisdiction of the United States; comparative international statistics; and metropolitan area statistics. (DCM)
Availability: GPO $10.50 (cloth), Stock No. 0324-01049-6; $8.00 (paper), Stock No. 0324-01050-0 for 1975 Edition; $10.50 (cloth), Stock No. 003-024-01173-5; $8.00 (paper), Stock No. 003-024-01174-3 for 1976 Edition

U.S. Dept. of Commerce, Bureau of the Census
Address: Washington, DC
** Selected Data from the 1973 and 1974 Surveys of Purchases and Ownership
62 p.
Jul 1976
Abstract: The Surveys of Purchases and Ownership were conducted in the fall of 1973 and 1974 as supplements to the Annual Housing Survey. Data are presented on consumer ownership, availability, and purchases of automobiles and major household items. Socio-economic factors affecting ownership and purchases of cars and appliances are surveyed (e.g., income, age of head of household, race and Spanish origin, location of residence, and tenure of housing unit). Data collected from the 1973 and 1974 Surveys and Purchases and Ownership are to be published in an issue of "Consumer Buying Indicators," Series P-65 in the Current Population Report Series. (BTC)
Abstract: Published every five years, this report in one of fourteen reports (TC72C1-1 to 14) in the Commodity Series of the Commodity Transportation Survey of the Census of Transportation. The entire series provides statistics on the shipments of commodities for about 80 three-digit Transportation Commodities Classification (TCC) groups. In this report, tables are presented which indicate the flow of transportation equipment for tons and ton-miles of shipment by means of transport, distance and weight of shipment, and origin and destination. (BKY)

Availability: GPO $1.20

<462>
U.S. Dept. of Commerce, Bureau of the Census, Transportation Division
Address: Washington, DC

U.S. Dept. of Commerce, Bureau of the Census, Transportation Division
Address: Washington, DC

1972 Census of Transportation. Commodity Series: Transportation Equipment
Apr 1975
Abstract: Published every five years, this report in one of fourteen reports (TC72C1-1 to 14) in the Commodity Series of the Commodity Transportation Survey of the Census of Transportation. The entire Series provides statistics on the shipments of commodities for about 80 three-digit Transportation Commodities Classification (TCC) groups. In this report, tables are presented which indicate the flow of transportation equipment for tons and ton-miles of shipment by means of transport, distance and weight of shipment, and origin and destination. (BKY)

Availability: GPO $1.20

Transportation Division
Address: Washington, DC

* Transportation Survey - Commodity Series: Petroleum and Coal Products

Report No. TC72C1-8, 42 p.
May 1975
Abstract: As one of the fourteen reports (TC72C1-1 to 14) in the Commodity Series of the Commodity Transportation Survey of the Census of Transportation, this report provides data on the shipments of petroleum and coal products from manufacturers. The entire Series contains information on the shipments of commodities for about 80 three-digit Transportation Commodities Classification (TCC) groups. This report presents data for shipment and ton-miles of petroleum and coal products for tons and ton-miles of shipment by means of transport, distance and weight of shipment, and origin and destination. (BKY)

Availability: GPO $1.20

<463>
U.S. Dept. of Commerce, Bureau of the Census, Transportation Division
Address: Washington, DC

1972 Census of Transportation. Commodity Series: Transportation Survey - Area Series: Area Report 8, United States Summary
Report No. TC72C2-8, 272 p.
Aug 1975
Abstract: The Area Series (TC72C2-1 to 8) of the Commodity Transportation Survey of the Census of Transportation (published every five years) presents data on the flow of commodities from each of 27 production areas, consisting of one Standard Metropolitan Statistical Area or a cluster of SMSA's and about 25 selected states. Data are presented in tables for shipment and ton-miles of commodities shipped, classified by means of transportation, length of haul, and area of destination of shipments. Area Report 8 is the last report in the Series, and contains data for the U.S. as a whole. The flow of commodities at different TCC (Transportation Commodities Classification) levels is described for tons and ton-miles, classified by means of transport, distance and weight of shipments, and origin and destination. (BYB)

Availability: GPO $4.85
Dec 1970

Motor Vehicle Accident Deaths in the United States:
Calendar Year 1975. Part 5: National Summaries

116 p. (1977)

Abstract: This fifth part of a series containing
statistics on U.S. motor vehicle accidents
presents summary data of the country as a
whole. The first four parts of this series
present detailed data on movements of
commodities and vehicles at ports and
harbors and on waterways and canals of the
U.S., Puerto Rico, and the Virgin Islands.
This series includes both foreign and
domestic commerce of the U.S. by water.
Section One of Part Five contains national
summaries. The second section provides, on
an area-to-area basis, the tonnages of
principal commodities transported by vessels
in the domestic inland water trade.
Section Three, Water Carriage-Ton-Miles, describes the performance of the
water carrier industry in terms of ton-miles on a
service basis and provides detailed
data on types of traffic and commodities
transported in the domestic trade, also in
terms of ton-miles. (TRB)

Availability: U.S. Army Engineer Division, New
England, 424 Trapelo Rd., Waltham, MA 02154
$2.00

U.S. Dept. of Health, Education, and Welfare,
Public Health Service, National Center for
Health Statistics

Motor Vehicle Accident Deaths in the United
States, 1950-67

Public Health Service Publication No. 1000,
Series 20, No. 9, 43 p.
Dec 1970

Abstract: This report is a study of mortality
from motor vehicle accidents, showing trends
for 1950-67 and differences by age, color,
sex, geographic, mileacterial, mileage,
driven, and marital status. The number of
deaths from motor vehicle accidents rose
almost every year from 1950 to 1967. The
motor vehicle death rate, however, did not
rise steadily—it reached its lowest point in
1961 and its highest in 1966. Males had
higher age-adjusted motor vehicle death rates
than females, while persons other than white
had higher rates than white persons.
Differences between the sexes, however,
consistently exceeded those between the color
groups. In 1950, males had rates as high as
3.4 times those for females. In 1967, 59.4
percent of all motor vehicle fatalities
occurred to persons under 35 years of age.
The age group with the highest motor vehicle
death rate was 15-24 years. This age group
and those 25-34 years of age showed the
largest increase in motor vehicle death rates
from 1950 to 1967. Motor vehicle death rates
for sales and females differed most in the
two age groups. Southerners and Mountain States
had the highest age-adjusted motor vehicle
death rates and the highest mileage death
rates while Northeastern States had the
lowest. The standard metropolitan
statistical areas with the highest fatal
motor vehicle accident rates were in the West
and South, the lowest in the Northeast.
Nonmetropolitan counties had higher motor
vehicle death rates than metropolitan
counties. Mileage death rates in the 1960's
were lower than in 1950. Among the marital
status groups, married persons had the lowest
death rate from motor vehicle accident, while
divorced persons had the highest. (16
references) (auth)
Annual publication

Abstract: These annual publications report on mineral industry activities with statistics and background information to aid in understanding each year's developments. Tables provide data on over 78 metals, minerals, and fuels, including essentially all of the metallic, nonmetallic, and mineral fuel commodities important to the U.S. economy. A general review chapter on mineral industries and a statistical summary are provided. Chapters are included on the minerals industries of each of the 50 states, the U.S. Inland possessions in the Pacific Ocean and the Caribbean Sea, the Commonwealth of Puerto Rico, and the Canal Zone. The latest available mineral data on more than 130 foreign countries are presented, with discussions on the importance of these minerals to the economies of these countries. Minerals in general and their relationships to the world economy are reviewed.

