**Summary**

The study is designed to address one phase of a detailed study on energy consumption by selected public transit systems in the United States. Although there are a number of factors that influence energy consumption, particular attention is given to energy-related studies in areas such as energy conservation and transportation planning, alternative fuels, public policy issues, energy consumption studies, alternatives and related programs.

This document focuses on the first task of a study designed to analyze and assess existing energy conservation programs in public transit and measures employed for achieving maximum efficiency and increased mobility in urban areas. The task undertaken for this study involved the identification and review of pertinent literature, documented reports, and other survey data on energy-related issues and how they impact the urban transportation planning process and fuel consumption.

The form of the bibliography and its accompanying annotations is intended to provide a guide to a particular area of interest; some direction relative to various types of energy consumption/conservation measures employed by public transit systems; and other alternatives for fuel conservation. It is not intended that every available reference be included. Only those studies within the general framework of the study, as described, have been included.

---

### Key Words

Energy Consumption, Energy Conservation, Transportation Planning and Alternative Fuels
Review of Energy-Related Studies: A Selected Bibliography

by

Laurence F. Jones
Angelo State University

and

Shirley Seaborn
Center for Transportation Training and Research
Texas Southern University

Texas Southern University
3100 Cleburne
Houston, Texas 77004
ACKNOWLEDGMENT

This publication was developed as part of the University Transportation Centers Program which is funded 50% in oil overcharge funds from the Stripper Well settlement as provided by the Texas State Energy Conservation Office and approved by the U.S. Department of Energy. Mention of trade names or commercial products does not constitute endorsement or recommendations for use.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>iii</td>
</tr>
<tr>
<td>I. Introduction</td>
<td>iv</td>
</tr>
<tr>
<td>II. Energy-Related Studies</td>
<td>01</td>
</tr>
<tr>
<td>A. Energy Conservation Transportation Planning</td>
<td>02-12</td>
</tr>
<tr>
<td>B. Alternative Fuels</td>
<td>12-14</td>
</tr>
<tr>
<td>C. Policy and Public Transportation</td>
<td>14-16</td>
</tr>
<tr>
<td>D. Energy Consumption Studies</td>
<td>15-21</td>
</tr>
<tr>
<td>E. Transportation Use During Energy Emergencies</td>
<td>21-24</td>
</tr>
<tr>
<td>F. Special Studies</td>
<td>24-28</td>
</tr>
<tr>
<td>G. Energy Programs and Texas</td>
<td>28-29</td>
</tr>
<tr>
<td>H. Transportation Alternatives</td>
<td>29-30</td>
</tr>
<tr>
<td>I. Others</td>
<td>30-31</td>
</tr>
<tr>
<td>III. Appendices/Bibliography</td>
<td>32</td>
</tr>
<tr>
<td>A. Books</td>
<td>33-35</td>
</tr>
<tr>
<td>B. Journals, Articles, Monography</td>
<td>35-41</td>
</tr>
</tbody>
</table>
Abstract

The study is designed to address one phase of a detailed study on energy consumption by selected public transit systems in the United States. Although there are a number of factors that influence energy consumption, particular attention is given to energy-related studies in areas such as energy conservation and transportation planning, alternative fuels, public policy issues, energy consumption studies, alternatives, and related programs.

This document focuses on the first task of a study designed to analyze and assess existing energy conservation programs in public transit and measures employed for achieving maximum efficiency and increased mobility in urban areas. The task undertaken for this study involved the identification and review of pertinent literature, documented reports, and other survey data on energy-related issues and how they impact the urban transportation planning process and fuel consumption.

The form of the bibliography and its accompanying annotations is intended to provide a guide to a particular area of interest; some direction relative to various types of energy consumption/conservation measures employed by public transit systems, and other alternatives for fuel conservation. It is not intended that every available reference be included. Only those studies within the general framework of the study, as described have been included.
I. INTRODUCTION

The purpose of this document is to provide the reader with a comprehensive reference source of important reports, books and manuscripts that deal with energy conservation and related programs in the urban transportation sector. There are several reasons why this document was produced. First, it was difficult to find ample references that included major research undertakings about urban mass transit energy conservation programs under a single cover. Second, in many instances, a survey of the related literature indicated the importance of updating on-going research, academic articles and books already published. There is also the need to develop comprehensive data on energy conservation programs and alternative fuels.

