

Transportation Energy Contingency Planning

A REPORT OF THE
TRANSPORTATION TASK FORCE
OF THE

URBAN
CONSORTIUM
FOR TECHNOLOGY INITIATIVES



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The Urban Consortium for Technology Initiatives was formed to pursue technological solutions to pressing urban problems. The Urban Consortium is a coalition of 37 major urban governments, 28 cities and 9 counties, with populations over 500,000. These 37 governments represent over 20% of the nation's population and have a combined purchasing power of over \$25 billion.

Formed in 1974, the Urban Consortium represents a unified local government market for new technologies. The Consortium is organized to encourage public and private investment to develop new products or systems which will improve delivery of local public services and provide cost-effective solutions to urban problems. The Consortium also serves as a clearinghouse in the coordination and application of existing technology and information.

To achieve its goal, the Urban Consortium identifies the common needs of its members, establishes priorities, stimulates investment from Federal, private and other sources and then provides on-site technical assistance to assure that solutions will be applied. The work of the Consortium is focused through 10 task forces: Community and Economic Development; Criminal Justice; Environmental Services; Energy; Fire Safety and Disaster Preparedness; Health; Human Resources; Management, Finance and Personnel; Public Works and Public Utilities; and Transportation.

Public Technology, Inc. is the applied science and technology organization of the National League of Cities and the International City Management Association. It is a nonprofit, tax-exempt, public interest organization established in December 1971 by local governments and their public interest groups. Its purpose is to help local governments improve services and cut costs through practical use of applied science and technology. PTI sponsors the nation's largest local government cooperative research, development, and technology transfer program.

PTI's Board of Directors consists of the executive directors of the International City Management Association and the National League of Cities, plus city managers and elected officials from across the United States.



Transportation Energy Contingency Planning

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**URBAN CONSORTIUM
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PREFACE

This is one of ten bulletins in the fourth series of Information Bulletins produced by the Transportation Task Force of the Urban Consortium for Technology Initiatives. Each bulletin in this series addresses a priority transportation need identified by member jurisdictions of the Urban Consortium. The bulletins are prepared for the Transportation Task Force by the staff of Public Technology, Inc. and its consultants. In 1980, Transportation of Hazardous Materials was identified as a priority need by both the Transportation and the Fire Safety and Disaster Preparedness Task Forces of the Urban Consortium. The Information Bulletin addressing that need was prepared under their joint direction.

Nine newly identified transportation needs are covered in this fourth series of Information Bulletins:

- Economic Impacts of Transportation Restrictions
- Parking and Traffic Enforcement
- Pedestrian Traffic Safety
- School Bus Use for Non-School Transportation
- Street Management Information Systems
- Taxicabs as Public Transit
- Transportation Construction Management
- Transportation of Hazardous Materials
- Transportation System Management, Air Quality, and Energy Conservation

One Information Bulletin covering a need identified in 1979 is being updated and expanded:

- Transportation Energy Contingency Planning

The needs highlighted by Information Bulletins are selected in an annual process of needs identification used by the Urban Consortium. By focusing on the priority needs of member jurisdictions, the Consortium assures that resultant research and development efforts are responsive to local government problems.

Each bulletin provides a nontechnical overview, from the local government perspective, of issues and problems associated with each need. Current research efforts and approaches to the problem are identified. The bulletins are not an in-depth review of the state-of-the-art or the state-of-the-practice. Rather, they serve to identify and raise issues and as an information base from which the Transportation Task Force selects topics that require a more substantial research effort.

The Information Bulletins are also useful to those, such as elected officials, for whom transportation is but one of many areas of concern.

The needs selection process used by the Urban Consortium is effective. Priority needs selections have been addressed by subsequent Transportation Task Force projects:

- Five Transit Actions regional meetings were held between January 1979 and May 1979 to address the need for Transit System Productivity. The product of these meetings is a Transit Actions Workbook that features techniques currently being used to improve transit system performance and productivity.
- To facilitate the provision of Transportation for Elderly and Handicapped Persons, five documents were developed: one on local government approaches, a planning checklist, an information sourcebook, a series of case studies, and a chief executive's summary.
- To help improve Center City Circulation, two new projects have been completed. Center City Environment and Circulation: Transportation Innovations in Five European Cities is the second of three volumes showing how cities use transportation and pedestrian improvements to help downtown revitalization. Another project, addressing the coordination of public transportation investments with real estate development culminated in a national conference--the second Joint Development Marketplace in Washington, D.C., in June 1980. The Marketplace was attended by over 500 persons, including exhibitors from cities and counties around the country and representatives of private development and financial organizations.
- A series of documents relating to the need for Transportation Planning and Impact Forecasting Tools has been prepared: (1) a management-level document for local officials describing manual and computer transportation planning tools available from the U.S. Department of Transportation, (2) a series of case studies of local government and transit agency applications of these tools, and (3) a guide describing ways local governments can gain access to these tools. Additional documents are being prepared on how local governments can use U.S. Census information more effectively through these U.S. Department of Transportation computer tools.

- To help meet the need to Accelerate Implementation Procedures, a conference on the Federal-Aid Urban System (FAUS) was held in Baltimore, Maryland, in May 1980, for Federal Highway Region 3. The conference was aimed at developing communication between local, State, and Federal officials to improve implementation of and clear up misunderstandings about the FAUS program.
- To meet the need to promote use of Transportation System Management (TSM) measures, a series of five regional meetings was held in 1980 to provide local, State, and Federal officials, and representatives of transit agencies and the business community with the opportunity to exchange information about low-cost TSM projects to improve existing transportation systems.
- To facilitate the dissemination of information on local experiences in Parking Management, a technical report describing the state-of-the-art is being prepared.
- A National Transit Pricing Forum was held at Virginia Beach, Virginia, in March 1979 to address the need for more information on Innovative Fares. Much of the Forum was directed to technical advances in areas of pricing research and practice. The proceedings of this conference are available.
- Two projects were undertaken to pursue the need for Taxicabs for Public Transportation. A handbook, Taxicabs and Federal Programs, was prepared, and five regional meetings were held in March and April of 1980. In May 1980, the Transportation Task Force sponsored the National Conference on Taxicab Innovations: Service and Regulations.

Ongoing Task Force Information Dissemination and Technology Sharing needs are currently addressed by a series of SMD Briefs. These one-page reports provide up-to-date information about on-going UMTA Office of Service and Methods Demonstrations projects. In addition, the SMD HOST Program allows transportation officials from selected jurisdictions to visit one of these projects for on-site training.

Additional Technology Sharing occurs through the National Cooperative Transit Research Program (NCTRP) which was organized jointly by Public Technology, Inc., the American Public Transit Association, the Urban Mass Transportation Administration, and the Transportation Research Board to address problems relating to public transportation identified by local and state government and transit administrators.

The support of the U.S. Department of Transportation's Technology Sharing Division in the Office of the Secretary, Federal Highway Administration, National Highway Traffic Safety Administration, and Urban Mass Transportation Administration has been invaluable in the work of the Transportation Task Force of the Urban Consortium and the Public Technology, Inc. staff. The guidance offered by the Task Force members will continue to ensure that the work of the staff will meet the urgent needs identified by members of the Urban Consortium for Technology Initiatives.

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CHAPTER 1

ISSUES AND PROBLEMS

The occurrence of a sudden fuel shortage remains a real possibility in the next decade. Recognizing this, the Transportation Task Force of the Urban Consortium placed an energy related subject among its ten most pressing transportation needs for the second consecutive year.

The 1979 Information Bulletin, "Mass Transportation Energy Conservation and Contingency Planning" addressed the medium- and long-term issues and the actions that can be taken to soften the long-term impacts of petroleum shortages. This Information Bulletin, "Transportation Energy Contingency Planning," addresses the short-term issues, and what can be done by local officials in advance to prepare for a sudden petroleum shortage. A shortage may be caused by action of any one of the OPEC nations or by one of the causes listed in Table 1. Regardless of its source, a sudden shortage of petroleum is a very difficult problem. Local officials do not, and in most cases cannot, control private petroleum consumption; however, they can take steps to help their communities prepare for a fuel emergency.

BACKGROUND

Public response to past gasoline crises has been largely self-adjusting. Retailers reduced hours to fit their supplies. Gasoline lines formed as demand was compressed by limited sales hours. The lines discouraged users from making some discretionary trips; meanwhile, public discontent grew. Minimum sales rules were adopted to avoid topping off, and administrative actions, such as odd-even day sales were applied to reduce lines. Gasoline usage dropped as some spontaneous trips were eliminated and others were combined for greater efficiency. Many local agencies responded with increased or adjusted transit service, use of school buses for public transportation, and parking requirement alterations.

This process accomplished its objective of reducing fuel consumption by encouraging individual users to balance travel reduction against the inconvenience of gasoline purchasing. For shortages of limited extent and duration, the self-adjustment process is probably adequate;

Table 1

POTENTIAL CAUSES OF AN ENERGY CRISIS

EVENT	IMPACT ON ENERGY AVAILABLE FOR TRANSPORTATION
International crisis or an oil embargo	Reduced petroleum supply, or disruption of international distribution system
Severe winter weather or natural disaster	Reduced supply, or disruption of domestic distribution system
Strikes or other work stoppages	Reduced supply, and/or disruption of domestic distribution system
Crude oil pricing changes	Financial hardship

Source: East-West Gateway Coordinating Council, Transportation Energy Contingency Plan: A List of Energy Contingency Strategies, St. Louis: March 1979.

many of the trips that are eliminated are discretionary, and few real hardships are imposed. However, for more extensive shortages or shortages of longer duration, it is inappropriate to base use restrictions on the tolerance and perseverance of the users.

It is likely that any future petroleum shortages will be accompanied by some statement from the Federal government to set forth the extent of the shortage and the method to be followed in allocating the available supplies. Effective July 1, 1980, the Emergency Energy Conservation Act of 1979 (P.L. 96-102) gives the President emergency allocation powers, the most far-reaching of which is gasoline rationing. The President may order gasoline rationing if a petroleum shortfall of 20% or more of the normal supply lasts or is expected to last 30 days or more.

Rationing is only one means of reducing motor fuel consumption. It can be a device for uniformly reducing all personal fuel consumption, or the reduction can be directed at classes of users or uses as was done during World War II. If rationing is initiated, the role of local government is to support the Federal program by establishing local allocation offices.