Pre-publication tables for the 1975 Minerals Yearbook are used in this "Transportation Energy Conservation Data Book." (BYB)

Availability: GPO $14.00 per Volume I of the 1973 Yearbook; $11.00 for Volume II of the 1973 Yearbook; $15.00, Stock No. 024-000-01893-1, Superintendent of Documents No. 128.37:973 Va-111
19 Jul 1976
Abstract: Sales of asphalt and asphaltic products in the U.S. during 1975 totaled 27,595,770 short tons, 11.1% less than the 1974 sales. This report contains the following tables: Sales of Petroleum Asphalt for Consumption in the U.S. by Type and Principal Use; Sales of Petroleum Asphalt Paving Products for Consumption in the U.S. by P.A.D. District and State; Sales of Petroleum Asphalt Roofing Products for Consumption; Sales of All Other Petroleum Products Asphalt for Consumption; and Sales of Petroleum Asphalt and Road Oil for Consumption. (BYB)

2 Oct 1976
Abstract: Total sales of liquid petroleum gases (propane, normal and other butanes, isobutane, and butane-propane mixtures) and ethane in the U.S. declined in 1975 to 24,195 million gallons, 2.7% less than the 1974 level. Tables provide statistics on: Sales of Liquefied Petroleum Gases and Ethane in the U.S., 1971-75; Sales of Liquefied Petroleum Gases and Ethane by Use, Excluding Use in Gasoline Production, by P.A.D. District and State--1975 and 1974; Sales of Liquid Petroleum Gases by Use (residential and commercial, industrial, seasonal, and miscellaneous use), by Type, by P.A.D. Districts and States--1975 and 1974; Sales of Liquefied Petroleum Gases and Ethane for Chemical and Synthetic Rubber Manufacture; Sales of Liquefied Petroleum Gases and Ethane, by Type, by P.A.D. District and State--1975 and 1974; and Liquefied Petroleum Gases Exported from the U.S. by Countries, 1975-74. (BYB)

Natural Gas Production and Consumption: 1975
4 Oct 1976
Abstract: Statistics on natural gas production, consumption, disposition, storage, and reserves are provided in this annual report. In 1975 marketed production of natural gas decreased 6.9% from the 1974 level to 20,109 billion cubic feet. Consumption was 20,410 billion cubic feet in 1975, down 7.7% from the previous year. Imports of natural gas totaled 953 billion cubic feet, a drop from 1974 of 0.6%, while storage of gas increased by 34 billion cubic feet. The following tables are provided: Salient Statistics of Natural Gas in the U.S.; Domestic Withdrawals and Disposition of Natural Gas in the U.S.; Quantity and Value of Marketed Production of Natural Gas in the U.S.; Market Production, Interstate Shipments, and Total Consumption of Natural Gas in the U.S., 1975; Production of Natural Gas Liquids at Natural Gas Processing Plants, and Disposition of Residual Gas in the U.S. in 1974-75, by State; Consumption of Natural Gas by Use and By State, 1975; Quantity and Value of Natural Gas Delivered to Consumers in 1975, by Type of Consumer and by State; Net Interstate Movements of Natural Gas in the U.S.; Natural Gas Stored in and Withdrawal from Underground Storage; Producing Gas and Condensate Wells in the U.S.; and Estimated Total Proved Reserves of Natural Gas in the U.S. (BYB)

Mineral Industry Surveys: Supply, Demand, and Stocks of All Oils by P.A.D. Districts and Imports to the United States, by Country
Abstract: Data on the production, supply, demand, imports, and stocks of crude oil, natural gas liquids, and petroleum products are reported in these periodic publications. Tables are provided on: Supply, Demand, and Stocks of All Oils by P.A.D. District; Supply, Demand, and Stocks of Crude Oil, Natural Gas Liquids, and Petroleum Products by Product by P.A.D. District; and Imports of Petroleum Products and Crude Oil into the U.S. (BYB)

Minerals in the U.S. Economy: Ten-Year Supply-Demand Profiles for Mineral and Fuel Commodities
100 p.
1975
Abstract: Supply/demand diagrams and tables are presented to highlight the flow of minerals through the U.S. economy. The data cover a ten-year period ending with 1973. A total of 96 tables and diagrams present data on minerals, metals, and fuel commodities. An update of this report covers the ten-year period ending with 1974 and is entitled "Minerals in the U.S. Economy: Ten-Year Supply-Demand Profiles for Mineral and Fuel Commodities (1965-74)." (BLM)
Availability: Publications Distribution Branch, Bureau of Mines, 4800 Forbes Ave., Pittsburgh, PA 15213 free

The National Atlas of the United States of America
April 1970
Abstract: The National Atlas of the United States of America was designed to be of practical use to decision makers in government and business, planners, research scholars, and others needing to visualize country-wide distributional patterns and relationships between environmental phenomena and human activities. Consequently, the 755 maps in this volume constitute a scientific presentation, in cartographic form, of the principal characteristics of the country, including its physical features, historical evolution, economic activities, socio-cultural conditions, administrative subdivisions, and place in world affairs. (from Introduction)
Availability: U.S. Geological Survey $100.00
Abstract: The latest Consumer Expenditure Survey, completed in June 1974, covered the civilian noninstitutional population over a period of 2 years (1972 and 1973). This Survey is a comprehensive source of detailed information on family expenditures and income that can be classified by socio-economic and demographic characteristics of U.S. families. The Survey is comprised of two separate components: (1) a diary or recordkeeping survey, completed by respondents for two 1-week periods and (2) an interview panel survey. The sample for the survey included about 10,000 families. These Diary Survey reports present weekly expenditure data for July 1972 through June 1973 and for July 1973 through June 1974 for U.S. families classified by income, age of family head, race of family head, education of family head, family size, region, occupation of family head, housing tenure, family composition, and type of area. Expenditure data are listed for food for home consumption, food consumed away from home, housekeeping supplies, personal care products, personal care services, non-prescription drugs and medical supplies, gas and electricity, and other fuels. (BTS)


Monthly publication, 9 p.
Monthly: These periodic reports provide data on retail prices and indexes of fuels and utilities for residential use. Indexes reported in this publication are components of the Consumer Price Index, which measures price changes for commodities and services bought by wage earners and clerical workers in the urban U.S. These tables are included: Indexes of Retail Prices, Fuels and Utilities, by Component, U.S. Averages; Average Retail Prices for Fuel OIL No. 2 and Residential Heating Gas, U.S. Averages; Indexes of Retail Prices of All Fuels and Utilities, and by Area; Indexes of Retail Prices of Gas and Electricity Combined, Gas, Electricity, by Area; Net Monthly Bills for Specified Kilowatt Hours of Electricity by Area; Wet Monthly Bills to Residential Customers for Specified Amounts of Gas, by Area; Average Price of 100 Gallons of Residential Heating Gas, and 100 Gallons of Fuel Oil No. 2 by Area; and Leaded Regular, Unleaded Regular, and Premium Gasoline Indexes for the U.S. and Selected Areas. (BTS)
Feb 1977
U.S. Dept. of Transportation, Coast Guard

Abstract: In order to plan future aviation development, this study constructed five
alternative scenarios describing possible socio-economic conditions from now to the
time period of the study. This report contains an Introduction, and a Discussion of the
relationship of safety and emission standards... This report consists of
three basic Sections: an Executive Summary, an Introduction, and a Discussion of the
Potential for Fuel Economy Improvements and their Impacts. Also included in a list of
Public Docket submissions and a summary of their content. (124 references) (auth., from Preface)

U.S. Dept. of Transportation, Federal Aviation Administration
Address: Washington, D.C. 20590
Boating Statistics - 1974
1 May 1975

Abstract: This sixteenth annual report contains data on boat accidents and casualties, boat
numbering registration, and related Coast Guard seven-point conserving accidents occur in mid-summer during good weather
because of operator error. A national survey, by state, of boat owners estimates 8.5 million numbered boats (some states are
still in the process of numbering water craft) and 3,460.7 million passenger hours.
Accidents were at the rate of 16.9 per
100,000 and accounted for 1,446 fatalities. Most accidents took place in non-tidal, calm waters, on clear July-August days, with
little or no wind, and good visibility. Outboard motor boats, involving 53% of the accidents, had one passenger and were the
fault of a 26 to 50 year old operator. The U.S. Coast Guard Auxiliary has begun a volunteer program to promote recreational
boating safety through education, courtesy boat inspection, and rescue operations. In 1974 the Auxiliary assisted 31,412 persons
and saved 403 lives. (DCR)