The time span covered in this bibliography is the early 1970's through the latter part of the 1980's. It should be noted that the beginning date was not a result of some arbitrary judgment. On the contrary, it was during this period that a renewed interest in energy conservation arose, due in part to petroleum shortages and increases in the cost of petroleum.

This bibliography includes government and academic publications. One of our major goals was to include annotations for each source. Because of the large number of article listings and the very specific nature of some titles, however, we have abbreviated several annotations. Additionally, we have attempted to develop a fairly complete treatment of the most widely available books and articles in the field of energy conservation and urban transportation. In an undertaking of this magnitude, however, it is virtually impossible to include all the writings and reports. Thus, it is highly possible that some books and articles have not been included. Updates of relevant information will be included in future editions of this document.
II. ENERGY-RELATED STUDIES
A. Energy Conservation and Transportation Planning


This report describes methods used by mid-sized Metropolitan Planning Organizations (MPOs) to incorporate energy conservation initiatives into their urban transportation planning programs. Based on a study of nine of these MPOs, Alberts found that because of the travel and spatial patterns characteristic of these areas, energy conservation strategies that proved successful in larger MPOs were not as effective in the mid-sized MPOs. Therefore, these smaller MPOs attempted to identify several network alternatives while encouraging ridesharing alternatives.


The purpose of this report was to analyze energy conservation strategies implemented in Denver, Co., Fort Worth, Tx., and San Francisco, Ca.,. Specifically, a set of disaggregate travel demand methodologies were used to analyze the unique transportation conditions of each of the three areas. As a result, separate case studies focusing on the application and implementation of the travel demand methodologies revealed several ways that energy consumption and transportation policy initiatives could be generalized in other locales.


This paper concluded that the Metropolitan Planning Organization (MPO) could be a vital player in the implementation of national transportation and energy policies at the regional and local levels of government. Specifically, the paper detailed the public transportation policy implementation efforts of the North Central Texas
Council of Governments, the MPO for the Dallas-Fort Worth area. The paper examined the technology, planning, management, and external interactions, experienced by the Council in providing guidance for its members and constituency.


This paper discusses the impact of gasoline price increase on public transportation and the possibility of using school buses and taxicabs to support public transportation energy contingency plans. The report concluded that certain taxicab operations and school buses would benefit the public during fuel shortages provided that there was a profit incentive for private owners and reciprocal support for school districts.


This document presents comparative cost and performance analyses of various modes and methods of urban transportation. Included are discussions about transit operations and equipment, cost efficiency measures, and recent innovations in the field.


This report presents the major findings and conclusions of a New York state transportation energy contingency planning study. The study presents information about the impacts of energy emergencies and the more promising actions and strategies that can be taken to alleviate those impacts. The major purpose of the report is to assist ongoing state and local emergency planning activities conducted by public and
private transportation providers. A secondary purpose is to educate the public about ways to cope with transportation energy problems and concerns.


This report provides a simple method that can be used by transit engineers to react to peak-hour transit capacity problems resulting from energy shortfalls. Through the use of a Capacity Problem Index developed from the responses of 45 transit agencies, Boyle provides transit professionals with a tool that can be used when analyzing various energy scenarios to use during energy crises.


This book discusses the characteristics of urban transportation while examining travel characteristics and theory, the planning process, land use, and various methods of data collection.


This document presents a set of manual techniques that can be used to estimate impacts on transportation and mobility due to signalization and intersection improvements. The study also looks at post implementation evaluation procedures for traffic related actions.

Dare, Charles E.A. Transportation Energy Contingency Plans For Rural Areas and Small Communities. A Report To The Ozarks Regional Commission, Ozarks, Missouri, December 1981.