In fact, local officials have little choice but to comply with whatever Federal programs are initiated. There are, however, several local actions that can influence the success with which the community copes with the emergency. Past experience suggests that most persons and businesses will cooperate in executing a logical and effective emergency plan that is carefully prepared in advance, based on generally recognized values and priorities (especially if some public input has been part of the process leading to the plan), and well publicized.

As a starting point it is useful to consider the major uses of petroleum in this country. The exact breakdown of energy use is conjectural, but the energy services and uses illustrated in Figure 1 are approximately correct. Liquid petroleum fills almost half of our energy needs, and half of the petroleum is used for transportation of people and goods. Other major users of petroleum are buildings (including residences), industry, and electric power generators.

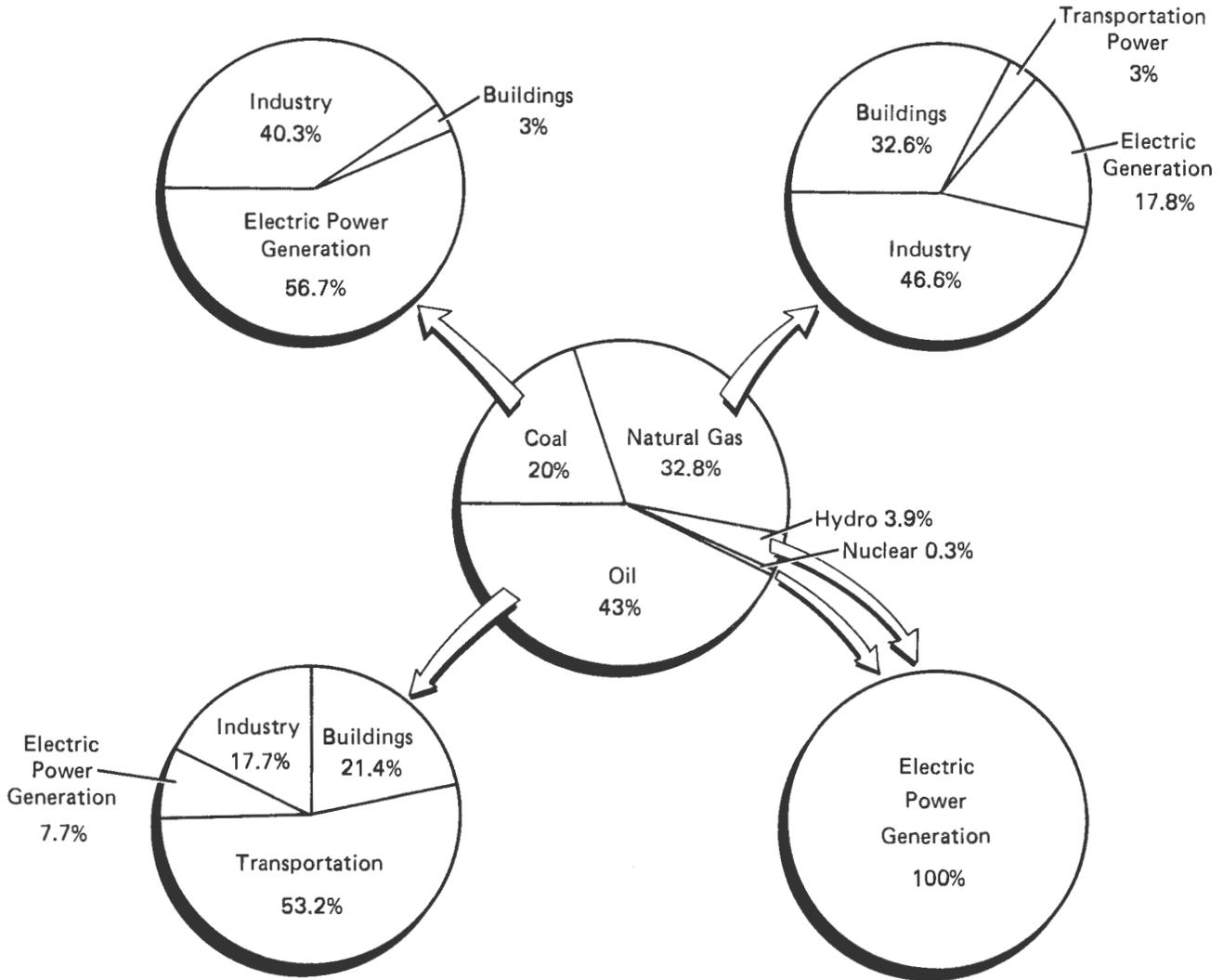
It is logical to look for reductions in those sectors of the economy that normally use the most petroleum. Ideally, discretionary consumption could be identified in each sector and could be curtailed in a consistent and logical manner. However, strong habits, institutional structures, and sometimes even laws important for other purposes, may stand in the way of uniform treatment.

The nature of the priorities that are established will depend on the expected duration of the emergency and the size of the shortfall. Individuals may accept considerable inconvenience with resignation, if not good humor, if the emergency is a short one. However, prolonged shortages will require more thoughtful solutions if adverse public reactions are to be avoided.

Figure 1

ENERGY SOURCES AND USES

This chart illustrates U.S. primary energy sources and their uses in each of the four energy-consuming sectors--buildings, industry, transportation, and electricity generation. About 95% of U.S. energy is supplied by nonrenewable fossil fuels. The other 5%, nuclear and hydro-electric energy, is used entirely for electric power generation.



Source: Public Technology Inc., Energy Conservation: A Technical Guide for State and Local Governments, (Washington, DC.: National Science Foundation, 1975).

Most energy priority schemes look to the well-being of citizens first. This means adequate supplies to (1) provide essential health services, (2) heat homes, and (3) sustain employment. An energy shortage of a few days might be accommodated by curtailing supplies to industry.¹ However, since industry's discretionary use of energy is small, continued industrial restrictions may cause large-scale unemployment, so energy for buildings and industry can sustain only modest cutbacks. As a result, principal energy curtailment schemes focus on the discretionary use of energy for transportation.

Energy consumption for transportation is shown in Figure 2. Sixty-eight percent of this energy is used in automobiles and light trucks; slightly over half of this is used in urban areas. It is the personal automobile that is a prime target for plans to reduce petroleum consumption both before and during emergency shortages.

REDUCING FUEL CONSUMPTION BEFORE A CRISIS

One instinctive response to an energy shortage is to call for massive shifts in personal travel from automobile to public transit systems. Historically, these shifts have occurred. Transit ridership increased dramatically during both the 1973-74 and 1979 energy crises. However, it is important to keep these increases in perspective. Nationwide, a 50% increase in transit patronage will raise transit's mode share from about 4% of all trips to about 6% of all trips. The consequent reduction in person trips is only 2%. Even if more travelers are attracted to public transit, accommodating them is difficult because much increased demand occurs during peak periods when transit vehicles are already filled to capacity, and more equipment is either unavailable or cannot be secured on short notice.

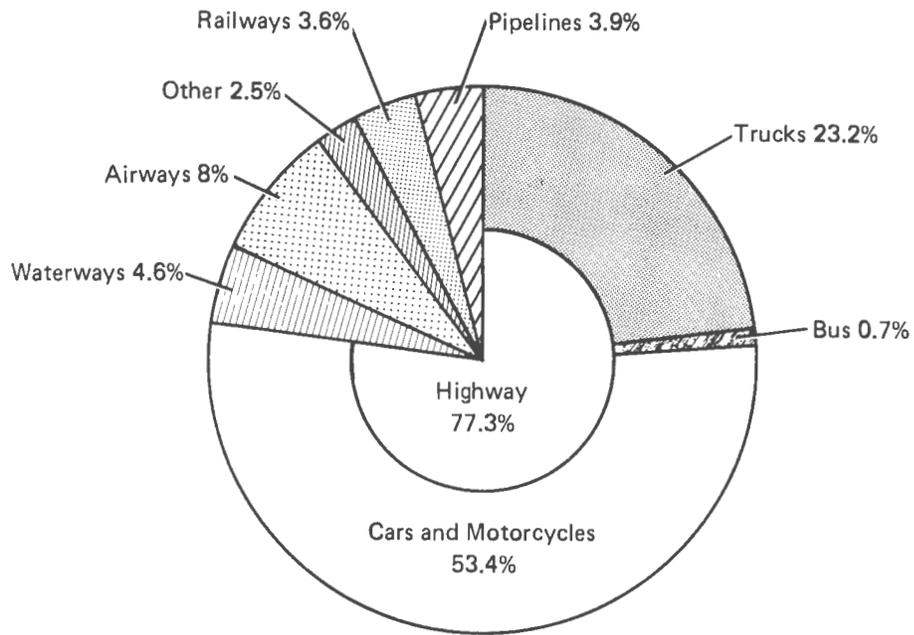
Buses are not necessarily more energy efficient than automobiles. Buses and other transit vehicles are energy efficient only when carrying a number of passengers. Energy requirements per vehicle-mile are approximately as follows:

Automobile	8,000-10,000	BTU/mile
Taxi	10,000-12,000	BTU/mile
Van	12,000-14,000	BTU/mile
School Bus	19,000-21,000	BTU/mile
Transit Bus	30,000-35,000	BTU/mile

(One gallon of gasoline is equivalent to 125,000 BTU; one gallon of diesel fuel is equivalent to 138,700 BTU.)

¹ This assumes the existence of interruptible contracts for electric power and natural gas that allow service to be discontinued when supplies run short.

Figure 2
PETROLEUM ENERGY CONSUMPTION BY TRANSPORTATION MODE



Source: Adapted from D.B. Shonka, A.S. Loeb1, and P.D. Patterson, Transportation Energy Conservation Data Book: Edition 2, (Oak Ridge: Department of Energy, Oak Ridge National Laboratory, 1977) p. xxvi.

An automobile that carries only the driver is clearly less energy efficient than even a moderately-loaded transit bus. Under normal use, taxis are even less energy efficient than single-occupancy automobiles, because taxis often travel some distance without riders while looking for fares. It is, however, important to consider that vehicle operations vary from time to time and from location to location. For example, an automobile carrying 4 persons is approximately as energy efficient as a transit bus carrying 12 passengers. A taxi carrying 4 passengers is almost as efficient. A van pool carrying 10 travelers is as efficient as a transit bus carrying 25 passengers. These figures suggest that fuel can be conserved by--

- Increasing automobile occupancy.
- Increasing use of van pools.
- Increasing taxi occupancy.
- Increasing transit bus efficiency.
- Adjusting travel patterns.