U.S. Dept. of Transportation, Federal Aviation Administration
Address: Washington, D.C., 20591
Report to Congress on Energy Conservation Policies and Practices by the Federal Aviation Administration
Report No. AD-A021312, V.P.
Feb 1976

Abstract: Pursuant to Section 382 (a) (1) of the Energy Policy and Conservation Act, P.L.
94-163, this report addresses energy conservation policies and practices instituted by the Federal Aviation Administration since October 1973. The
report is essentially historical in nature and provides a factual presentation of energy policies and practices as required by the Act. These include: early FAA actions, the
FAA's conservation program and follow-on investigation of energy conservation measures, recent or on-going actions in fuel conservation, and long-range prospects for energy conservation. (Gra) Availability: NTIS

U.S. Dept. of Transportation, Federal Aviation Administration
Address: Washington, D.C. 20591
Aviation Futures to the Year 2000
58 p.
Feb 1977

Abstract: In order to plan future aviation development, this study constructed five

U.S. Dept. of Transportation, Federal Aviation Administration
Address: Washington, D.C. 20591
Current Aviation Statistics: Air Traffic Activity, Fiscal Year 1975
Feb 1976

Abstract: Tabular data for the time period
1966-1975 are given on the number of general and military aircraft handled, including the percent annual change; departures and overs;
itinerant, instrument, and visual flight operations; and flight service station workload. (GRA) Availability: NTIS

U.S. Dept. of Transportation, Federal Aviation Administration
Address: Washington, D.C. 20591
Aviation Forecasts, FY 1977 - 1988, Summary and Briefing Conference
Report No. FAA-AVE-77-16, Conference held on
2 Dec 1976

Abstract: The second annual Federal Aviation Administration Forecast Conference was
attended by approximately 250 people from various segments of the aviation community. This report of the proceedings includes all the formal presentations and some
representative questions and answers. This Conference, like the previous one, was held for the primary purpose of (1) reemphasizing
Economic and Social Effects of Highways

Abstract: This report provides information from more than 200 studies of the economic and social effects of highways. It consists of two principal parts: (1) a narrative discussion of the studies and (2) abstracts of 178 highway planning research studies undertaken cooperatively by the State highway departments and the Federal Highway Administration. The abstracts also include reports on studies conducted by the Federal Highway Administration, both in house and under contract, and some pioneering land use studies conducted solely by State and local governments. The narrative highlights matters of current concern, such as land development patterns at interchanges, effects of highways in aiding an undeveloped area, residential experience with highways, including the indebtedness of residents following relocation, and trends in the rates of home mortgage foreclosure. The report also provides indexes of subject matter, authors, and research agencies. The report points up a number of findings or tentative findings. For example, accommodating highways to the needs of residential development has apparently been more difficult than accommodating them to the needs of industry and commerce. Residential disadvantages have generally been due to proximity problems (noise and fumes, for example) or to neighborhood disruption. Solutions to such problems apparently include more space between the highway and residences, better barriers or screening, and greater sensitiveness to neighborhood needs in planning highway locations. Other findings suggest development consideration near the highway right-of-way. For example, high costs of land near highways would indicate that airspace development might be limited to the high-value areas in the centers of cities. Interchange land development has been shown to be affected by the type of intersecting highway and the relative accessibility of the interchange quadrants. Important factors of such land development are traffic volumes and proximity and population of the nearest urban center.

Availability: GPO $1.25, Stock No. 5001-00036

U.S. Dept. of Transportation, Federal Highway Administration
Address: Washington, DC
Report No. PB-255090, annual publication, 268 p. for 1974 Statistics

Abstract: This annual publication brings together selected statistical tabulations relating to highway transportation in three major areas: 1) highway users—the ownership and operation of motor vehicles; 2) highway finance—the receipts and expenditures for highways by public agencies; and 3) the highway plant—the extent and changing characteristics of the mileage of public highways, roads, and streets in the Nation. Beginning in 1975, this report is being released in several sections in order to make the information available earlier. One of the 1975 Statistics, subtitled "Vehicles, Drivers, and Fuels," contains data on Motor Fuel; Motor Vehicles and Driver Licensing; Highway Usage Characteristics; Federal Fuel and Automotive Taxes, and the Highway Trust Fund; Highway Finance Summaries; Federal Highway Finance and Programs; State Highway Finance; Local Road and Street Finance; Roadway; and U.S. Territories. (EBB)
Availability: GPO, Stock No. 050-001-00107-1 or NTIS for 1974 Statistics

U.S. Dept. of Transportation, Federal Highway Administration
Address: Washington, DC
Economic and Social Effects of Highways
104 p.
1972
Abstract: This report provides information from more than 200 studies of the economic and social effects of highways. It consists of two principal parts: (1) a narrative discussion of the studies and (2) abstracts of 178 highway planning research studies undertaken cooperatively by the State highway departments and the Federal Highway Administration. The abstracts also include reports on studies conducted by the Federal Highway Administration, both in house and under contract, and some pioneering land use studies conducted solely by State and local governments. The narrative highlights matters of current concern, such as land development patterns at interchanges, effects of highways in aiding an undeveloped area, residential experience with highways, including the indebtedness of residents following relocation, and trends in the rates of home mortgage foreclosure. The report also provides indexes of subject matter, authors, and research agencies. The report points up a number of findings or tentative findings. For example, accommodating highways to the needs of residential development has apparently been more difficult than accommodating them to the needs of industry and commerce. Residential disadvantages have generally been due to proximity problems (noise and fumes, for example) or to neighborhood disruption. Solutions to such problems apparently include more space between the highway and residences, better barriers or screening, and greater sensitiveness to neighborhood needs in planning highway locations. Other findings suggest development consideration near the highway right-of-way. For example, high costs of land near highways would indicate that airspace development might be limited to the high-value areas in the centers of cities. Interchange land development has been shown to be affected by the type of intersecting highway and the relative accessibility of the interchange quadrants. Important factors of such land development are traffic volumes and proximity and population of the nearest urban center.

Availability: NTIS

U.S. Dept. of Transportation, Federal Highway Administration
Address: Washington, DC
Highway Travel Forecasts
67 p.
Nov 1974
Abstract: This report is the result of a Federal Highway Administration study to reevaluate national highway travel forecasts in light of such factors as declining birth rates, possible saturation of vehicle ownership, and fuel constraints. Results indicate that highway travel in expected to increase at an annual compound rate of 2 to 3 percent per year to 1990 as compared to an average annual growth of 4.6 percent for the last 20 years. The travel projections are based on anticipated increases in population, licensed drivers, vehicles, and personal income. The reduced growth rate in travel would have occurred even without the fuel shortage due to the decreasing rate of persons entering the driving age population. This has resulted from the decline in births since the late 1950's. Even with fairly severe constraints on fuel the travel projections appear reasonable, assuming continued increases in the fuel efficiency of the vehicle fleet using presently available technology. Although this was a national assessment, review and application of these analyses at the State and local level are encouraged. Comments will be useful in updating the report. (GRA)
Availability: NTIS
1 Jul 1977