Based on a comprehensive review of transportation fuels contingency planning and several surveys administered to local government officials and rural residents, this study offered several recommendations about the strategies that could be
implemented to reduce gasoline consumption in rural areas and the institutional
arrangements required for coping with a transportation fuels shortage. Specifically, the
study suggested that regional commissions be established to serve as focal points
between local and state transportation policymakers.

Department of Energy. A Technology Assessment of Productive Conservation in

This study is concerned with energy conservation in public transit and the
impact of current technology.

Erlbaum, Nathan S. and William C. Holthoff. Incorporation of Energy Analysis in
the Transportation Improvement Program Process. Planning Division
New York State Department of Transportation, Albany, New York, August
1983.

The analysis of 92 energy conservation projects and studies showed that
public fuel expenditure in the state of New York could be reduced by almost 6 million
gallons. The study also showed that an annual savings of almost 60 million gallons
could be realized in the private sector due to improvements in vehicular design and
usage.

Federal Energy Administration. Project Independence and Energy Conservation:

This report looks at various transportation modes and their impact on energy
conservation.

Graves, Charles H., and others. Energy Impacts of Transportation Systems
Management Actions. Transportation Data and Analysis Section, New
York State Department of Transportation, Office of Planning Assistance, Urban Mass
Transportation Administration, October 1981.

The purpose of this document is to provide procedural guidance when
implementing transportation related activities. The procedures discussed in the
document are designed to appeal to a variety of user groups in that they require
minimum data input and analysis.

This report summarizes the findings of a study that evaluated energy savings efforts of New York state transportation managers during the fuel crisis of the late 70's. Both direct energy savings and energy costs of construction and maintenance were quantified and evaluated for a number of TSM tactics.


This study examined the responses of New York consumers to the 1979 energy crisis. The study also assessed the effectiveness of public transportation energy contingency plans and public efforts to maintain mobility through transit initiatives.


This paper summarizes the work of New York state transportation engineers concerning energy consumption and conservation. The paper also looks at gasoline usage by trip purpose, public attitudes toward conservation, and changes in travel behavior during the energy crisis of 1973-1974. Possible conservation actions and their potential are also reviewed.


This study presents several alternatives to Tulsa transportation engineers in the event of fuel shortages. Specifically, maintaining the current system despite fuel shortfalls, improving the existing system with faster and more fuel efficient service, expansion of service, and service readjustments, are discussed. Additionally, current fuel consumption levels and vehicle conditions in Tulsa County are described.

The purpose of this report is to provide transportation engineers with a set of transit vehicle supply strategies that could be used in combination with local energy conservation programs for fixed route bus systems. The report provides parameters that could be used to help engineers and planners in their assessment of ridership patterns and fuel saving alternatives.


This paper describes the key components of a state level energy emergency conservation plan development process, and concomitant issues critical to responding effectively to future fuel supply emergencies. The paper emphasizes alternative mobility options and the need for consumers to use those alternatives in their own self-interest.


This paper examines several ways to enhance the quality of our air and to conserve energy in public transportation.


This report documents an 18-month study designed to test a prototype scenario analysis process that could be used during energy emergencies. The process allows consideration of the interaction of energy issues with transportation as well as other planning concerns such as land use, technological change, and economic development.

This manual is a practical guide to reducing fuel consumption in the transit revenue fleet. It is written for maintenance and cost efficiency issues. The manual describes concrete, low-cost steps that can be taken to yield modest, yet significant, fuel and budget savings.


This report addresses the issue of providing needed funds to pay for increases in the cost of fuels during fuel shortfalls. It also looks at ways to ensure that there is enough fuel to support the demand for expanded service that is expected during energy emergencies.


This guidebook presents a model that can be used by transit managers to assess their fuel reserve capacity while suggesting a minimally acceptable level of fuel reserves. It also presents alternatives for those managers who want to upgrade their emergency fuel programs. Lastly, it presents a framework for evaluating reasonable fuel reserve alternatives.


This report presents a practical plan for developing and implementing a six-part energy conservation program that consists of: an energy conservation team; an energy profile: a walk-through survey; implementation of low-cost operating and maintenance
operations; evaluation of energy conservation measures; and the establishment of a permanent conservation program.