The programs and procedures described in this Information Bulletin focus on actions that can encourage these kinds of changes in response to a sudden petroleum shortage.

Increase Automobile Occupancy

By far the greatest reduction in transportation energy consumption can be achieved by increasing automobile occupancy. This is a difficult change to accomplish because individuals cannot be forced into any kind of ridesharing activities. Some people will initiate carpools and vanpools, but others will require considerable encouragement. Numerous inducements may be used:

- Providing incentives for use of carpools, vanpools, and other HOVs.
- Restricting purchase of motor fuel or prohibiting driving at certain times.
- Restricting use of single occupancy vehicles.

Incentives for the use of vanpools might include extra fuel supplies, preferential fuel purchase, reserved travel lanes, and reserved parking. Employers may be encouraged to provide ridesharing information and to permit flexible working hours so as to make carpooling easier.

Individuals can be discouraged from driving alone or buying fuel by inconvenience, high cost, or legal restrictions instead of by rationing plans. Listed in decreasing order of severity, schemes that have been proposed include:

- Vehicle Use Sticker Plan: This plan would limit the number of days per week that each vehicle could be used.
- Off-road Plan: This plan would limit the amount of fuel available for general aviation aircraft, power boats, and off-road recreational vehicles.
- Sunday Driving Plan: This plan would restrict or prohibit use of vehicles on certain Sundays.
- Informal Ridesharing Plan: This plan would provide identification and perhaps liability insurance to support informal ridesharing or registered hitchhiking.
- Parking Restriction Plan: This plan would restrict the availability and use of parking in employment and commercial centers.
- Employer-Based Travel Plans: These plans would depend on strong economic and social pressure from employers to encourage greater ridesharing. The plans may also include employee relocation to save fuel, limited working at home, and bicycle programs.
- Bicycle Plan: This plan would provide and enforce bicycle paths and provide bicycle storage facilities.
- Fuel Price Plan: This plan would add a high tax to fuel to discourage purchase.
- Fuel Purchase Plan: This plan would restrict automobile fueling to odd or even days. It might also specify shorter hours and Sunday closing for service stations.

Some of these plans present serious enforcement problems. Sampling schemes, use of off-duty officers, part-time officers, and specially deputized civil servants can be considered to complement normal enforcement personnel.

The value of non-rationing plans can only be estimated, because few have been tried in conjunction with adequate enforcement. A 1979 MIT investigation into five plans--employer-based travel, vehicle use sticker, off-road, single occupant vehicle restrictions, and alternate Sunday driving ban--suggests that from 500,000 to 1 million barrels of fuel a day might be saved if all five were implemented.² This is 6 to 12% of the transportation fuel consumed in this country--a good start, but not enough to cope fully with a serious emergency. Thus, additional inducements are needed.

² Center for Transportation Studies, Massachusetts Institute of Technology, Fuel Transportation Energy Conservation Contingency Plans, Cambridge, Massachusetts: April 1979.

Restrictions on the use of single-occupancy vehicles can be implemented by reserving certain streets and highways for vehicles carrying more than one person. The outstanding example of this type of inducement to increase automobile occupancy occurred during the 1980 transit strike in New York City, when some 6.2 million people who normally travel by subway and bus needed to find other means to reach their destinations.³ The major river crossings into Manhattan and selected arterial streets within Manhattan were restricted to the use of vehicles with three or more occupants. Thousands of police officers and traffic agents enforced these provisions. The results were spectacular. Ninety percent of the employed persons reached work each day. Automobile traffic rose only 26% during the morning peak period. Automobile accumulation in the central business district increased only 25%. These results were achieved at considerable inconvenience to individuals, and residents quickly reverted to their pre-strike practices as soon as the strike was settled. Nonetheless, as an emergency procedure, the New York City plan and its execution were stunningly successful in increasing automobile occupancy. Although the immediate goal of the plan was to cope with a vast increase in automobile use, the results indicate its elements are relevant to an energy emergency.

A summary of the New York City transit strike is contained in Appendix A. New York City is now studying permanent automobile occupancy restrictions for East River crossings. This experience suggests that vehicle occupancy restrictions can be effective, assuming that--

- The program has the general support of the population.
- Key arterial routes can be easily identified.
- Adequate enforcement personnel monitor traffic at sufficient points to ensure compliance.

Increase Use of Vanpools

Vanpool programs sponsored by large employers and by independent groups for multiple employers have been generally successful. Where adequate inducements have been used to encourage the driver to promote his van, ridership has been high. These programs will continue to be useful in times of emergency, but they can expand only to the extent that additional vans are available. Dealers' inventories will provide little help. The best source of additional vans for pooling will be those that can be found in other services. These include:

- Vans owned and operated by social welfare agencies.
- Vans owned by individuals and used for recreational purposes.

³ New York City Department of Transportation, Bureau of Planning and Research, The 1980 Transit Strike, Transportation Impacts and Evaluation, New York, N.Y.: April 1980.

Formation of vanpools will be stimulated by a fuel emergency. Some persons will organize pools as a civic duty; others may form pools to make better use of fuel, and still others may be attracted by the possibility of charging higher fees because of the emergency. Local officials can participate in developing an effective vanpool program in the following ways:

- Prepare in advance a data file of all van owners. Records of current sales can be secured from automobile dealers.
- Organize a brokerage function around the data file on van ownership and employee residences.
- Offer special services, such as group liability insurance, reserved parking, and central maintenance, to vanpool operators.
- Prepare in advance schemes that provide priority to registered vanpools for no-wait use of gas supplies for implementation in an emergency.

These steps will increase the value of matching programs to facilitate pool formation.

Increase Taxi Occupancy

In most urban areas, taxis are a valuable resource that is only partly used. Because of the large number of single party rides, cruising in search of fares, and deadheading, the average taxi occupancy is 0.7 persons. Empty miles can be reduced by more efficient dispatching and by eliminating restrictions against picking up passengers in jurisdictions other than the one issuing the taxi permit. Occupancy rates can also be increased by offering shared-ride taxi service.

Dispatching improvements can be achieved by pooling the dispatching function among a number of small taxi operators. Alternatively, local government may sponsor or provide a centralized dispatching service for the urban area. Under these circumstances area-wide rates should be established and enforcement measures developed to prevent mis-charging.

Many taxicab ordinances already have provisions for ridesharing at all times, with special provisions applicable during emergencies, such as snow or flood. Group fares should be publicly available, and means are needed to allow a driver to refuse service when a new fare might offend or severely inconvenience passengers already in the taxi. Lack of public knowledge about ridesharing rules is a major problem. Jurisdictions could help overcome this by publicizing ridesharing rules during an emergency.

Ordinances permitting general purpose ridesharing may benefit a city's taxicab operators and assure that more taxis are available in a time of emergency. Long term experiments with shared-ride taxis have

generally been successful in such diverse communities as Westport, Connecticut; Little Rock, Arkansas; and Phoenix, Arizona.⁴ Problems among patrons are few and are generally resolved with little fuss.

Increase Transit Bus Efficiency

Transit agencies have explored a variety of different actions to increase bus efficiency that can contribute to increased ability to move large numbers of new patrons. These include actions that will:

- Increase the effective supply of buses.
- Increase the number of available bus operators.
- Provide information on available services. Some of the more common proposals in each category are--

To Increase the Effective Bus Supply

- Adjust service on low density routes to increase bus occupancy.
- Turn back some buses on the low density portions of routes and provide feeder van service to the new terminus.
- Stockpile old buses in operating condition for emergency use.
- Add school buses if an emergency occurs during summer months and vacation periods. (This may raise problems; see "School Bus Use For Non-School Transportation," an Information Bulletin prepared by Public Technology, Inc. for U.S. DOT, Washington, D.C.: 1980.)
- Provide preferential treatment lanes for buses and ban automobiles altogether from some major transit streets.
- Initiate skip stop service on heavily traveled routes.
- Upgrade maintenance service so that more buses are in serviceable condition.

To Increase the Number of Operators

- Prepare training programs for rapid expansion of operator force.
- Maintain a list of retired operators and mechanics for possible re-employment.

⁴ For a full discussion of the transit potential for taxicabs see "Taxicabs as Public Transit," an Information Bulletin prepared by Public Technology, Inc. for U.S. DOT, Washington, D.C.: 1980. SYSTAN, Inc. Paratransit Handbook Final Report, 2 vols., prepared for U.S. DOT. Washington, D.C.: 1979, identifies 28 general market shared-ride taxi operations and seven target market shared-ride taxi services.

- Allow employment of part-time operators for potential full-time service in time of emergency.

To Provide Information on Available Services

- Expand public information service to acquaint potential riders with the available services.
- Improve information along routes to facilitate use by inexperienced riders.
- Expand telephone information center.

Much attention has been given to ways to improve bus speeds by means of preferential lanes and preferential signals. The extent to which these measures are needed will depend on the nature of the emergency. If it is severe enough, traffic will be reduced by one means or another to a point where congestion does not hinder bus speed.

Fuel conservation and supply measures are also important for a transit agency. Even though transit agencies can expect preferential fuel allocations, they will need adequate facilities to store their supplies. They should also develop programs to reduce fuel consumption by:

- Reducing or eliminating engine idling.
- Keeping all engines well tuned.
- Minimizing late night and early morning runs that are not well patronized.
- Giving operators instruction on fuel efficient bus operation.

Adjust Travel Patterns

Although non-work trips comprise most urban travel, investigations typically focus on work trips because of their concentration during morning and evening rush periods. Work trips tax available transportation resources and are slowed by congestion. Travel speed would be considerably improved if peak period congestion could be reduced and travel could be spread over a larger part of the day by such means as--

- Encouraging employers to change starting and stopping hours.
- Adjusting school hours to begin after businesses open and to end before businesses close.
- Encouraging flex-time, whereby workers select their own hours, within limits.
- Encouraging a ten hour, four day work week.

Staggered work hours are normally used to relieve congestion, but can be detrimental to ridesharing in that they reduce common arrival and departure times. Flexible working hours, on the other hand, can relieve congestion and promote ridesharing. Local officials can directly

influence the working hours of civic employees, and they can encourage private employers to make adjustments. Federal agencies in Washington are using all four techniques to ease peak hour traffic congestion.