Abstract: The safety and design issues in the Alaska natural gas transportation system relate primarily to how a recommended system should be designed, constructed, and operated, and to a lesser degree, where such a system should be located. This report discusses the relative safety and design merits of the three alternatives considered in the Federal Power Commission (FPC) Recommendation to the President, May 1, 1977. Each of the three systems presented for transportation of natural gas from Alaska presents new challenges in design, construction, and operation. Information in the record detailing the applicants’ approaches to meeting these challenges is exhaustive, and much of it has been tested for accuracy by examination, rebuttal, and argument before the FPC and by its staff. In this report, the interagency participants who analyzed the FPC Recommendation and other relevant material discuss the principal concerns which remain to be decided relative to the safety and design of an Alaska gas transportation system and make their own recommendations on these matters. Safety and design issues will continue to attract attention because the safety and design issue in the Federal case relates primarily to how a recommended system should be designed, constructed, and operated. This report presents the principal concerns which remain to be decided relative to the safety and design of the systems presented for transportation of natural gas from Alaska. This report presents the principal concerns which remain to be decided relative to the safety and design of the systems presented for transportation of natural gas from Alaska. (Excerpt from Summary)
Transportation noise is a combination of mechanical factors and location. The design of a vehicle and the quality of its construction, repair, and manner of operation all affect the amount of noise it produces. The level of audible sound (measured in decibels and, in the case of aircraft, RPNdB) is affected by distance and the number of obstructions the sound waves must pass. Analysis is made of sound levels of various types of aircraft and motor vehicles. An unsilenced motorcycle two feet away, for example, produces nearly as much noise as a jumbo jet transport making a landing. Noise abatement, in addition to design changes, can be effected through planning sound barriers, grading highway cuts, planting vegetation, careful planning of route locations for highways and airport runways, and zoning for compatible land use. Recommendations for specific ways to control noise are listed for aircraft, highway vehicles, and rapid transit systems. (1 references) (DCX)

Availability: GPO $7.70, Stock No. 5000-0057
Abstract: Materials in automobiles are analyzed and reported. Report No. PB-20635, 75 p.
1975 Abstract: An overview of the present and future transportation energy situation in the U.S. is provided through the presentation of extended abstracts of ten papers selected from recent literature. As much of the authors' data as possible is contained in these abstracts, including any tables from the reports. The abstracted papers are as follows: "Energy and Environmental Aspects of U.S. Transportation" by W.S. Praizer, F. Dyson, and B.S. Gooss; "Energy Requirements for Passenger Ground Transportation Systems" by J.L. Stroboson and J.S. McGowan; "The Automobile--Energy and the Environment: A Technology Assessment of Advanced Automotive Propulsion Systems" by D.G. Harvey and W.S. Menken; "Energy Consumption for Transportation in the U.S." and "Transportation Energy Conservation: Opportunities and Policy Issues" by N.A. Baillie and E.L. Stroboson; "A Perspective of Transportation Fuel Economy" by R.D. Nutter; "Energy Efficiencies of the Transport Systems" by E.A. Rice; "Energy Conservation Through Transportation Actions" by Alan R. Voorhees and Associates, Inc. (BYB)
Availability: NTIS

U.S. Environmental Protection Agency
Address: Washington, DC
Report to the President and Congress on Noise
31 Dec 1971 Abstract: The nature of noise as an environmental problem and the economic implications of noise abatement programs are summarized. Evidence of damage to living organisms, the ecology, and inert objects as a result of high intensity noise is presented in terms of psychological, sociological, physiological, and physical effects. Available data does not yet exist that will allow a definitive evaluation. Recommendations are made that will allow noise levels to be significantly reduced in the next 5 to 10 years. These specify (1) the need for Federal leadership, specifically from the Environmental Protection Agency; (2) noise emission standards for transportation and combustion equipment and product labeling; (3) Federally sponsored research and analysis on the economic impact of noise control; (4) information to increase public awareness; and (5) appropriate legislation. Emphasis should be placed on noise sources, such as transportation vehicles and construction equipment, which threaten hearing.
Availability: NTIS

U.S. Environmental Protection Agency, Emission Control Technology Division, Mobile Source Control Branch
Automobile Emission Control - The Technical Status and Outlook as of December 1974
207 p.
Jan 1975 Abstract: An evaluation is given of the progress of 25 automobile manufacturers and other
Organizations have made in developing technology to control automobile emissions.Eleven conclusions are linked with appropriate data and rationale. A major conclusion is that top priority should be given to hydrocarbons emissions; (2) emissions from diesel engines are not inherently related; (3) it is important to set a goal of high standards, so as to keep the engine to a time table; (4) it is impossible to provide currently legislated emission standards with fuel economy; (5) only the conventional engine is available for widespread application; (6) while emission standards for hydrocarbons and nitrogen oxides can be met, it may be more cost-effective to allow more lead time; and (7) more effort is needed in sulfate control.

**U.S. Environmental Protection Agency, Office of Air and Waste Management**

**Factors Affecting Automotive Fuel Economy**

**Abstract:** This third report by the Environmental Protection Agency on automotive fuel economy contains information on emission controls and tapping, the average fuel economy of 1973 cars, and driving patterns and their effect on fuel economy. The most important variables are design factors affecting fuel economy and vehicle weight and engine displacement. In the last 10 years vehicle size and weight and the use of energy-consuming convenience devices have been increasing. Driving habits and trip characteristics can have more of an impact on fuel economy than any vehicle design feature. Over 30% of automotive fuel is consumed in inefficient, short automobile trips of 5 miles or less. It is not necessarily true that fuel economy must suffer as environmental standards are made more stringent. Tampering with the environmental control systems is likely to decrease fuel economy, make emissions worse, and cause deterioration in engine durability. Comparing the three alternative engines now available in mass produced 1975 vehicles to the conventional engine, the rotary engine suffers a 30% penalty in fuel economy, the CVCC stratified charge engine gives the same economy, and the diesel engine provides a 35% improvement. (17 references) (BTB)

**U.S. Environmental Protection Agency, Office of Air and Water Programs, Office of Mobile Source Air Pollution Control**

**A Report on Automotive Fuel Economy**

**Abstract:** This report presents a detailed analysis of each of the factors which affect the fuel economy of an automobile. Tables and graphs are presented to show trends in these factors from 1967 through 1973. A brief section describes possible future developments. (5 references) (JMC)

**U.S. General Accounting Office**

**Address:** Washington, DC 20548


**Report No. LCD-76-206, 17 p. 3 Mar 1976**

**Abstract:** Many high-performance conventional vehicles are being used by Federal agencies for tasks which could be handled by lower performance vehicles that offer advantages of reduced costs, energy conservation, and air pollution. This report compares the performance, cost, energy use, and environmental pollution characteristics of conventional vehicles with conventional vehicles. (auth)

**U.S. General Accounting Office**

**Address:** Washington, DC 20548

**Sponsors:** Energy Research and Development Administration

**U.S. General Accounting Office**

**Address:** Washington, DC 20548

**Improvements Still Needed in Federal Energy Data Collection, Analysis, and Reporting. Report to the Congress by the Comptroller General of the United States**

**Report No. GSP-76-21, 55 p. 15 Jun 1976**

**Abstract:** This document reviews recent actions affecting Federal energy data collection, analysis, and reporting, and identifies major energy data problems. On February 6, 1974, the General Accounting Office (GAO) testified before the Senate Committee on Interior and Insular Affairs on "Actions Needed to Improve Federal Efforts in Collecting, Analyzing, and Reporting Energy Data." That report concluded that legislation was needed to establish a comprehensive energy data system to be placed where it would not be influenced by energy policy and formulation. This document is based on GAO's testimony before the Senate Interior Committee on March 9, 1976, which updated its earlier testimony. Included is the Statement of Assistant Comptroller General Hughes and five attachments: an Overview of GAO's February
Abstract: Upon request of the Senate Committee on Interior and Insular Affairs, the General Accounting Office undertook this study on energy data collection in the Federal government. The state of Federal energy data collection is described as "fragmented and uncoordinated." This report reports on the results of GAO's field efforts. At least 17 Federal agencies, comprising 35 bureaus, offices, divisions, and administrations were involved in energy data collection. These problems areas are discussed: voluntary vs. mandatory energy data collection, confidentiality of data, timely reporting of data, definitions, adequacy and completeness of data, and analysis of data. It is concluded that legislation is needed to establish a comprehensive Federal Energy Information System. A first step to improve energy data collection efforts would be to develop a single reference source or directory describing existing energy data collection efforts. (EY)

Abstract: The purpose of this briefing was to describe aviation fuel problems relating to availability and price, to examine the economic impact of these problems on the air transportation industry, and to determine what effect amending the emission standards would have on related environmental controls. Representatives from the aviation industry, governmental agencies, and the aviation consumer action project were present at the hearings.