This report focuses on data collection and on site surveys as ways to provide step-by-step instructions for developing and energy conservation program for transit facilities.


This report describes the results of a national survey of energy management activities undertaken by 100 transit systems in the United States and Canada. Survey participants reported on the activities in five areas: energy crisis contingency planning; energy conservation in bus maintenance facilities; energy conservation for petroleum fueled bus fleets; energy conservation awareness programs; and fuel supply and price protection strategies.


This report presents various planning and management alternatives that can be used to alleviate transit woes. For example, this report suggests that transit problems can be alleviated through the efficient use of public land and the implementation of innovative parking strategies and zoning practices.

This article examines several ways to increase fuel efficiency in public transit fleets.


This document provides an overview of general considerations faced by local government and transit agency officials when developing contingency plans for petroleum shortages.


This report addresses two questions: How can bus authorities move more passengers during energy emergencies and how can they economize on fuel requirements? To respond to these questions, the report includes analyses of energy-related problems while presenting various ways to economize on the use of fuel.


This report presents an overview of how local governments can devise appropriate and constructive solutions to the energy problems facing their communities. Included are detailed case studies of several communities such as Davis, CA, Hartford, CT and Norhglenn, CO.


The purpose of this report is to give transit property managers a tool that can be used to evaluate energy consumption based on factors such as the terrain, operating speed, and number of stops per mile. Simulations were used on different types of bus routes using sample data on bus characteristics collected from manufacturers in an
effort to compare energy efficiency versus performance under different operating conditions.


The purpose of this report is to provide technical support to state and local governments when facing energy shortfalls. The report describes the planning and organizational process, reviews specific actions to be taken, and presents a model case study of the contingency planning process.


This report examines alternative ways to expand public transit capacity during fuel emergencies. It specifically analyzed how rolling stock, routes, schedules, personnel, facilities, public information, rates, ridership and finances would be effected by specific contingency measures. The study concluded that to meet energy shortfalls and expected increases in transit demand, all levels of government needed to interact and cooperate.


This workbook gives public transportation managers a functional tool that can be used to analyze energy consumption. It also gives the manager a set of alternatives that can be used to conserve energy.


This book analyzes the impact of zoning controls on traffic. Also included are chapters that deal with land use controls.

This short report examines the change in direction many urban transportation planning departments have undertaken because of energy and fuel constraints.

B. Alternative Fuels


This report summarizes the limited research that has been conducted regarding alternative fuels for public buses. Bloch briefly discusses and evaluates five fuels that have been proposed as possible alternative fuel sources for public bus transit systems: methanol; ethanol; methane, hydrogen, and vegetable oils. The author also presents an assessment of the current developmental status of each fuel and conclusions regarding future research efforts.


This study examines concerns about the long-term trends in diesel fuel availability and pricing decisions. It also discusses the advantages and disadvantages associated with diesel fuel.


This paper summarizes an investigation of the effects that a large-scale use of electric cars could have on energy use, the environment, and the economy. The widespread use of electric cars would drastically reduce the amount of petroleum consumed for urban transportation while alleviating automotive air pollution and noise.
However, a larger role must be planned for them in order to reap their potential benefits.


This paper presents an argument that electric cars can be viable secondary cars in urban households. The authors predict that improvements in batteries and automotive technology should make it possible to develop electric cars having a range of 180 kilometers.


This study developed a model that could be used by researchers to show how the reserves and economics of oil and gas will be effected by wellhead prices, tax provisions, fuel finding rates, and drilling capacities.


This paper is an overview of the existing literature related to the energy intensity of various intra- and inter-city transportation modes, such as automobiles, buses, automated guideway transit systems, vans, heavy- and light-rail transit, airplanes, waterways, and pipelines. Statistical analyses suggested that there was a correlation between energy intensity and the speed, load factor, and type of commodities being moved.


This study presents information about fuel and fuel additives, with a particular emphasis on their use in transit buses. The study reports that while the use of additives is often proposed as a remedy for fuel-related problems, their cost is often prohibitive.

The purpose of this manual is to respond to questions about methanol as a fuel, describe relevant properties and explain those factors important to using methanol safely in a transit environment.