PREPARING THE PLANS

There is no set format or standard content for a Transportation Energy Contingency Plan. Each urban area's needs, resources, and community relationships are different. The plan should be a broad document whose purpose is to set up a procedure whereby the transportation system provides for the mobility of people and goods during a short-term fuel crisis with the least possible impact on the economic health of the community and inconvenience to its citizens. Steps in formulating the plan include: (1) identifying the energy reduction strategies to be followed, (2) devising means for implementing each strategy, (3) developing organizational relationships and lines of authority that can implement each strategy, and (4) identifying sources of financial support for each strategy. Legislative and institutional provisions for emergency arrangements may need to be made well in advance in the following areas:

- Insurance for taxicabs and school buses--current insurance probably won't apply.
- Regulations pertaining to taxicabs and school buses--other than normal use may not be permitted without special waivers.
- Union contracts--work hours, school hours, and driver agreements cannot be summarily changed without advance arrangements.

Special legislation may be needed to empower a public official, such as the governor, to declare a State emergency and implement the plan.

The final plan should be ready for implementation on short notice and include fully executed agreements and understandings, and clear delineations of responsibilities in a fuel emergency. It must also be reviewed and updated periodically, whether or not an emergency has occurred. Local officials suggest that a public information program to present contingency plans to the public is important. Existing lines of communication established through local ridesharing programs with local media could be used.

Selecting the Strategies

Energy reduction strategies can be drawn from all the five target areas discussed earlier in this Information Bulletin. Table 2 contains a checklist of strategies for easy reference, together with an indication of the time needed to implement each (more or less than one month), and its potential for fuel saving. A number of actions (such as inter-governmental agreements, service curtailment studies, fuel shortage planning, carpool matching programs, and development of a reserve bus fleet) can be effectively initiated before a crisis arises; others, such

Table 2

FUEL REDUCTION STRATEGY CHECKLIST

	TIME FOR IMPLEMENTATION		POTENTIAL FUEL SAVING*
	LESS THAN ONE MONTH	ONE MONTH OR MORE	
Establish Administrative Procedures			
Agreement for intergovernmental cooperation		x	
Implementation strategy	x		
Emergency transportation information center	x		
Service curtailment study		x	
Provide for Fuel Distribution and Management			
Allocation/rationing	x		
Sales strategy (odd-even, license number)	x		
Provide fuel storage		x	
Emergency fuel distribution	x		
Increase Vehicle Occupancy			
Media campaign	x		
Expand carpool matching program	x		0.4-0.8%
Develop new park and ride lots	Temporary	x	0.4-0.8%
Preferential parking for shared-ride vehicles	x		0.4-0.8%
Increase parking rates for non-pool vehicles	x		0.6-1%
Restrict major arterials to pool vehicles	x		5-15%
Encourage trip reduction and consolidation	x		1-2%
Initiate Paratransit Services			
Inaugurate shared-ride taxi service		x	0.5-1%
Prohibit taxi cruising	x		0.1-0.2%
Initiate jitney service		x	0.1-0.2%
Redirect elderly and handicapped service for fuel efficiency	x		0.05-0.1%
Coordinate social welfare services		x	0.1-0.2%
Improve Transit Efficiency			
Establish and maintain reserve bus fleet	small	large	0.5-2%
Develop driver/mechanic recruitment and training program		x	0.5-2%
Improve bus fleet maintenance		x	0.2-0.5%
Recruit church buses for feeder and low density use		x	0.2-1%
Arrange to use school buses for feeder service		x	0.2-1%
Establish preferential lanes for buses and pool vehicles		x	0.06-0.08%
Monitor ridership by route and time of day	x		

Table 2 (Continued)

	TIME FOR IMPLEMENTATION		POTENTIAL FUEL SAVING*
	LESS THAN ONE MONTH	ONE MONTH OR MORE	
Improve Transit Efficiency (Cont'd)			
Selectively add reserve buses to routes as needed	x		0.5-1%
Initiate skip stop service on routes with frequent service	x		0.3-0.5%
Substitute shared-ride taxi for late night and low volume services		x	0.4-0.7%
Initiate turnback service on long routes with low patronage ends	x		0.3-0.7%
Adjust fare structure to promote more efficient use	x		0.4-0.6%
Initiate aggressive marketing program	x		0.4-0.8%
Spread Peak Period Traffic			
Initiate staggered working hours	some	most	0.5-1%
Initiate flexible working hours	some	most	1-2%
Promote reverse commuting		x	0.5-1%
Adjust shopping hours	some	most	0.8-1.5%

Source: Compiled from several sources, including Massachusetts Institute of Technology, Transit, Paratransit and Ridesharing Strategies; Massachusetts Institute of Technology, Transportation Energy Contingency Strategies; and NCHRP, Report 43, Energy Effects, Efficiency, and Prospects for Various Modes. See Bibliography for full citations.

*

These numbers are based on numerous assumptions and are indicative of order of magnitude. Actual savings will depend on the intensity of implementation of a given measure. That in turn will depend on political and financial feasibility.

as an emergency information center and restricting streets to high occupancy vehicles, may require crisis conditions to achieve the needed cohesion and support. Each urban area should select those strategies that can best reach its energy reduction target and that have a reasonable likelihood of success. A variety of different selection processes are available.

The North Central Texas COG offered the following guidelines for selecting energy reduction strategies:

- "The energy strategies should be short-range responses. They must be implementable within three months of the initiation of a supply interruption.
- The strategies must be locally effective. They must be applicable to the needs and characteristics of the ... metropolitan area.
- The recommended measures should encourage voluntary, rather than mandatory, energy actions.
- Since [a given] plan considers only problems which may occur in the near term, it is applicable up to the ... target year."⁵

Organizing Structure to Implement the Strategies

The available strategies cover a broad range of community activities and authorities. In many instances there will not be a single agency that has jurisdiction over all activities. It may be useful to create a set of mutually supporting contingency plans that are part of a hierarchical structure that fits the urban area's administrative organization. For example, there may be separate contingency plans for:

- The public transit agency.
- The social service transportation providers.
- The individual suburban communities.
- The employers' association.
- The police departments.
- The emergency medical services.
- The fire departments, and others.

⁵ North Central Texas Council of Governments, Review of Energy-Related Transportation Planning in the North Central Texas Region, Report No. 16, Arlington, Texas: January 1979.

In some urban areas, it may be desirable to establish an "emergency energy coordinator" to oversee all activities, to facilitate communications among different agencies, and to serve as mediator in cases of conflict. The exact organizational structure should fit into the existing governmental structure as easily as possible.

Financing the Plan

Many communities may need outside financial support to prepare their energy plans. Some Federal aid is available. Planning funds, under the Urban Mass Transportation Act of 1964, as amended, and the Federal-Aid Highway Program may be used to prepare transportation energy contingency plans. Federal funds may also be used in implementing an energy plan once it has been formulated. MPO's, as the designated recipient, may apply for Federal funds from Section 8 of the Urban Mass Transportation Act of 1964, as amended, and FHWA planning funds for implementation. State funds may be available from Energy or Transportation departments.

LEARNING FROM OTHERS

Many cities have already prepared energy contingency plans. Other communities can learn from their experiences. Table 3 lists the 13 strategies adopted by the Metropolitan Washington Council of Governments together with a lead agency for each strategy, an implementation approach, a potential funding source, and an estimate of the anticipated impact of the strategy.

However, it is not possible to guarantee a prescription for dealing with an energy crisis. The best plan and the best organization can fail in the face of a real situation. The following lessons were learned trying to contend with transportation emergencies that resulted from real disasters.

Grappling with transportation congestion after being inundated by Hurricane Agnes, Wilkes-Barre, Pennsylvania, learned the following lessons:

- The ultimate responsibility for emergency planning, prevention, response, and relief resides within the local community itself.
- Funding of initial transit emergency support should be arranged beforehand to ensure an available delivery service.
- A public information plan is important.
- Flexible Federal support is needed.
- Pre-disaster planning can avoid or simplify identified problems in the areas of:

- Labor.
- Extra buses and support vehicles.
- Fuel supplies.
- The lack of mutual-aid agreements.
- The lack of two-way radio communications.
- Transition back to normal operations.

Los Angeles learned the following lessons from an intense petroleum shortage during the 1973 oil embargo:

- Local governments often must assume leadership under adverse conditions.
- Emergency ordinances should remain as a standby mechanism for future emergencies.
- The public education and information program should be multi-lingual.
- The long-range plan for local growth patterns should be consistent with energy considerations.⁶

⁶ U.S. Department of Transportation, Transportation Energy Contingency Planning: Local Experiences (Washington, D.C.: June 1979).

Table 3

METROPOLITAN WASHINGTON ENERGY CONSERVATION AND MANAGEMENT PLAN
RIDESHARING ACTIVITIES

MEASURES	LEAD AGENCY/ ORGANIZATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE	ANTICIPATED IMPACT
(1) Accelerate areawide ridesharing programs. Within budgetary and manpower limits, step up "Commuter Club" efforts; form standby carpool procedures.	Transportation Planning Board, Board of Trade.	Direct mail and/or personal contact with largest private sector employers; technical assistance to state, local and federal gov't's.; computerized matches to be delivered to employees. Additional funding required to implement.	State transportation agencies; U.S. Dept. of Transportation, Dept. of Energy.	If regional auto occupancy can be raised from 1.2 to 1.3, 48,000 gallons of gas per weekday will be saved. This assumes that 35,000 new carpools composed of former auto drivers will be formed. If regional auto occupancy can only be raised from 1.2 to 1.25, gas savings will be proportionally less.
(2) Establish designated ridesharing "staging areas" and additional fringe parking at Metrorail stations, where approved, after consultation with local gov't's and affected communities.	Local general purpose gov't's; state transportation agencies and TPB.	Free parking permitted on locally-controlled land and at participating shopping centers and other potential sites; lots patrolled and supervised by local personnel who also assist in forming carpools. Expand use of all known fringe parking sites and identify new sites.	State and local gov't's., FHWA.	Benefits subsumed under above measure.
(3) Promote combined trips for non-work travel.	COG/TPB and local gov't's.	Distribution of technical "how-to" information to 800 civic associations and "umbrella" organizations in metro area and other low cost techniques. Additional funds required to prepare and distribute information.	COG/TPB and local gov't's.; U.S. D.O.T., D.O.E.	63,000 gallons per day saved by reducing non-work trips by 5%. 126,000 gallons saved by 10% reduction.