Abstract: A limited review of the fuel problems related to aircraft, the summation of the Subcommittee's field hearings held in Los Angeles are combined in this report. Fuel requirements are examined for both current and future subsonic aircraft. The hearings were held to obtain an understanding of what efficiencies and fuel conservation measures could be attained from properly directed technology programs. The measures designed for immediate relief of the aviation fuel shortage consist mainly of changes in operating procedures. Various NASA and industry technology programs were discussed. Witnesses from engine manufacturers and aircraft manufacturers testified, giving higher priority to technology for conventional and landing aircraft and associated systems than to technology for short-haul systems. Projections are made that by combining various NASA technology, a 20% fuel saving could be realized by 1980. (BLM)
U.S. House of Representatives, Committee on Science and Technology
Address: Washington, DC

Committee Print No. 71, hearings held March 17, 18, 1976, 810 p.
1976
Abstract: These hearings examined automotive R & D to decrease emissions and increase fuel economy, and the role of Federal government in such research. Several bills on automotive R & D were under consideration, i.e., H.R. 9174, H.R. 1109, H.R. 5557, H.R. 7354, H.R. 7231, H.R. 6156, H.R. 6558, and H.R. 8459. Two witnesses testified with respect to recent studies on the best strategy for alternative automobile development. Dr. Rhoads Stephenson from the Jet Propulsion Laboratory described the two volume report entitled, "Should We Have a New Engine? An Automobile Power Systems Evaluation." This report looks at alternative power plants for cars (e.g., Stirling, Brayton, Rankine, diesel, stratified charge Otto, uniform charge Otto, electric, and hybrids), describes an optimal development program, and compares this program with the proposed FY 1977 ERDA budget in these areas. This comparison shows that much more Federal money is needed to accomplish significant energy conservation in the automotive sector. The second witness, Dr. Lawrence Linden of the Energy Laboratory of the Massachusetts Institute of Technology based his comments on the results of a study on the role of Federal R & D on alternative automotive power plants. He recommends that the Federal government support R & D on some of the attractive alternative power plants with substantial industry involvement from the "Big Three" car manufacturers.

Appendices contain: both volumes of "Should We Have a New Engine?"; three critiques of this report; "Energy and Transportation," a report from the Society of Automotive Engineers; the Congressional Research Service's "Automotive Transport Research and Development"; and excerpts from the MIT report, "Federal Support for the Development of Alternative Automotive Power Systems."

U.S. House of Representatives, Committee on Science and Technology, Subcommittee on Energy Research, Development and Demonstration

Committee Print No. 27, hearings held June 3, 4, 5, 6, 1975, 1146 p.
1975
Abstract: The Demonstration Act would set up within ERDA a program to investigate all aspects of electric vehicle transportation through a three-year research, development, and demonstration project. The hearing included input from the public, the executive branch, and the private sector, including the electric vehicle and the automotive industry—both the smallest interested concern to the largest. Four key issues were obvious differences in Government and industry opinion regarding the ready availability of reasonably competitive technology, the timing of the demonstration, the best means to include both large and small businesses while protecting small businesses, and the type of support the Government should provide. The feasibility of a hybrid electric-internal combustion vehicle was explored. The near-term demonstration features of the bill, which calls for demonstration within one year of 5000 vehicles on conventional chassis, using current type lead-acid batteries, are questioned. Most witnesses approved of Federal assistance in R & D for improved battery technology and encouragement of smaller independent manufacturers. Many key technical and socio-economic problems relating to alternative commercialization of electric vehicles are pinpointed in the testimony. (BLM)

U.S. House of Representatives, Committee on Science and Technology, Subcommittee on Energy Research, Development and Demonstration
Address: Washington, DC


Committee Print No. 71, hearings held March 17, 18, 1976, 810 p.
1976
Abstract: These hearings examined automotive R & D to decrease emissions and increase fuel economy, and the role of Federal government in such research. Several bills on automotive R & D were under consideration, i.e., H.R. 9174, H.R. 1109, H.R. 5557, H.R. 7354, H.R. 7231, H.R. 6156, H.R. 6558, and H.R. 8459. Two witnesses testified with respect to recent studies on the best strategy for alternative automobile development. Dr. Rhoads Stephenson from the Jet Propulsion Laboratory described the two volume report entitled, "Should We Have a New Engine? An Automobile Power Systems Evaluation." This report looks at alternative power plants for cars (e.g., Stirling, Brayton, Rankine, diesel, stratified charge Otto, uniform charge Otto, electric, and hybrids), describes an optimal development program, and compares this program with the proposed FY 1977 ERDA budget in these areas. This comparison shows that much more Federal money is needed to accomplish significant energy conservation in the automotive sector. The second witness, Dr. Lawrence Linden of the Energy Laboratory of the Massachusetts Institute of Technology based his comments on the results of a study on the role of Federal R & D on alternative automotive power plants. He recommends that the Federal government support R & D on some of the attractive alternative power plants with substantial industry involvement from the "Big Three" car manufacturers.

Appendices contain: both volumes of "Should We Have a New Engine?"; three critiques of this report; "Energy and Transportation," a report from the Society of Automotive Engineers; the Congressional Research Service's "Automotive Transport Research and Development"; and excerpts from the MIT report, "Federal Support for the Development of Alternative Automotive Power Systems." (BYB)
Abstract: Testimony was recorded from legislators and from organizations who represented practically all phases of energy production, use, and conservation. With the exception of the sponsoring legislators, the consensus of the testimony seemed to be that restrictions on expenditure of energy imposed by H.R. 6860 are not stringent enough, and that the Bill deals inadequately with the problems of increasing energy supplies. The proposals of the Bill relating to allocations, import tariffs, and import quotas provoked much comment—often criticism. The gas and petroleum industries presented strong arguments for deregulation of prices as an energy production incentive. The inadequacy of provision for domestic energy resources was a concern of many witnesses. A panel of witnesses presented reforms of electric rate structure that would encourage energy conservation. Also, the removal of the recycling incentive from H.R. 6860 by the Senate was considered to be an anti-conservative action. The testimony also pointed out that conservation alone cannot solve the energy shortage, but that at best, conservation could reduce energy growth to 2% annually. Communications received by the Committee expressing an interest in these hearings are appended. (BLM)

Availability: GPO $4.60
companies included 12 vertically integrated firms, 38 independents, and 19 subsidiaries; 46 of these firms have foreign operations, and 17 have an interest in coal, uranium, or geothermal operations. Major findings of the study include the following: (1) although mergers and acquisitions since 1954 have been significant in magnitude and number, the 20 largest companies have maintained market shares; (2) direct or indirect affiliations between competing petroleum companies were infrequent, but many indirect affiliations exist; (3) because ownership data are generally in a nominee form, the recording of actual or beneficial ownership is precluded; (4) bondholders among the 20 largest oil companies are high; (5) subsidiary data are insufficient to describe interactions; (6) multiple affiliations by accounting firms are common, but almost nonexistent with law firms; (7) due to insufficient financial data, the impact of Federal tax subsidies on industry production and investment cannot be determined; (8) joint ownership of oil production and wells is common for both large and small companies; (9) state concentration in refinery ownership is much greater than national concentration; (10) the measure of concentration normally used for the petroleum industry results in lower concentration and cooperation than any other tax measure; (11) petroleum companies control a significant amount of coal production and reserves, and 7 of the 15 largest oil companies are owned by petroleum companies; and (12) 95% of uranium milling capacity is affiliated with petroleum companies. (GBR)