This collection of papers focuses on alternative fuels, components, and engine configurations to reduce exhaust emissions and improve fuel economy. For example, a gas generator has been developed which converts liquid to gaseous fuel by partial oxidation with air. Other initiatives include the use of exhaust valves that result in reductions in fuel consumption and emissions without a loss in power or performance.


The purpose of this report is to show how coal can become a major source of energy in public transportation. While the report effectively provides managers with a basic understanding about coal and the technology requirements associated with its development, it is somewhat lacking when it comes to technical sophistication. However, the authors stress that they were more concerned with providing a basic foundation that could serve as an introduction and reference to more detailed studies and reports.

C. Policy And Public Transportation

This report discusses the impacts of oil deregulation on transit systems. Specifically, it addresses the economic uncertainty which has arisen in terms of diesel fuel price and supply during oil supply disruptions. Bloch also identified six alternative methods to reduce this uncertainty for transit systems. He also presented an evaluation of these alternatives against three types of criteria that addressed the breadth, cost, and institutional impacts of each method.


This paper presents an environmental profile in which transit operators will likely be operating during energy emergencies and fuel shortages. The paper suggests that increased federal regulation of the energy market are warranted to alleviate and address urban transit physical limitations budgetary shortfalls, and the behavior of diesel suppliers.


This paper suggests that policies that directly effect automobile ownership and use such as gasoline taxes and fuel economy standards, are much more effective in saving energy than are policies designed to shift travelers to energy-efficient alternatives such as mass transit and carpool. As a result, more attention should be focused on technological means to reduce fuel consumption.


This book has several chapters that discuss how America's public transportation sector has resisted or neglected efforts to address the energy needs of public modes of transportation. Hence, ways to enhance the energy efficiency of the existing systems either in the short run by changing operations, or in the long run by
changing the rolling stock and design of the infrastructure may have been excluded from many urban transportation programs.

D. Energy Consumption Studies


This paper presents several demand shift strategies that can be used to conserve energy in public transportation.


The purpose of this report was to present the findings of a study that was designed to analyze the energy consumption of transportation systems during the peak hours of commuter travel.


This study examined the energy effects of small-scale transit improvements in New York state's eight metropolitan areas. Policy initiatives were analyzed to determine the effects on ridership, mode shift, and energy savings. The energy costs associated with the development, implementation, and operation of the initiatives were also studied.


This paper looks at energy consumption trends and predicts the impact that energy-related problems will have on both the private and public sectors.

This government-sponsored study presents the results of research efforts designed to demonstrate the potential savings of petroleum consumption associated with different modes of urban transportation.


This study used an energy requirements model to focus on the difference between gross resource input and net energy requirements for various modes of travel. The paper concluded that rail systems were one way to more efficiently consume public transit energy resources.


Much of this book discusses transportation energy consumption. In particular, much time is spent comparing the energy consumption and efficiency of various modes of transit. Additionally, the authors posit several alternatives for improving the energy efficiency of transportation vehicles.


This report examines energy consumption and costs associated with different types of transportation systems.


This paper identifies pitfalls often encountered in energy analysis. Additionally, requirements for the energy assessment of an urban area's transportation system are summarized.

This report examines the time, energy, and dollar costs associated with intercity travel. Additionally, it discusses ways to alleviate those costs.


This study differs from other investigations of the energy efficiencies of transportation modes in that it calculates the energy consumed by one traveler using a variety of modes for a variety of trip types, rather than emphasizing overall modal energy use. In the study three types of trips were analyzed: the intraurban commute; the suburban to urban commute; and the intercity trip.


This study examines the problems that energy shortages will have on future transportation needs. It also suggests that to alleviate these problems, transit engineers and decisionmakers must reevaluate current energy needs and consumption patterns.


This study used digital computers to determine the impact that rail speed, the topology of track circuits, and power surges, had on the energy consumption of rapid transit lines in Washington, D C. The analysis also revealed that energy savings could be obtained through the use of regenerative braking techniques.