Table 3 (Continued)

METROPOLITAN WASHINGTON ENERGY CONSERVATION AND MANAGEMENT PLAN
TRANSIT-RELATED ACTIVITIES

MEASURE	LEAD AGENCY/ ORGANIZATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE	ANTICIPATED IMPACT
(4) Provide for increased use of mass transit. Initiate Sunday Metro-rail service; put reserve buses into a state of readiness and prepare deployment plan.	WMATA	Reschedule equipment and service for more efficient utilization of transit.	WMATA; State and local govt's.	35,000 gallons per day saved if core-destined work trips on transit increase from 40 to 50%.
(5) Increase supply and use of commuter rail service and private bus service.	C&O, B&O, Conrail, Trailways, Greyhound, other private operators. Possibly encourage AMTRAK participation.	Equipment acquisition and service marketing programs by operators. Additional funds required for implementation.	U.S. D.O.T., State transportation agencies, operators.	No short-range benefits computed, insufficient data.
(6) Create preferential parking spaces for carpools/vanpools at fringe METRO parking lots. Recommend similar policy for implementation by private sector. Support additional fringe parking at Metro-rail stations, such as at New Carrollton and similarly situated stations.	WMATA/private sector employers.	By administrative action under authority of WMATA Board; voluntary private sector cooperation.	N.A.	Savings subsumed under measures 1 and 4, above.

Table 3 (Continued)

METROPOLITAN WASHINGTON ENERGY CONSERVATION AND MANAGEMENT PLAN
WORKPLACE-RELATED ACTIVITIES

MEASURE	LEAD AGENCY/ ORGANIZATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE	ANTICIPATED IMPACT
(7) Adjust building temperatures to levels mandated by the President and D.O.E.	COG/Board of Trade; local general purpose gov't's. and school boards.	Local gov't's. requested to instruct chief administrative officers to strictly control building energy use in locally-controlled buildings; private sector cooperation.	N.A.	36,000 gallons per day from 65°/80° setback, assuming 25% compliance. Savings would be considerably greater with full compliance.
(8) Invoke flexible working hours.	Federal Govt., State and local gov't's., retail trade (large firms), services sector, manufacturing firms.	By actions of public and private sector employers; most appropriately implemented in Central Employment Area.	N.A.	Measure is complementary to measure 4, above.
(9) Invoke commercial parking rates for govt. and private sector employees.	Federal, State, and local gov't's. and private sector employers.	As recommended implementation measure in State Implementation Plan for air quality.	N.A.	No additional savings claimed; measure needed to support 1, 4 and 5, above.
(10) Reduce energy consumption in govt. sector by reducing vehicle use and by improving energy efficiency of building operation.	Federal, State, and local gov't's.	By administrative direction.	N.A.	No specific benefits computed for vehicle fleet mgmt; building temperature savings subsumed under measure 7, above.

Table 3 (Continued)

METROPOLITAN WASHINGTON ENERGY CONSERVATION AND MANAGEMENT PLAN
COMMUNITY ASSISTANCE AND INFORMATION ACTIVITIES

MEASURE	LEAD AGENCY/ ORGANIZATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE	ANTICIPATED IMPACT
(11) Provide citizen information regarding operation hours of service stations.	Area service station owners associations, media, and local govt's.	Voluntary implementation by service station owners associations and media; information to be provided to local govt. energy coordinators and emergency preparedness offices.	N.A.	No savings claimed.
(12) Promote consistent area-wide approach to motor fuel sales restrictions.	Chief Executives of Maryland and Virginia and District of Columbia.	Through Tri-State Energy Emergency Coordination Agreement.	N.A.	No savings claimed.
(13) Assure equitable use of state fuel "set-aside" between competing public and private uses, such as transit, paratransit, operations, and public safety functions.	State petroleum allocation offices.	Through operation of fuel "set-aside" programs by states of Maryland and Virginia and District of Columbia.	N.A.	No savings claimed.

Source: Metropolitan Washington Council of Governments, "Metropolitan Washington Energy Conservation and Management Plan." (see p. 31.)

CHAPTER 2

CONTACTS AND CURRENT PROGRAMS

FEDERAL AGENCIES--U.S. DEPARTMENT OF TRANSPORTATION

Office of the Secretary

- Assistant Secretary for Governmental Affairs
Provides technical information to State and local governments through the Division of Technology Sharing.
Contact: Al Linhares
Director, Office of Technology Sharing (I-40)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-4208

- Office of Intermodal Transportation
Deals with procedures and materials relating to energy policy through its Energy Policy Division.
Contact: Donald J. Igo
Chief, Energy Policy Division (P-13)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0783

- Examines energy use to determine the impact of Federal policy on transit energy decision making through the Transit Energy Conservation and Federal Policy Project.
Contact: Robert D. Nutter
Planning Analysis Division (P-12)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-2916

- Office of Public Affairs
Develops promotional materials on ridesharing, the 55 m.p.h. program, and other energy-related activities.
Contact: Robert M. Beasley
Regional Coordinator (S-88)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-1267

- Office of Environment & Safety
Coordinates policies and programs, conducts research, and promotes information dissemination on bicycle transportation.
Contact: Eugene Lehr
Chief, Environmental Coordination Division (P-23)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-4366

Federal Highway Administration

- Associate Administrator for Planning
Provides direction for the FHWA policy statement and contingency plan through the FHWA Energy Council Project.
Contact: Richard B. Robertson
Associate Administrator for Planning and Policy Development
(HPL-1)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0585
- Office of Engineering
Develops design and construction standards for bicycle facilities, administers the Bikeway Demonstration Program, and provides information on the design and funding of bicycle facilities.
Contact: Jeanette Kloos
Landscape Branch (HNG-22)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0314
- Office of Environmental Policy
Concerned with the relationship between transportation improvements and energy consumption. Assists policy makers in developing plans.
Contact: Donald J. Emerson
Environmental Quality Branch (HEV-22)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-1033

Provides an exchange of information on state of the art through the Workshop on Energy Requirements for Transportation Systems Project.

Contact: Larry Isaacson
Chief, Environmental Quality Branch (HEV-22)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-9173

- Office of Highway Planning
Provides, through the Ridesharing Branch, general information on pooling approaches that have been used and funding sources that are available:
Contact: Barbara K. Reichart
Chief, Ridesharing Branch (HHP-33)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0210

General ridesharing and publication information is available toll-free on the Ridesharing Hotline:
(800) 424-9184

- Provides, through the Transportation System Management Branch, information on TSM techniques and methods such as preferential and exclusive lanes for high occupancy vehicles, parking policies, and staggered work hours; also reports on energy contingency planning with recommendations for appropriate policy actions through the Transportation Energy Contingency Planning Project.
Contact: Gary E. Maring
Chief, Transportation System Management Branch (HHP-32)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0210
- Provides basic background material on the energy situation for policymakers through the Energy Considerations in Transportation Planning Project.
Contact: Bruce E. Cannon
Chief, Planning and Programming Branch (HHP-15)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-1045
- Performs analysis on Energy Considerations in the Urban Transportation Planning Process.
Contact: Fred Van Antwerp
Community & Environmental Planning Branch (HHP-23)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0215
- Analyzes alternative national energy supply policies through the Interaction Between National Energy Supply and Transportation-Related Energy Consumption Project.
Contact: Louise Skinner
Technical Support Branch (HHP-22)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0182

- Office of Research
Conducts studies and disseminates information related to bicycling, pedestrian, and moped use.
Contact: John Fegan
Socio-Economic & Environmental Design
Group (HRS-41)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-9710

National Highway Traffic Safety Administration

- Office of State Vehicle Programs
Provides information on improving the fuel economy of vehicles through inspection, maintenance, and repair programs.
Contact: Joseph J. Innes
Chief, Engineering and Demonstrations
Division (NTS-31)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-1597
- Office of Automotive Fuel Economy Standards
Provides information on the energy efficiency of new passenger cars and approaches to improving it.
Contact: Dr. Richard Strombotne
Director, Office of Automotive Fuel
Economy Standards (NRM-20)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0846
- Office of Driver & Pedestrian Research
Provides information on driver education approaches to energy efficient operation of passenger vehicles and bicycles.
Contact: John W. Eberhard
Driver/Vehicle Systems Division (NRD-41)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-4892
- Office of Driver and Pedestrian Programs
Sponsors demonstration projects, conducts workshops and conferences, and provides technical assistance on bicycle and pedestrian safety.
Contact: Lawrence Pavlinski
Driver and Pedestrian Education Division (NTS-141)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-2180

Urban Mass Transportation Administration

- Office of Planning Assistance
Administers the Planning Grant Program and conducts special energy planning research studies. Has conducted Energy Contingency Planning Prototype Studies and a series of Energy Contingency Planning Workshops to assist local governments in developing contingency strategies.
Contact: Richard P. Steinmann
Community Planner (UPM-13)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 422-5140

- Office of Policy Research
Studies policy implications of energy use by selected commuter modes. Provides procedures and recommendations for conducting alternatives analysis and for evaluating urban transportation plans.
Contact: Philip G. Hughes
Director, Office of Policy Research (UPP-30)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-0080

- Office of Service and Methods Demonstrations
Sponsors demonstrations of methods and services that can improve the quality of transit and paratransit services.
Contact: Ronald J. Fisher
Director (UPM-30)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-4995

- Office of Technology Development & Deployment
Conducts research on advanced transit vehicles and concepts.
Contact: Henry Nejako
Executive Assistant to the Administrator,
Technology Development and Deployment (UTD-5)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-4052

- Office of Transportation Management
Supports good management practices and operating efficiencies.
Contact: Brian J. Cudahy
Director (UPM-40)
400-7th Street, S.W.
Washington, D.C. 20590
(202) 426-9274

U.S. DEPARTMENT OF ENERGY

- Economic Regulatory Administration offers a hot line service for transit agencies seeking supplies of fuel.
Contact: Esther Reed
Hotline Supervisor
(800) 424-9246
- Office of Transportation Programs conducts research on the energy efficiency of different vehicles and transportation services.
Contact: Richard T. Alpaugh
Conservation and Solar Energy
1000 Independence Ave., S.W.
Washington, D.C. 20585
(202) 252-8012

LOCAL AGENCIES

- Kansas City, Missouri
Transportation Energy Contingency Plan
The Mid-America Regional Council prepared this interim plan in response to a motor fuel shortage in the Kansas City area. It is part of a larger energy contingency project funded by the Urban Mass Transportation Administration.
Contact: Lucinda S. Kemper
Mid-America Regional Council
20 W. 9th Street
Kansas City, MO 64195
(816) 474-4240
- Los Angeles, California
Energy Shortage Contingency Plan
The Southern California Rapid Transit District, a regional transit agency, has prepared a contingency plan for its bus operation in the event that a fuel shortage of crisis proportions significantly restricts automobile mobility.
Contact: Paul C. Taylor
Southern California Rapid Transit District
425 S. Main Street
Los Angeles, CA 90013
(213) 972-6170

For the city perspective.