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U.S. Senate, Committee on Public Works, Subcommittee on Air and Water Resources

The Impact of Auto Emission Standards, Report of the Staff of the Subcommittee on Air and Water Policy to the Committee on Public Works, United States Senate

Committee Print Serial No. 93-11, 146 p.
1973

Abstract: Information is presented which was from an intensive study, which included hearings, meetings with representatives of government, industry, and environmental groups, and on-site investigations carried out over a 1 1/2-year period. The report is divided into three parts: an introduction, a status summary, and seven chapters discussing the major outstanding issues. The issues are: quality assurance; health standards and the rollback technique; emission control and energy conservation; emission control technology; leadtime, the Clean Air Act and alternative systems; nitrogen oxides measurement problems; and control of fuel additives. Appendices are included in some of the chapters. (12 references) (GBR)

<533>
U.S. Senate, Committee on Public Works, Subcommittee on Transportation

Transportation and the New Energy Policies, Part 1, Hearing Before the Subcommittee on Transportation of the Committee on Public Works, United States Senate, Ninety-Third Congress, First Session

Committee Print Serial No. 93-12, 200 p.
1974

Abstract: The subject of this hearing was the impact of new energy policies on transportation and transportation-related industries; testimony was also received on S.B.11372, the Emergency National Maximum Highway Speed Limit Act. Some of the important issues explored were: 1) the future of the highway construction program; 2) speed limits for cars, trucks, and buses; 3) capacity of mass transit to handle the increased load of passengers resulting from lower gasoline supplies for highway use; 4) priorities to be established for fuel allocation among the different transportation modes; 5) anticipated problems in moving foods and other essential goods to market; and 6) economic dislocations resulting from adjustments required in transportation policy. The thirty-four witnesses represented the federal government, labor organizations, and transportation associations, including the American Automobile Association, the American Association of State Highway and Transportation Officials, the Institute of Rapid Transit, American Road Builders Association, and the American Transit Association. Letters, prepared statements, communications, and a Dept. of Transportation study, "The Effect of Speed on Automobile Gasoline Consumption Rates," are included in Additional Statements and Materials. (GBR)

<534>
U.S. Travel Data Center

Address: 1100 Connecticut Ave. NW, Washington, DC 20036

1975 National Travel Survey: Full Year Report

Annual report, 131 p.
1976

Abstract: Travel activity of U.S. residents during 1975 is summarized in this second annual report. In order to indicate changes in travel behavior over time, the 1975 and 1974 National Travel Surveys attempted to duplicate the 1973 survey conducted by the Bureau of Census. A quota sample of over 3,000 households was used for the 1975 survey. The volume of travel and person-trips for travel by car and other types of transportation is shown for 1975, with person-trips numbering over 650 million, or 12% above the 1974 level and 4% above the 1972 level. Person-trips traveled rose 1% over the 1974 level and person-nights away from home rose 4%. The average trip distance lengthened while average travel party size and trip duration declined. This
<534> CONT.

... report includes data on overnight accommodations, auto/truck travel, air travel, travel to visit friends or relatives, other pleasure travel, business travel, weekend travel, vacation travel, regional travel patterns, secondary means of transportation, travel agent usage, length of stay at destination, and frequency of dialing out. The user of the 1975 data in this report is cautioned "to consider the results as indicators of the general orders of magnitude rather than precise representations of fact." (BYB)

Availability: $20.00

<535>

U.S. Water Resources Council
Address: Washington, DC
1972 OBEES Projections. Regional Economic Activity in the U.S. Series E - Population. V. 1 Concepts, Methodology and Summary Data
Dec 1974
Abstract: This report presents projections of economic activity for the nation, functional economic areas, water resources regions and subareas and the 50 States by decade intervals from 1980 to 2020. Included are projections of population, personal income, employment earnings of persons and output, with the last three items shown by industry. Also included are projections of land use by broad categories for the same period. The historical information from which the projections were derived included in essentially the same geographic and industrial detail as the projections. ... Volume I includes an introduction, a discussion of concepts and methodology in three parts, the national and summary tables, and four appendices relating to the measures and terms used. (from Introduction)
Availability: GPO $3.05

<536>

Olbrich, E.A.
Creative Automotive Research
Address: 8136 - Gbyc on, Whittier, CA
Application of a Shunt Motor and a 2 Cylinder Gasoline Engine as a Hybrid Drive for an Automobile
Paper No. 769068 presented in the "Eleventh Intersociety Energy Conversion Engineering Conference Proceedings" (conference held at the Sahara Tahoe Hotel, State Line, Nevada, on September 12-17, 1976), pp. 396-403
1976
Abstract: The application of a shunt motor and a 2 cylinder gasoline engine as a hybrid drive for an automobile is described. A drawing of the drive train and the control system is presented. The operation of the vehicle is described from a theoretical and an empirical viewpoint. Test results are presented from a mileage, pollution, and public opinion point of view. Failures and hazards are described. Extensions to future vehicles are made.
(auth)
Availability: American Institute of Chemical Engineers, 477 Madison Ave., NY 10022 $90.00 for entire proceedings

<537>

Olbrich Systems Inc.
Address: 7926 Jones Branch Drive, McLean, VA 22101

Final Report, 50 p.
28 Mar 1977
Sponsor: Federal Energy Administration, Office of Energy Systems Data
Abstract: Energy consumption in the transportation sector is detailed by mode of transportation and by geographical region for the years 1967, 1971, and 1974. Volume I summarizes the study in these reports.
Consumption by Fuel and Mode; Percentage of Consumption by Fuel Type and Mode; Consumption by Fuel Type and Function; Percentile of Consumption by Fuel Type and Function; Consumption by Fuel Type and Region; Expenditure by Income Class and mode; and Expenditure by Income Class and State/Region. Although total energy consumption for this sector continued to grow from 1967 to 1972, the average annual rate of growth slowed considerably. The average annual rate of growth in energy consumption was 6% for the 1967-1971 time period, but only 2% for the 1971-1974 period. Even with this 4% change in growth rate, the percentage of energy consumed remained relatively constant. Also the percentage of consumption of a particular fuel by a mode to the total consumption of that fuel by the transportation sector remained constant. Petroleum fuels accounted for 35% of the total energy consumed for transportation; over 70% of the petroleum was consumed as motor gasoline. About 75% of the motor gasoline was consumed by the automobile, which is responsible for 50% of the total petroleum and the total energy consumed in the transportation sector. Trucks accounted for 22 to 23% of the total energy consumed in this sector, and for over 50% of the distillate oil consumed. Private aircraft and private shipping showed a constant rate of growth in energy consumption between 1967 and 1974. Natural gas accounted for 4% of the total transportation energy consumed between 1967 and 1974; and electricity accounted for less than 1%. Data on energy consumption by state and region show that local differences are mainly a result of uneven population distribution, and are not due to any other economic or demographic variables. Personal expenditures on automobile, commercial air, bus, and rail transportation have increased from 1967 to 1974, with private automobile expenditures showing the largest absolute increase, followed by air, rail, and bus transportation.