This paper analyzes intercity ground transit systems in an effort to identify the most optimal mode for urban movement.
This paper discusses several public transit problems such as mobility, energy consumption, and environmental impacts. It also presents several ways to alleviate the problems discussed throughout the paper.

This study presents the results of an analysis undertaken to compare the trade off between time and energy in the propulsion of a rapid transit train. The study concludes that while faster schedules consume more energy, they also reduce other operating costs and are an important factor when trying to increase ridership. Thus, in the long run, more energy will be conserved through increased rail ridership.

In this book, experts from diverse fields examine the evolving structure of the energy system, explore the changing patterns of supply and demand, offer insights into the forces driving the changes, and discuss energy planning strategies. Also covered are: the vulnerabilities in the energy system in the United States such as the uncertain role of alternative fuels; the influence of technological change; and the increasing importance of the environmental aspects of energy systems.

This paper presents the argument that rapid transit systems such as BART in San Francisco should not have been built if energy conservation was the primary goal.
This paper describes a framework that categorizes the major components of urban transportation energy consumption. It also describes how this framework has been applied by the Congressional Budget Office and summarizes the results of similar analyses by other researchers.


This report is intended to be used by state and local/regional transportation planners when estimating the economic impacts of public transportation fuel consumption.


This paper concludes that energy conservation cannot be satisfied with a one-for-one substitution of transit trips for auto trips, whatever the mode. Instead, the need to make trips should be reduced; trips should be shortened when they have to be made; and more productive corridors for the easier substitution of energy efficient public transportation for trips made by private modes must be provided.


This study concludes that the automobile accounts for 60% of all fuel consumption in the United States while public transit systems use only one percent. However, unless public acceptance and the use of public transit systems dramatically increases, public transit will not be an important contributor for reducing petroleum consumption.

This essay primarily examines the impacts that improved urban transit systems have had on energy consumption.

E. Transportation Use During Energy Emergencies


This study focused on 66 urbanized areas during the second and third quarters of 1979 in an effort to examine the relationships between gasoline supplies and transit ridership during the 1979 energy crisis. Although Boyle found that the shortfall in gasoline supplies led to an increase in public ridership in many of the areas in the study, factors he developed to depict the overall role of transit in alleviating the impact of the 1979 energy crisis suggested that the transit role was minor. Based on these findings, Boyle was pessimistic about the impact of public transit in alleviating the problems associated with energy emergencies.


This report analyzed the travel patterns of New York households during the 1979 energy crises and during the early days the state was subjected to increases in gasoline prices. The study suggested that the consumers' residential location and economic status were important for explaining their response to energy constraints. The report concluded by suggesting ways that government and state agencies could assist consumers to maintain their mobility and maximize energy conservation despite energy emergencies.

This paper addresses possible fuel market conditions through the year 2000 while providing estimates of fuel prices and the impact of auto ownership and government intervention on the transit fuel market. It also suggests that there is a need for cooperation between the levels of government to price and allocate gasoline supplies in order to alleviate problems associated with disruptions in our oil supplies.


The purpose of this study was to provide local government officials in urban areas having a population under 50,000 with special assistance in the planning and implementation of transportation energy contingency plans. The financing, institutional problems, mobility needs and specific problems, associated with several plans are assessed in an effort to provide the transit decisionmakers in these communities with a practical guideline that could be used when considering and selecting transit alternatives.


This study involved a New York statewide survey of over 1500 residents to determine actions taken during the 1979 energy crisis and to ascertain what actions would be taken should gasoline pump prices reach $1.50 per gallon and should there be a 20% shortfall in fuel supplies. The survey revealed that New Yorkers reduced their gasoline usage by 6% through various ways: carpooling, increased public transit usage, reduced travel, and the purchase of more fuel efficient transportation. Additionally, differences were observed based on age, income, auto ownership and the
location of the respondents.


This paper presents a method that can be used to estimate local area impacts of national energy shortages. Using data from the 1977 National Personal Transportation Study, it examines the potential travel impacts of fuels shortages occurring in six different-sized urban areas under seven different energy futures. These futures were defined by level of fuel supply shortfalls, the government actions taken to offset shortfalls, and by whether long-range conservation actions were taken. The study concludes that this latter action was most effective in reducing fuel use. These actions included the purchase of more fuel efficient cars and relocation closer to the work place.