Contact: Julie Sgarzi
Director of Research
Mayor's Office
City of Los Angeles
200 N. Spring Street
Los Angeles, CA 90012
(213) 485-4438

- Memphis, Tennessee
Petroleum Shortage Contingency Plan
 The Memphis Area Transit Authority has prepared a contingency plan in case of a serious petroleum shortage. The plan defines the general transportation options available in an emergency situation as well as transit and paratransit options. It also discusses the application of the energy conservation strategies. System capacity is identified, potential fuel savings are estimated, and specific actions to be undertaken by the various Transit Authority operating departments are outlined.
Contact: Kerry D. Roby
 Memphis Area Transit Authority
 P.O. Box 122
 701 N. Main Street
 Memphis, TN 38107
 (901) 528-2893

- Metro-Dade County, Florida
 The Metropolitan Planning Organization for the Miami Urbanized Area has prepared a Contingency Action Plan for Transportation Energy Conservation. This plan contains a number of gasoline conservation measures for implementation during different types of fuel shortages. Impacts of each measure are estimated and responsibilities for implementation are discussed.
Contact: John A. Dyer
 Chairman, Transportation Planning Council
 Metropolitan Planning Organization for
 the Miami Urbanized Area
 44 West Flagler Street, 11th Floor
 Miami, FL 33130
 (305) 579-5675

Fuel Management Program

Dade County developed a separate fuel management program that involves the rationing of fuel according to priority of use and level of fuel supplies available. The five phases of plan implementation address five levels of fuel availability from normal to critical.

Contact: Daniel Alvarez
 Energy Coordinator
 Dade County
 140 W. Flagler Street, Suite 1603
 Miami, FL 33130
 (305) 579-5275

- Minneapolis-St. Paul, Minnesota
 The Metropolitan Transit Commission for the Twin Cities Area has prepared a Contingency Plan for Transit and Paratransit Expansion during Petroleum Emergencies. This plan presents contingency options based on the severity of a petroleum shortage and its duration. Possible actions are presented, analyzed, and ranked, and a specific set of actions is recommended.

Contact: Metropolitan Transit Commission
for the Twin Cities Area
300 Metro Square Building
7th and Robert Streets
St. Paul, MN 55101
(612) 291-6359

- Nashville, Tennessee
Petroleum Shortage Contingency Plan
The Metropolitan Transit Authority has developed a contingency plan, which lists some conditions that might lead to petroleum shortages; discusses the major transit and paratransit options available to mitigate the effects of a major fuel shortage; considers transit-related options available to major employers and local decision makers; identifies the reserve capacity of the existing system; estimates fuel savings that could be realized; and defines a specific course of action for the Metropolitan Transit Authority.
Contact: Mike Harbour
Metropolitan Transportation Authority
60 Peabody Street
Nashville, TN 37210
(615) 242-1622
- New York City
The Bureau of Planning and Research of the New York City Department of Transportation prepared an analysis of the 1980 transit strike. This report describes measures used to bring six million persons to their jobs during the 11 day transit strike, and evaluates the result (see summary in Appendix A, p. 41).
Contact: Samuel I. Schwartz, P.E.
Division of Plans and Programs
New York City Department of Transportation
40 Worth Street
New York, NY 10013
(212) 566-2980

North Central Texas Council of Governments
A Metropolitan Transportation Plan for National Energy Contingencies.

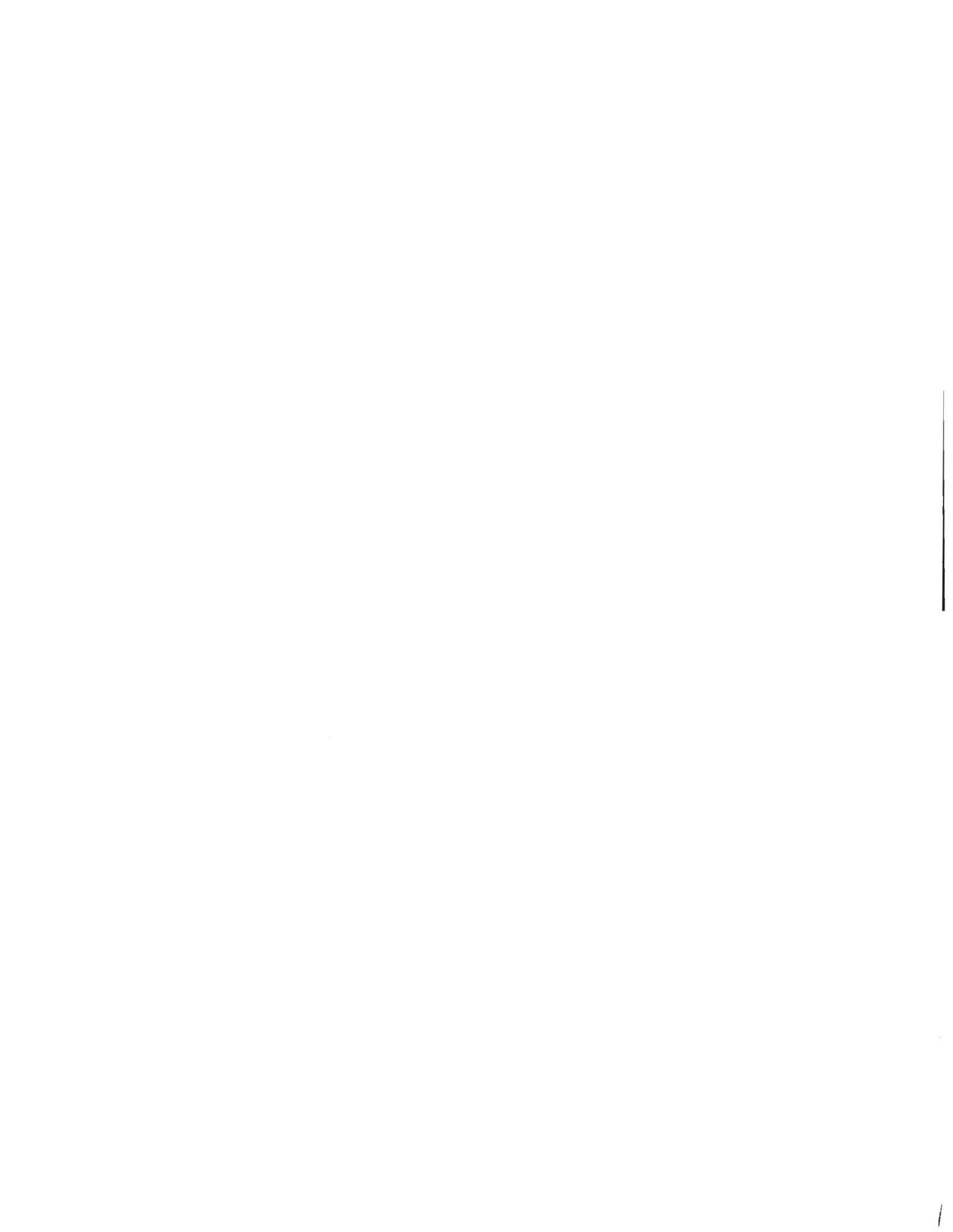
The North Central Texas Council of Governments has developed a program to maintain the mobility of the regions' workers in the event of restricted local fuel supplies. Problems created by fuel shortages are identified and analyzed, implementation considerations are discussed, and strategies are recommended for dealing with a crisis.

Contact: William G. Barker
North Central Texas Council of Governments
360 Place
P.O. Drawer COG
Arlington, TX 76011
(817) 640-3300

- St. Louis, Missouri
Transportation Energy Contingency Plan
 The East-West Gateway Coordinating Council has developed an energy contingency plan for ground transportation in the St. Louis region. It recommends actions to assure that travel to work can be maintained. The plan is a reference source for planners engaged in short term energy supply problems. Recommendations and strategies are discussed and analyzed for dealing with several levels of energy shortages.
Contact: James Bogart
 East-West Gateway Coordinating Council
 The St. Louis Area Council of Governments
 Pierce Building
 Suite 1200
 112 N. 4th Street
 St. Louis, MO 63102
 (314) 421-4220

- Seattle, Washington
An Energy Crisis Contingency Plan
 The Municipality of Metropolitan Seattle is updating a 1975 Energy Crisis Contingency Plan. The plan discusses how to get the transit system to do more during an energy crisis, including how to serve areas not normally served by the transit system. The cost of implementing the plan is included along with a discussion of what to do if not enough fuel is available even for the transit system.
Contact: Jackie Dewey
 Metro Transit
 821 2nd Avenue
 Seattle, WA 98104
 (206) 447-6768

- Washington D.C. Metropolitan Area
Metropolitan Washington Energy Conservation and Management Plan
 The Metropolitan Council of Governments has developed 13 energy conservation and community assistance measures for dealing with petroleum shortfalls within the Metropolitan Washington D.C. Area. The Council has recommended these measures to its constituent jurisdictions as an attempt to conserve 8 to 13% of average daily gasoline consumption.
Contact: Council of Governments
 Information Center
 1875 Eye Street, N.W.
 Washington, D.C. 20006
 (202) 223-6800



CHAPTER 3

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APPENDIX A

THE 1980 NEW YORK CITY TRANSIT STRIKE-- TRANSPORTATION IMPACTS AND EVALUATION

SUMMARY

During the transit strike, the City had the task of moving by other means 6.2 million people who normally travel by subway and bus. The task was accomplished by advance planning that included certain extraordinary measures, such as deployment of thousands of Police Officers and Traffic Agents, restrictions on vehicle occupancy, lane reversals on river crossings, and maintenance of emergency routes and provisions for bicyclists and pedestrians. The following is an outline of just how people did get to work.