Final Draft, 15 p.
14 Feb 1977
Sponsor: Federal Energy Administration, Office of Energy Systems Data
Abstract: Energy consumption data for the transportation sector by mode and by geographic region are provided in this study for the years 1967, 1971, and 1974. Volume II includes data definitions and programs. The transfer of the data to magnetic tape using three large matrices is described, and the transfer program is presented.
Abstract: Detailed information is presented on energy consumption in the transportation sector by mode and by geographical region for the years 1967, 1971, and 1974. Following a summary, consumption and expenditure data are provided in these reports: (1) Consumption by Fuel Type and Mode; (2) Percentage of Consumption by Fuel Type and Mode; (3) Consumption by Fuel Type and Function, (4) Percentage of Consumption by Fuel Type and Function, (5) Consumptions by Fuel Type and Region, (5a) Consumption by Fuel Type and State/Region, (6) Percentage of Consumption by Fuel Type and State/Region, (7) Expenditure by Income Class and Mode, and (8) Expenditure by Income Class and State/Region. Documentation and the methodology section of the Energy Consumption Data Base (ECDB) is provided to enable the user to reproduce each cell contained in this sector's data base. Included are a general description of the methodology used in calculating energy consumption and expenditure data, with an explanatory flow diagram; step-by-step instructions for deriving consumption and expenditure data for each reference number contained in the data base; the computer program used to develop and install the data in the ECDB; the data input files; and the bibliography. Computer programs written to process the data input files are listed, including programs on: private aircraft aviation gasoline consumption; private aircraft jet fuel consumption; commercial airline fuel consumption; Class I railroad diesel/residual fuel consumption; Class I railroad electricity consumption; transit electricity consumption; truck fuel consumption; school bus fuel consumption; all other bus fuel consumption; private auto fuel consumption; U.S. Postal Service fuel consumption; private ship fuel consumption; commercial ship fuel consumption; natural gas pipeline fuel consumption; and private expenditures on auto, air, rail, and water transportation. Further work will be done on updating the data input files and on filling data gaps. (23 references) (BY9)

Study by McLean and Haigh. This study encompasses five stages: crude production, crude transportation, refining, product transportation, and product marketing. (11 references) (from Executive Summary)
Abstract: The staff study presents and analyzes NCV 1976. Sponsor: Federal Energy Administration, Office of Aviation Policy. Address: 1218 Massachusetts Ave., Cambridge, MA 02138. Baseline Energy Forecasts and Analysis of Alternative Strategies for Airline Fuel Conservation. Report No. EIA/DO-76-026, Conservation Paper No. 48, 181 p. Jul 1976. Sponsor: Federal Energy Administration, Office of Energy Conservation and Environment, Office of Transportation and Appliance Programs. Abstract: The objectives of this study were to identify measures to reduce airline fuel consumption and to evaluate the impact of these alternatives on fuel consumption through 1990. To evaluate the impact of fuel conservation strategies, baseline forecasts of airline activity and energy consumption to 1990 were developed. Alternative policy options to reduce fuel consumption were identified and analyzed for three baseline levels of aviation activity within the framework of an aviation activity/energy consumption model. By combining the identified policy options, a strategy was developed to provide incentives for airline fuel conservation. Strategies and policy options were evaluated in terms of their impact on airline fuel conservation and the functioning of the airline industry as well as the associated social, environmental, and economic costs. (66 references) (GRA)
Availability: NTIS

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Availability: NTIS

Abstract: This document is intended to serve as an aid to local transportation planners, traffic engineers, and administrators in the incorporation of energy conservation considerations into the transportation planning process, especially in reference to short-term transportation actions. Various types of low-cost, short-term transportation actions are summarized, and their potential
Wager, H. (ed.)

Abstract: This report describes possible... of the relationships among transportation changes in the spatial organization of the nation (land use), and the use of resources: energy, labor, and capital. These discussions explore the implications of the transportation options described earlier, and the longer range policy choices they imply.

Availability: NTIS

Ward's Communications Inc.
Address: 20 W. Adams St., Detroit, MI 58226

Ward's Engine Update

Biweekly publication, approximately 8 p.

Biweekly

Abstract: This periodical provides news on engine research and development, particularly with respect to reciprocating, Wankel, diesel, turbine, Stirling, and steam engines and electric vehicles. In addition to news briefs describing individual automobile companies' 8 & P progress, the Update reports on related government activities, emissions standards, fuel economy, automotive fuels (including alternative fuels) and fuel additives, industry happenings, and engine components. (BYE)
policy alternatives and its application in the 1974 National Transportation Study in the U.S. This multimodal version of the TRANS-Urban model system employs an aggregate modelling technique which treats each urban area as a single analysis unit. Given a level and mix of funds, the model calculates the amount of highway and transit facilities, travel demand by mode, system performance, and external impacts such as fatalities, land consumed, air pollution, dislocations and energy consumed. The model was applied to assess the effects of alternative funding and pricing policies for the 64 largest urbanized areas. (20 references) (auth)

Davisor Bumpers Reduce Weight and Damage

Paper No. 770308, presented at the International Automotive Engineering Congress and Exposition, Cobo Hall, Detroit, Michigan, February 28 - March 4, 1977

Sponsor: Society of Automotive Engineers

Abstract: This paper describes the Davisor bumper system which is a lightweight automotive bumper utilizing reaction injection molded urethane fascia panels and simple, low weight supporting structures. The principal features, such as improved in damage resistance, weight reduction, styling freedom and reduction in component parts, are described in detail. A design section provides information for application of urethane bumpers to specific vehicles. (8 references) (auth)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 $2.75

Taxicabs, which are termed "personalized" rather than "mass" transit, move more passengers than the combined total handled by rail, trolley coach, commuter rail, and taxiing aircraft. Since World War II the urban public transportation industry in the U.S. has experienced economic problems, largely due to demand deficiency, especially for bus transit. The basic cause for this demand deficiency is consumer preference for the private automobile. Taxicabs, which are termed "personaled" rather than "mass" transit, move more passengers than the combined total handled by rail, trolley coach, and commuter rail, and more than one half as many as those riding buses. Due to financial problems, many privately-owned bus, rail, and trolley coach systems have been taken over by local municipalities. Private owners of public transit still dominate the industry in terms of the number of systems, but large-scale systems in big cities are mainly publicly-owned. Rail rapid transit systems, as defined in this study, are rail facilities operating within urban areas on exclusive rights-of-way. The analysis of rapid transit in this study covers nine U.S. systems (New York City Transit Authority, Chicago Transit Authority, Massachusetts Bay Transit Authority, Southeastern Pennsylvania Transportation Authority, Port Authority Trans Hudson Corporation, Port Authority Transit Corporation of Pennsylvania and New Jersey, Cleveland Transit System, Shaker Heights Department of Transportation, and Public Service Coordinated Transportation in Newark, New Jersey) and two Canadian systems (Toronto Transit Commission and Montreal Urban Community Transit Commission). Commuter railroads, which have daily passenger service to haul passengers to and from metropolitan areas, are mixed with other rail operations, making it difficult to measure the financial status of the commuter operations. A section of the report is included on external costs of public transportation (i.e., air pollution, noise pollution, and accident costs). Perhaps the main contribution of this study is that an extensive data base of economic statistics on the urban public transportation industry has been collected and an analysis of the industry's economic characteristics has been made. (23 references) (HTB)

Availability: GPO $3.50, Stock No. 5000-0052
Abstract: Current energy demand and supply patterns are reviewed and the availability of energy resources to meet demands in the free world is projected. At current petroleum industry capital investment levels, it is shown that future domestic crude oil production will not be sufficient to significantly reduce the level of petroleum imports. Synthetic fuels from such sources as oil shale, tar sands and coal are also considered as replacements for imported petroleum. It is suggested that conservation coupled with incentives for new petroleum and alternate resource development can substantially reduce the United States dependence on imported petroleum. Since transportation accounts for a large portion of liquid fuels consumption, it is shown that the vehicle, its fuel, and the refinery (VFR) must be optimized as a total system in order to provide for the most efficient utilization of our crude oil and subsequent synthetic-based fuels. To present the benefits to be derived from optimizing the VFR system, a series of cases is presented on the basis of applying known vehicle fuel economy efficiencies to various transportation fuel product slates obtained from computer runs made to simulate an average U.S. refinery. These runs show the relative fuel quantities available when a given refinery is operated to provide a fixed volume of non-automotive petroleum products and a fixed amount of transportation miles when using gasoline, diesel fuel, coal-range fuel, and future concept engines. It is concluded that system optimizations similar to the VFR system study were broadly applied between the various energy sources and final use devices to improve conservation in the entire spectrum of energy utilization. (16 references) (auth)