This report presents a set of procedures that can be used to adjust travel forecasts to reflect changes in fuel supplies, fuel prices, and fuel efficiency.


This report presents the results of a consumer survey of public responses to the 1979-1980 energy crisis. Thus, it presents ways that the public responded to the crisis. It was found that most of the respondents reacted to the emergency by purchasing more fuel efficient vehicles.


The purpose of this study was to determine the effect of the energy shortage of 1974 on the suburban area. Data from several nationwide surveys and selected
transit operations were used to achieve this purpose.


This report describes the actions taken by several urban transit managers to address the 1979 energy crisis. Common emergency actions identified in the study included: the expansion of public information and marketing distribution systems; the emergency expansion of ridesharing services; the rehabilitation and use of reserve fleet buses; the implementation of minimum fuel purchase restrictions; and the monitoring of transit ridership so that buses could be shifted to the most heavily used routes.


This article describes several ways to preserve energy. For example, adjustments to energy conservation, the stock piling of fuel, the substitution of other energy sources for oil, and the acceptance of reasonable regulations that effect the efficient use of energy, were discussed.

**F. Special Studies**


This document discusses the efforts of regional transportation engineers in Denver, CO, who were testing evaporative cooling systems in urban transit coaches. Based on the results of the engineers, UMTA funding was provided to develop a prototype evaporative cooling system that could be used throughout the public transit system. Test results showed that, in low humidity climates, this technology affords an opportunity to provide passenger comfort while realizing energy savings and decreased maintenance costs well below that of conventional mechanical air conditioning.

This report provides guidance on the use of fuel futures trading to lock in the price of fuel against volatile market changes. The paper suggests that through futures trading transit agencies can reduce pricing problems while ensuring that necessary fuel supplies are maintained during an energy emergency.


The purpose of this study was to identify ways to alleviate America's mobility and congestion problems. Similar to many reports, Colpitts concluded that our dependence on the private automobile is one of the major contributors to these problems. Colpitts suggests that one way to provide increased mobility to our citizens is to find ways to make multimodal trips more attractive to travelers.


Based on household surveys, this study concluded that carpooling and trip chaining policies would result in a 10% savings in fuel expenditures. The study also suggests that "carpool coordinators" and "transportation auditors" be used to monitor the program and help achieve predicted savings.


The purpose of this article is to present the findings and recommendations of the Military Traffic Management Command Transportation Engineering Agency concerning ways to alleviate traffic congestion while decreasing fuel consumption. The basic approach of the article is to present economical ways to increase roadway capacity and reduce traffic demand through transportation system management and basic traffic
engineering actions.


This paper reviews consumer responses to U. S. gasoline shortfalls in 1973-1974 and 1979. Survey results showed that reductions in non-work travel through trip combining and less frequent travel were used to address fuel problems during the former period. On the other hand, the modal response to fuel savings techniques in 1979 was the purchase of more energy efficient automobiles. The paper also showed that there was an increase in the overall awareness for energy conservation by consumers.

Hartgen, David T. **What Will Happen To Travel In The Next 20 Years?** Research For Transportation Planning, Albany, New York, August 1980.

The purpose of this study was to develop a baseline projection of travel and energy use for New York state for the period 1975-1995: a projection that is adjusted to account for major shifts in household and population trends; the economy; urbanization; and automobile ownership. Factors found to explain increases in travel included increased car efficiency, population growth, increases in suburbanization, and increases in automobile ownership. Energy prices, embargoes, inflation, and unemployment, were factors that were found to explain reduction in travel. Additionally, despite these factors, travel is projected to continue to grow despite reduction in gasoline consumption and periodic supply shortfalls.


Transit service, park and ride lots, and carpooling programs are often used to promote transportation energy conservation. Traditionally, however, evaluations of these programs have neglected the energy expenditures necessary to access the various
options. This report attempts to rectify this neglect by analyzing and calculating the costs associated with these energy expenditures. The report suggests that the energy used to gain access to many of these services can reduce direct line-haul transit energy savings by 30 to 50 percent.