HOW PEOPLE ENTERED THE CENTRAL BUSINESS DISTRICT (C.B.D.)--MANHATTAN SOUTH OF 60TH STREET

- Normally 1.36 million people enter the business district between 7 and 10 A.M. each day. During the strike, 1.06 million people entered from 7 to 10 A.M., with an additional 130,000 entering prior to 7 A.M. or later than 10 A.M.
- The greatest number of people entered in motor vehicles (45%).
- Remaining Public Transit services (Railroads, PATH, Private, Charter, and New Jersey Buses, S.I. Ferry) handled nearly 40%.
- Approximately 10% of the people walked or biked to the C.B.D. Normally 4,000 persons use bikes between 7 and 10 A.M., with approximately 25,000 more entering during other hours. Pedestrian volumes went up from 3,000 to 65,000.
- Six percent of workers in the C.B.D. temporarily changed their residence during the strike.
- Approximately 12,000 persons entered each morning by private boat, accounting for about 1% of total entries.
- Employee attendance in the C.B.D. hovered close to the 90% level. The normal level is approximately 93%. By the second week of the 1966 strike, attendance levels reached 84%. The level of attendance was exceeded by day two of the 1980 strike. Attendance outside the C.B.D. was approximately normal.

Source: Bureau of Planning and Research, New York City Department of Transportation

TRAVEL PATTERNS TO AND IN THE C.B.D.

- Between 4 A.M. and 10 A.M., an average of 236,000 vehicles entered the C.B.D. as compared to a normal flow of 188,000, an increase of 26%. The bulk of the increase occurred between 4 A.M. and 7 A.M.
- The accumulation of vehicles in the C.B.D. (the most accurate measure of the potential for over saturation or grid-lock) reached a peak of 219,000 between Noon and 4 P.M. Controls on vehicle entries were exercised in order to keep this figure from climbing. Normal peak accumulation is approximately 175,000; during the 1966 strike peaks approaching 260,000 vehicles were recorded.
- The average occupancy of autos heading toward the C.B.D. was approximately 3.2 as compared to 1.5 normally. During the 1966 strike, the occupancy rate was only 2.2. Had no carpool restrictions been instituted and 1966 occupancy rates prevailed, a potential 60,000 additional motorists would have attempted to enter between 7 and 10 A.M.
- The percentage of vehicles with a single occupant dropped from a normal rate of 60% to 4% on the priority roadways (those roadways with the three or more passengers per car restriction).
- The carpooling restrictions on entries and on priority roadways created, in effect, a new transportation system. Persons wishing to ride to the C.B.D. quickly learned that by standing near an entrance to a priority roadway or at the 96th Street screenline, they would find motorists in search of riders.
- Travel speeds on priority roadways to the C.B.D. were actually higher than normal (up to 40%). In fact, on one morning, the Long Island Expressway, traditionally the barometer of traffic congestion, received an unprecedented "A" rating from traffic engineers, indicating free flow conditions.
- Non-priority roadways to the C.B.D. did not fare as well. Occasionally delays became severe adding up to 1-1/2 hours to travel times. It is clear that by carpooling and using the priority roadways motorists saved a significant amount of time.
- Travel speeds within the C.B.D. varied greatly by time of day, day, and location. Traffic on reserved arterials (restricted to buses, taxis and emergency vehicles) moved within the normal range. Travel times on these routes were relatively consistent. Travel times on other routes, however, were not consistent, with substantial delays at times.

- Congestion levels in general were not that much greater than those on normal days. Midday traffic conditions, however, were much heavier than normal. The midday problem occurred consistently during the strike and arose due to the fact that the exodus of motor vehicles from Manhattan coincided with the peak accumulation of vehicles. This created numerous conflicts during midday. Normally, the peak accumulation of vehicles occurs at approximately 2 P.M., with a peak exodus at 5 P.M.

SUMMARY CONCLUSION

It is clear that the plan had a major impact on minimizing congestion and on maintaining essential services. The thousands of Police Officers and Traffic Enforcement Agents were the key ingredients to the success of the plan. Major difficulties for individuals existed throughout the strike. There is no way to measure the impact on those individuals who could not get to work at all or the physical pain and, in some cases, injuries experienced by those who had to struggle to get to work.

Some days were rougher than others. The City appeared to be tested on the ninth day with a record-breaking thunderstorm and high winds on a matinee day, a return to school day, and thousands of Easter week tourists. Localized "locking" of portions of the street system occurred. The agents and officers wrestled with the traffic and kept the City moving.

The events of April 1st through the 11th were a traffic engineering marvel--8,000,000 people made it so.

EPILOGUE

- Preliminary surveys show drivers returning to their old habits. Average vehicle occupancies are down to pre-strike level. Traffic volumes also resemble those of the weeks preceding the strike.
- Usage of the bikelanes and bridges with bicycle access has approximately doubled. However, 90% of the bikers have switched from mass transit.
- Surprisingly, ferry passenger volumes are up by approximately 20%.
- Improvements for cyclists, pedestrians, and motorists at the Brooklyn Bridge will be kept, although modifications may be made as they are made permanent. In addition, the traffic engineering modification at the West Street entrance to the Battery Tunnel has been made permanent.
- A report is being prepared on a comprehensive program of measures to be followed as a result of the strike.

- The usage of selected limited access arterials was restricted to vehicles with three or more passengers during the morning peak hours.
- An extended peak period "No Standing" regulation was installed on major arterial roadways radiating to and from Manhattan.

PARKING

Although the public was urged to make use of the remaining public transportation services, the private passenger vehicle was a major transportation option. A number of measures were taken to provide added parking locations:

- Carpool staging areas were established in each of the five boroughs. Motorists could drive to convenient areas and organize impromptu carpools or use other transportation (bus, bicycle, ferry).
- Alternate side of the street parking regulations were suspended.
- Additional parking areas throughout the City were provided and identified.

OTHER TRANSPORTATION MEASURES

For the duration of the transit strike, the following measures were also imposed:

- All vehicles were prohibited from the Staten Island Ferry between the hours of 7 A.M. and 7 P.M.
- Group riding in taxicabs was authorized.
- All non-emergency road repair work and street excavation was curtailed.
- Employers were encouraged to make provisions for bicycle storage in their offices.
- Increased gasoline allocation to the metropolitan region was arranged.
- Participation in a staggered work hours program was encouraged.
- Two trucks were pre-deployed to critical locations to remove road hazards and prevent undue congestion.

APPENDIX B

SUMMARIES OF TRANSPORTATION ENERGY CONTINGENCY PLANS

KEY ISSUE	CONTINGENCY PLAN REVIEWED			
	North Central Texas Council of Governments Dallas/Ft. Worth, TX	Southern California Rapid Transit District Los Angeles, CA	Municipality of Metropolitan Seattle Seattle, WA	Metropolitan Transit Commission Minneapolis/St. Paul, MN
Maximum Utilization of Existing Transit Capacity - fill vacant seats, run longer peaks	Capacities available on some lines in Dallas (Avg. 10% un-filled seats), Ft. Worth (15%) Reduce service standards - standees tolerated	Increase of 10% on main routes, 75% on policy headway routes could lead to 35% increase in patronage.	About 4000 additional riders (5%) could be accommodated	Adjust schedules, add turnbacks
Flextime, Variable Hours, Four Day Work Week	Flexible hours adds 10% to ridership in Dallas, 15% in Ft. Worth and should be encouraged.	Four-day work week would be ineffective in reducing travel; staggered and Flexible hours recommended.	Flextime recommended, major employers identified, 3100 riders possible (5%).	Variable Hours recommended; generally including flextime, staggered hours, 4-day week.
Expand Transit Fleet . stockpile old buses: where to store, how to return to service . use school, church buses: regulatory restrictions, vehicles . use charter buses for subscription, reg. route, non-work trips	Dallas needs 40 buses to handle over 30% increase in ridership, Ft. Worth needs none to handle 40%. Stockpiling not recommended. ----- 1500 church-owned buses, 1000 school buses; Texas law forbids school bus use; study further. ----- Obtain buses from SURTRAN (Airport access operator), reduce transit operator chartering-out	Recommended stockpile of 375 buses in sound mechanical condition; as new vehicles obtained, locate additional storage facilities. ----- 5400 school buses in region, but not recommended ----- Contract for additional off-peak service in over-capacity areas during severe shortage	Possibility of retaining replaced buses to be explored ----- 818 school buses available, but insurance and school schedules are problems. Study further. ----- Availability of rental vehicles held unlikely	Maintain 100 bus standby fleet (10%) ----- In serious shortage, could use school buses for feeder ----- Not considered
Add Additional Service - on new routes, shorter headways, double heading	Exploration of use of school buses, altering State law in suburban areas. Recommends law change.	300 buses stockpiled used to reduce peak hour headways on existing route-adds 5% to ridership. Severe crisis-operate peak hour level all day	Run any additional vehicles (school buses, stockpiled, added fleet) on existing routes	Adjust schedules, possible turnbacks, double heading, reduce deadheading, (layover at downtown, linking of trips)

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Source: U.S. DOT. Urban Mass Transportation Administration, Transportation Energy Contingency Planning: Local Experiences, Washington, D.C.: GPO, June 1979.

KEY ISSUE	CONTINGENCY PLAN REVIEWED	
	Metropolitan Washington Council of Governments Washington, D.C.	Memphis Area Transit Authority Memphis, TN
Maximum Utilization of Existing Transit Capacity - fill vacant seats, run longer peaks	Significant increases in peak period core-destined trips made by transit would overload the transit system, especially during the peak hour.	Current operation at 80% of capacity during one hour peak.
Flextime, Variable Hours, Four Day Work Week	Variable hours recommended with the Federal Government taking the lead. Staggering work hours is the only short-term way to increase Metrorail capacity.	Variable hours recommended, although effect would be less significant than other measures; major employers and present work shifts identified.
Expand Transit Fleet .stockpile old buses: where to store, how to return to service .use school, church buses; regulatory restriction, vehicles .use charter buses for subscription, reg. route, non-work trips	Delay retirement of 178 old buses, rehabilitation of 30 out-of-service buses, expansion of a storage facility, no disposal of aged buses without authorization. ----- Coordinate school hours to possibly make school buses available ----- Not considered	Current level (300 buses) can adequately service Memphis system during peak hour in crisis, allowing a 5% spare ratio ----- School buses could be used for service, but would receive low priority even in a severe shortage ----- Contract with public/private carriers to provide feeder service to main lines
Add Additional Service - on new routes, shorter headways, double heading	Use old buses and lower spare ratio to increase service during peak periods along present routes (financial and time start-up considerations prevent initiation of new service). Begin Sunday Metrorail service.	Monitor ridership to determine schedule adjustment, use double-heading, develop additional park and ride, additional reverse commuter routes