Availability: American Petroleum Institute, 2101 L St. NW, Washington, DC 20037 $15.00 for entire proceedings

Future Transportation Fuels - Optimization of the Vehicle-Fuel-Refinery System

Presented at the 41st Midyear Meeting of the American Petroleum Institute Refining Department, Century Plaza Hotel, Los Angeles, May 10-12, 1976, p. 1976

Abstract: Current energy demand and supply patterns are reviewed and the availability of energy resources to meet demands in the free world is projected. At current petroleum industry capital investment levels, it is shown that future domestic crude oil production will not be sufficient to significantly reduce the level of petroleum imports. Synthetic fuels from such sources as oil shale, tar sands and coal are also considered as replacements for imported petroleum. It is suggested that conservation coupled with incentives for new petroleum and alternate resource development can substantially reduce the United States dependence on imported petroleum. Since transportation accounts for a large portion of liquid fuels consumption, it is shown that the vehicle, its fuel, and the refinery (VFR) must be optimized as a total system in order to provide for the most efficient utilization of our crude oil and subsequent synthetic-based fuels. To present the benefits to be derived from optimizing the VFR system, a series of cases is presented on the basis of applying known vehicle fuel economy efficiencies to various transportation fuel product slates obtained from computer runs made to simulate an average U.S. refinery. These runs show the relative fuel quantities available when a given refinery is operated to provide a fixed volume of non-automotive petroleum products and a fixed amount of transportation miles when using gasoline, diesel fuel, coal-range fuel, and future concept engines. It is concluded that system optimizations similar to the VFR system study were broadly applied between the various energy sources and final use devices to improve conservation in the entire spectrum of energy utilization. (16 references) (auth)

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point of spark, is responsible for increased efficiency with comparable power for some engines. Large cars require increased engine size to provide power for acceleration. Estimated cost increments for stratified charge engines having current 0.6 NOX emission levels are $250 for large cars. (52 references) (DCK)

Hydrogen Storage in Vehicles—An Operational Comparison of Alternative Prototypes

Paper No. 760570, presented at the Fuels and Lubricants Meeting, St. Louis, Missouri, June 7-10, 1976

Sponsor: Society of Automotive Engineers

Abstract: Performance and operational characteristics of several prototype containers for storing hydrogen are described. A cryogenic vessel and three metal hydride containers of similar design but different size have been used in automotive testing. Hydrogen release rates were controlled to match with engine demand. All prototypes were able to sustain a steady state flow rate sufficient for vehicle operation at normal cruise speed. In order to illustrate the principle of hydride operation, a pressure—temperature history for recharge of a small portable hydride tank is given along with several discharge curves with and without cooling. (57 references)

Availability: Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA

Wulfsberg, R. M.; Lang, D. A.

Transportation Noise and Noise from Equipment Powered by Internal Combustion Engines


Sponsor: U.S. Environmental Protection Agency, Office of Noise Abatement and Control

Abstract: A detailed analysis of noise from transportation vehicles is presented in this report, including vehicles used commercially and by private and non-industrial and farm operators. The noise characteristics of each type of source, environmental noise attributes of each type of source, trends and present efforts toward reducing noise, and estimated potential noise reduction for the future are presented. This study encompasses all types of vehicles in the U.S. transportation system, including commercial aircraft, other aircraft, highway vehicles, rail systems, ships, and recreation vehicles. The contribution of these noise sources to the total noise environment is assessed, and potential future impact is projected to the year 2000. At least 50 million or 25% of the population, are affected by noise pollution from these sources. Approximately one half of this total impact is a potential

Wyle Laboratories Inc.

Address: El Segundo, CA

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Determining the Effects of Gasoline Price on Use of Metals in Automobile Manufacture

Abstract: The thrust of this Bureau of Mines report is to relate the size of automobiles to the price of gasoline, and the use of metals in automobile manufacture to the size of automobiles. Only one of the many plausible scenarios of public reaction to higher gasoline prices, a switch to economy size automobiles, is developed. No account is taken of other potential impacts such as improvements in public transportation or increased occupancy per vehicle. Furthermore, the gasoline price increase is the only incentive to the greater utilization of economy cars that is considered. A gasoline price increase to $0.60 per gallon would reduce the amount of minerals required to produce the automobiles sold in the United States by an estimated 15 percent. Gasoline prices of $0.80 and $1 per gallon would cause declines in mineral requirements for U.S. automobile sales estimated at 25 percent and 35 percent, respectively. (AUTH)

Availability: Publications Distribution Branch, Bureau of Mines, 4800 Forbes Ave., Pittsburgh, PA 15213

Small Electric Vehicle Considerations in View of Performance and Energy Usage

Paper No. 769060 presented in the "Eleventh Intersociety Energy Conversion Engineering Conference Proceedings" (conference held at the Sahara Tahoe Hotel, Stateline, Nevada, on September 12-17, 1976), pp. 363-368

Abstract: Present and projected technology is covered on batteries, drive systems, packaging and accessories as it relates to small electric vehicles. Energy usage is compared between an electric vehicle and its internal combustion engine counterpart. It was concluded that even with Zn/Ni-Oxide batteries, the performance and range of electric vehicles would still be rather modest in comparison to current I.C. engine vehicles. However, should substantial new oil reserves become available and should no low cost synthetic fuel be produced in quantity due to capital requirements or technological difficulties, an advanced electric vehicle could become a viable second car in a two-car family. (40 references) (AUTH)

Availability: U.S. Dept. of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, $0.10 for mimeographed copy, $0.30 for microfiche copy, $0.45 for photoprint copy

Auto Weight and Public Safety, A Statistical Study of Transportation Hazards


Address: Washington, D.C.

Abstract: Analyses based on 1973 data from the Texas State Automobile Accident and Registration records have been utilized in this study of the relationships between passenger-car weight and occupant safety. In particular, the research showed the following: (i) the relatively higher frequency of accidents in large cars than in small cars is statistically very significant; (ii) the relatively higher frequency of accidents results in for serious injuries in large cars than in small cars is statistically very significant; (iii) although the occupants of small cars appear to have a higher frequency of incurring fatal or serious injuries given that an accident has occurred, such an inclination is not statistically significant; and (iv) accidents involving drunken drivers occur much more frequently in large cars than in small cars statistically to a very significant degree. Some plausible explanations for these occurrences are included in the report.

Current research limitations and some suggestions for further improvement and extensions of this research are also discussed. The current study is the first phase of a larger study focusing on the relationship between automobile weight and energy savings as well as the environmental and economic effects of varying auto weight. (AUTH)

Availability: NTIS

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Availability: U.S. Dept. of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, $0.10 for mimeographed copy, $0.30 for microfiche copy, $0.45 for photoprint copy

Fuel Conservation in Ship Operations


Address: Glen Cove, NY

Abstract: The energy consumption involved in long distance freight haul by trucks and by railroads is compared. Railroads are four times more efficient in terms of Btu per ton-mile. Trucks are more expensive to operate than railroads for runs over 100 miles long. Also, trucks do not pay their share of highway taxes. A study of possible consequences of a shift from trucks to railroads on the labor force suggests that the negative impact would be negligible. It is concluded that a shift of long-distance freight haul from trucks to railroads would be beneficial. To implement this shift, an intermodal transportation model should be constructed to determine suitable locations and number of transfer terminals. (40 references) (AUTH)
Abstract: A study of ways to reduce fuel consumption by both short-term and long-term changes in operational practices has been made, using two typical North Atlantic container fleets as models. Fuel saving strategies are evaluated, all involving reductions in ship speed.
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