This paper explores several ways to redesign an existing transit service in an effort to reduce its energy requirements without substantially reducing the quality of service. Specifically, the study showed that energy consumption could be reduced through the improved scheduling of vehicles, reductions in deadheading, and the design of more efficient routes. Through the testing of seven alternative designs it was shown that the energy requirements of the Bellevue, Wa. transit agency could be reduced by almost 56% without a substantial reduction in the level and quality of service.


This report provides a summary of current DOT sponsored energy related research, technical assistance, planning activities, and information sources. Additionally, information concerning Transportation System Management, transit performance, staggered work hours, priority techniques for HOV vehicles, and ridesharing, is presented


This study examines ways to enhance urban mobility through enhanced transportation management.

This is a summary of transportation, energy-related research. It also contains information relevant to transit performance, alternative work schedules, and priority techniques for high-occupancy vehicles.

G. Energy Programs And Texas


This document reports on the development and progress of several transit projects introduced in Texas cities.


This publication provides an overview about Texas fuel reserves, fuel production, energy transmission, energy conversion, energy consumption patterns, and the evaluation of energy in Texas. The publication also contains several graphs that compare the energy industry in the United States with the energy industry in Texas.


This report addresses three major topics: the relationship between the economy of Texas and Texas transportation fuel consumption; quantitative data describing the magnitude of the fuel shortfalls that occurred in 1974 and 1979; and potential transportation energy conservation options.

The purpose of this study is to assess the uncertainties associated with the economic and environmental impacts of various strategies the electric utility sector could use to alleviate energy problems associated with the transportation sector.

H. Transportation Alternatives


This document is a collection of papers that discuss various economic and operating aspects of urban mass transit systems.


This paper examined the importance of indirect energy expenditures, i.e., energy consumed for material manufacture, hauling, and construction, on direct energy savings of a prototype park-and-ride lot. It develops a procedure to estimate indirect energy requirements of a basic park-and-ride lot and the fuel savings incurred from its usage by computers.


This essay examines several programs and alternative modal systems designed to enhance energy efficiency in urban mass transit.


This study presents information concerning the increased use of bicycles to enhance energy conservation.

The purpose of this paper was to compare the total economic cost of urban railways and express bus service.


This book describes the energy requirements of alternative urban transportation technologies and ways to access their effects on urban transportation fuel consumption.

I. Others


A demonstration program conducted in several New Jersey school districts identified 18 fuel cost-saving opportunities for school bus operations that could save the state an estimated $1.6 million in fuel costs.


This document is the fourth edition of the Transportation Energy Conservation Data Book, a statistical compendium compiled and published by the Oak Ridge National Laboratory under contract with the Office of Transportation Programs in the Department of Energy. The book presents statistics and data that characterize transportation activity and other factors that influence the use of transportation energy.

This document is the first edition of the Transportation Energy Conservation Data Book, a statistical compendium compiled and published by the Oak Ridge National Laboratory under contract with the Office of Transportation Programs in the Department of Energy. The book presents statistics and data that characterize transportation activity and other factors that influence the use of transportation energy.


This document is the third edition of the Transportation Energy Conservation Data Book, a statistical compendium compiled and published by the Oak Ridge National Laboratory. It presents secondary data on transportation characteristics by mode, energy use, and other related variables in tabular and/or graphic form.


This journal article on student transportation presents a case study of a school system that recycles buses for safety drills; articles of fuel-saving strategies, the pros and cons of contracting for transportation services and a transportation directory.
III. APPENDICES/BIBLIOGRAPHY
A. Books


Wagner, F. "Energy Impacts of Urban Transportation Improvements", in Levinson and Weant (eds.), Urban Transportation; Perspectives and Prospect. ENO Foundation For Transportation Inc., Westport, CT, 1982.


B. Journals, Articles, Monographs


Dare, Charles E. A. Transportation Energy Contingency Plans For Rural Areas and Small Communities. A Report To The Ozarks Regional Commission, Ozarks, Missouri, December 1981.