KEY ISSUE	CONTINGENCY PLAN REVIEWED			
	North Central Texas Council of Governments Dallas/Ft. Worth, TX	Southern California Rapid Transit District Los Angeles, CA	Municipality of Metropolitan Seattle Seattle, WA	Metropolitan Transit Commission Minneapolis, St. Paul, MN
Provide Additional Personnel - drivers, maintenance - training - 13(c), contracts	Not explicitly considered	Need 7% (300) more drivers. Training needed. In severe crisis need 37% (1600) more. Need 6 months to train.	Not explicitly considered	Plans for driver, maintenance personnel training to be developed. 8 weeks to train driver.
Provide for Additional Maintenance - altered maintenance schedules - handling breakdowns - personnel needs	Altering maintenance schedule could add 10% (Dallas), 20% (Ft. Worth) to capacity - recommended	Maintenance provided by overtime, may need new personnel (about 20%), 50% in severe crisis	10% more buses possible by adding 10-15 (10%) more mechanics and using swing shift or jobbing out maintenance	Standby fleet needs garaging in emergency (cold weather)
Role of Transit for Non-Work Trips - off peak service for shop, social-rec. trips - tourism trips	Not explicitly considered	Assumes some non-work trips would be foregone, but proposes addition of off-peak service	Not explicitly considered	Reduce certain shoppers service
Subscription Service (Buspools) - role of operator; trade-off of new service vs. more runs to old routes	Plan implies focus on serving existing routes by operator, leaves subscription services to private sector	Not considered	Potential for service to Duwamish Valley (Boeing) if vehicles are available	Expand "Total Commuter Service" with buspools if vehicles available
Storage of Fuel - standby sources - backup for allocation - borrow/lend to others	Increase storage capacity of Dallas Transit to 30 days. Maintain CITRAN capacity at 30 days	Expand capacity at all garages to 10 days supply; only one has this capacity now.	Not considered	Not considered

KEY ISSUE	CONTINGENCY PLAN REVIEWED	
	Metropolitan Washington Council of Government Washington, D.C.	Memphis Area Transit Authority Memphis, TN
Provide Additional Personnel - drivers, maintenance - training - 13(c), contracts	Recruitment and training of new personnel could take up to 3 months; up to 313 operators and 99 maintenance personnel needed	Minimum of 6 weeks necessary to train new drivers.
Provide for Additional Maintenance - altered maintenance schedules - handling of breakdowns - personnel needs	Most buses to be retained in service require rehabilitation, a storage facility is under expansion.	Expand to two full shifts, would require more personnel; increase preventative maintenance.
Role of Transit for Non-Work Trips - off peak service for shop, social-rec. trips - tourism trips	Begin Sunday Metrorail Service.	Improve midday service, reverse commuting routes could promote transit use for suburban shopping; lower off-peak fares.
Subscription Service (Buspools) - role of operator; trade-off of new service vs. more runs to old routes	Not considered	Subscription and charter buses suggested, low spare ratio (5%) could hinder the use of Memphis transit buses.
Storage of Fuel - standby sources - backup for allocation - borrow/lend to others	Capacity for storage to be doubled; an additional fuel distribution truck is on order.	Tennessee Energy Authority assures public transportation agencies a minimum of 100% of previous year's allocation, plus has procedures for additional allocations.

KEY ISSUE	CONTINGENCY PLAN REVIEWED			
	North Central Texas Council of Governments Dallas/Ft. Worth, TX	Southern California Rapid Transit District Los Angeles, CA	Municipality of Metropolitan Seattle Seattle, WA	Metropolitan Transit Commission Minneapolis/St. Paul, MN
Getting Transit Personnel to Work - carpool, vanpool - special operator-provided service	Not considered	Organize carpools, may need to have operator use its gas to help with carpools.	Not considered	Not considered
Funding Increased Service - cost of changes - fare change (raise) (reduce) - revenue, fund sources	Peak period surcharge (to spread load rather than for revenue) considered.	No fare change, assumes revenue could fund part of increased cost, no other sources. Work with State and Federal governments to provide a fair share of transit funds.	Filling empty seats gains \$1.0 m/yr. Obtaining additional buses cost \$300K. Running additional service costs \$1.6 m, gains \$400K. Subscription service costs \$2.1 m., gains \$525K. Peak hour surcharge possible, other sources not considered.	Peak period surcharge; cost for strategies totals to \$2.4 m/yr. for 10% gas shortage, \$3.0 m for 20%, \$7.2 m for severe (30%). General revenue source not identified.
Information/Monitoring/Interagency Coordination - ensuring cooperation - understanding situation - transit route, service information - pooling information	Designate local energy coordinator at local governments. Draft contingency agreements. Ensure inter-governmental dialogue.	Establish 24-hour transit information service, work with CALTRANS to develop regionwide transit plans.	Monitor situation by route/review counts. Develop/implement general public information program. Possible additional personnel in information service.	Establish energy! emergency information centers for consumer information. Monitor route ridership. Expanded marketing.
Meet Transit Fuel Short fall by Reducing Service - off peak, nights weekends, - eliminate routes - longer headways - skip stop, express service - reduce deadheading	If fuel supply for transit is curtailed, alternatives considered include: eliminate night service, eliminate weekend service, eliminate midday service, increase headways (10-20%), reduce bus stops (20-50%), express service, decrease deadheading by providing storage for 237 buses in downtown Dallas, 45 downtown Ft. Worth.	Cut back service, develop pricing options	- Alter routes (shuttle to routes for transfers). Eliminate mid-day expresses, extend headways, eliminate routes, provide peak hour only service on routes (7%) - Reduce midday, evening service to zero; Sunday, Saturday service (33% reduction) - Run trolley-bus service only (100%).	Supply shortage not addressed but actions recommended to save fuel include: increased turnback operations, reduced deadheading, skip stops, reduced shopper service.

KEY ISSUE	CONTINGENCY PLAN REVIEWED	
Metropolitan Washington Council of Governments Washington, D.C.	Memphis Area Transit Authority Memphis, TN	
Getting Transit Personnel to Work - carpool, vanpool - special operator- provided service	Not considered	Not considered
Funding Increased Service - cost of changes - fare change (raise) (reduce) - revenue, fund sources	Initial expense of bus rehabilitation and personnel training is \$2.9 million ;which would not be offset by revenue. Operating subsidy increase due to fleet expansion for 1980 FY in \$5.3 million.	A differential rate structure (peak vs. non-peak) is considered (to increase non-peak period usage rather than for revenue).
Information/Monitoring/ Interagency Coordination - ensuring cooperation - understanding situation - transit route, service information - pooling information	Encourage use of commuter rail and private buses, establish information services for transit operations, ride-sharing, transportation options, and gasoline availability; coordinate with existing agency programs; monitor revenue and ridership.	Define key departments in the Authority and their roles during a crisis, establish emergency transportation information centers, monitor route ridership, expand marketing.
Meet Transit Fuel Short fall by Reducing Service - off peak, nights, weekends, - eliminate routes - longer headways - skip stop, express service - reduce deadheading	Work with officials to assure adequate allocations, utilize state reserves, evaluate conversion to Diesel #2 fuel, initiate energy conservation measures for Metrobus, Metro-rail, and associated buildings.	State energy policy assures little or no shortfall, fuel can be conserved by increasing turnback routes and commuting routes, reduced dead-heading, skip stops, preferential treatment, using shared ride taxi for night service.

KEY ISSUE	CONTINGENCY PLAN REVIEWED			
	North Central Texas Council of Governments Dallas/Ft. Worth, TX	Southern California Rapid Transit District Los Angeles, CA	Municipality of Metropolitan Seattle Seattle, WA	Metropolitan Transit Commission Minneapolis/St. Paul, MN
Ridesharing - buspool - vanpool - carpool - expanded matching - employer-based actions	Maintain existing matching programs	Maintain present program, arrange for more Commuter-Computer capacity to handle emergency ride matching; dial-a-ride not recommended as an energy saver.	Maintain existing "Commuter Pool" Program (City). Buspools possible if vehicles can be made available.	Expand "Total Commuter Service" by operator.
Park-and-Ride - temporary gravel lots - shopping center	Detailed plan for region to be developed as recommended	Park and Ride stations along freeways, especially in Long Beach and Orange County; greatly increase Park and Ride bus service	Not considered	Use of shopping center, churches, public facilities.
HOV Lanes - carpools, bus lanes - signalization, ramps - use of existing HOV - new lanes - restudy rejected lanes	Potential bus lanes on 37 miles of freeway, 44 miles of arterial in Dallas, 35 miles Freeway, 15 miles arterial Ft. Worth Possible priority ramps; future development recommended	Long term programs include ramp metering and exclusive HOV lanes on Freeways.	Not considered	Unspecified potential bus lanes in downtowns and outlying freeways and arterials.
Other TSM Actions - signal retiming - parking management	Considered in proposal for HOV prioritization	General TSM program reiterated	Not considered	Institute skip stop operation. Use of St. Paul emergency vehicle priority-system by buses. Preferential parking for HOV's.
Use of Taxicabs - route taxi - taxipool - feed fixed route transit	Options considered include route taxi. Further study recommended.	Route taxis could absorb some extra demand, could serve park and ride lots to take overflows.	Taxipools possible, but existing regulations now forbid out-of-area pickups. Study of possibilities recommended.	Use of Taxicabs for shared ride feeder service. Use taxis for shared ride night-time service.

KEY ISSUE	CONTINGENCY PLAN REVIEWED	
	Metropolitan Washington Council of Governments Washington, D.C.	Memphis Area Transit Authority Memphis, TN
Ridesharing - buspool - vanpool - carpool - expanded matching - employer-based actions	Maintain and coordinate with present ridesharing staging areas, give preference to HOV's at fringe parking lots (include Metrorail lots)	Maintain present carpooling incentives; establish a carpooling and ridesharing program; use shared-ride vehicles for feeder and night service
Park-and-Ride - temporary gravel lots - shopping center	Expand present park-and-ride lots; use present shopping center lots.	Additional use of churches, shopping centers, schools, and other public facilities.
HOV Lanes - carpools, bus lanes - signalization, ramps - use of existing HOV - new lanes - restudy rejected lanes	Bus lanes, especially near Metrorail stations.	Additional priority measures are under study.
Other TSM Actions - signal retiming - parking management	Discontinue parking subsidies for government employees.	Signal retiming and preemption under study; preferential parking for HOV's.
Use of Taxicabs - route taxi - taxipool - feed fixed route transit	Not considered	Shared-ride taxis suggested for night service and as feeder service to main lines.